
Market Participants Group on Reforming Interest Rate Benchmarks

Final Report

March 2014

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Cross Currency Summary

March 2014

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Executive Summary

Introduction

At its June 2013 Plenary, the Financial Stability Board (FSB) established the Official Sector Steering Group (OSSG) to coordinate the reviews of widely used interest rate benchmarks. The OSSG established and guided the work of the Market Participants Group (MPG), which was tasked with identifying feasible and viable alternative reference rates and recommending potential transition paths.

The necessity of this work is explained in the introduction to the FSB's 29th August 2013 progress report to G20 Finance Ministers and Central Bank Governors:¹

'The cases of attempted market manipulation and false reporting of global reference rates, together with the post-crisis decline in liquidity in interbank unsecured deposit markets, have undermined confidence in the reliability and robustness of existing interbank benchmark interest rates. As is well understood, however, without liquidity in unsecured interbank markets, the price discovery process in those markets will remain vulnerable, thus affecting the credibility and reliability of the benchmarks that draw on them. The official sector has an essential role to play in ensuring that widely - used benchmarks are held to appropriate standards of governance, transparency and reliability. The measures proposed by national regulators, international standard setting bodies and central banks - including the Wheatley Review of LIBOR, and reviews by EBA/ESMA, IOSCO, and ECC Governors of reference rates as a whole - to restore the governance and oversight processes of benchmark rates need to be implemented with high priority and urgency.'

This report details the findings and recommendations of the Market Participants Group.

This section (i) briefly presents the tasks set out in the MPG's Terms of Reference and the manner in which the MPG addressed those tasks, (ii) describes the work process taken by the MPG to produce its final report, (iii) explains the structure of the report, and (iv) summarizes the main findings and recommendations of the MPG.

Addressing our Terms of Reference²

The MPG was asked to submit a report that:

- Proposes options for robust reference interest rates that could serve as potential alternatives to existing LIBOR, EURIBOR and TIBOR benchmark rates. The proposed rates should be consistent with IOSCO Principles.³

¹ This report may be found at http://www.financialstabilityboard.org/publications/r_130829f.pdf

² The complete MPG Terms of Reference can be found in [Appendix A](#).

³ This IOSCO principles may be found at <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD409.pdf>

- Proposes strategies for any required transition to alternative reference rates and for dealing with legacy contracts in the national or regional currency. This includes identifying problems that could arise in moving to new benchmark rates, and how these can be addressed.

The members of the MPG represent a wide range of expertise and market experience, covering most of the target markets with both providers and users of relevant financial services. Consistent with its Terms of Reference, the MPG engaged in outreach to a wide range of market participants, and on several occasions turned to external experts to cover specific technical or operational issues. Many of these experts are effectively co-authors of this report. They have signed non-disclosure agreements and have been included in the deliberations of the MPG. [Appendix B](#) contains a list of MPG project participants.

The Terms of Reference do not ask the MPG to judge whether existing legacy benchmark rates (LIBOR, EURIBOR and TIBOR) are likely to be endorsed by regulators as compliant with IOSCO principles, and this report does not deal with this question. Judging this would in any case have been difficult given that methods for fixing these legacy rates were changing as the report was being written. Nonetheless, the MPG identified reference rates based on estimates of term unsecured bank borrowing costs, which might in the future be used as replacement fixing methods for legacy reference rates.

The MPG provided an interim report and draft recommendations to the OSSG on 31 December 2013 and received written feedback from the OSSG on 28 January 2014. This final MPG Report reflects efforts by the MPG to address the feedback received from the OSSG.

Workstream Approach and Structure of the MPG Report

In order to cover the wide range of subjects included in the report across all relevant currencies and jurisdictions, the bulk of the MPG's efforts were managed by six currency-level teams, one for each of USD, EUR, GBP, CHF, JPY and Emerging Markets (EM). The MPG's work was also divided into seven functional workstreams, as described below:

1. Market Footprint Analysis

This workstream was tasked with providing detailed information on the use of interest rate benchmarks across the five currencies (USD, EUR, JPY, GBP, CHF). Key classes of contracts referencing the relevant reference rates were identified and, wherever possible, outstanding volumes were estimated by contract type, maturity, and tenor of reference rate.

2. Reference Rate Menus

This workstream was tasked with recommending alternative reference rates for each of the five currencies, and for each of a list of key tenors for each currency. The output of this workstream includes a menu of recommended alternative reference rates for each currency, along with a discussion of their merits in terms of feasibility and viability.

3. Fixing Methodologies

For each proposed alternative reference rate, this workstream was tasked with ascertaining whether there could be a suitable fixing methodology that is likely to be judged as IOSCO compliant. Where relevant, this workstream examined potential methodologies and their relative robustness.

4. Transitions

This workstream was tasked with examining the possible transition paths from legacy reference rates to the alternative reference rates proposed by the Reference Rate Menu workstream. The workstream was also asked to provide recommendations regarding the timing of any transition, to identify the key risks that may arise from a proposed transition, and to suggest actions that could mitigate these risks. In the larger currency groups (USD, EUR, and GBP), work on this workstream was split into two sub-groups, covering debt products and derivatives, respectively.

5. Legal Analysis

This workstream was tasked with identifying and addressing the potential legal risks that could arise from a transition from legacy reference rates to alternative reference rates, as characterized by the Transitions Workstream. After laying out the relevant legal doctrines, this workstream analysed contracts incorporating standard terms across products and jurisdictions, examined how the terms in question may give rise to contractual continuity challenges in circumstances of benchmark transition, and suggested mitigants that could be applied to minimize legal risk.

6. Outreach to Market Participants

This workstream was tasked with gathering the views of a wide range of market participants regarding their appetite for reference rate reform, the viability of potential alternative reference rates and their concerns regarding transition issues. The workstream gathered information using surveys and bilateral discussions.

7. Impact on Corporates

This workstream was tasked with gathering relevant information regarding the preferences and practices of non-financial corporate end users of reference rates. The workstream collected information through a widely distributed survey and through discussions with market experts and industry associations. The workstream identified the many uses that corporates have for reference rates, in addition to traded financial instruments. The workstream also polled preferences by non-financial corporations regarding the characteristics of alternative rates and the potential impact that any transition away from legacy reference rates may have on corporate users.

The MPG report is structured as seven separate report sections, as illustrated in Figure 1 below.

[Section 1, Cross Currency Summary](#), presents the main findings and recommendations of the MPG across the various workstreams. The report contains nine sub-sections: this executive summary, a summary of findings and recommendations for each of the seven

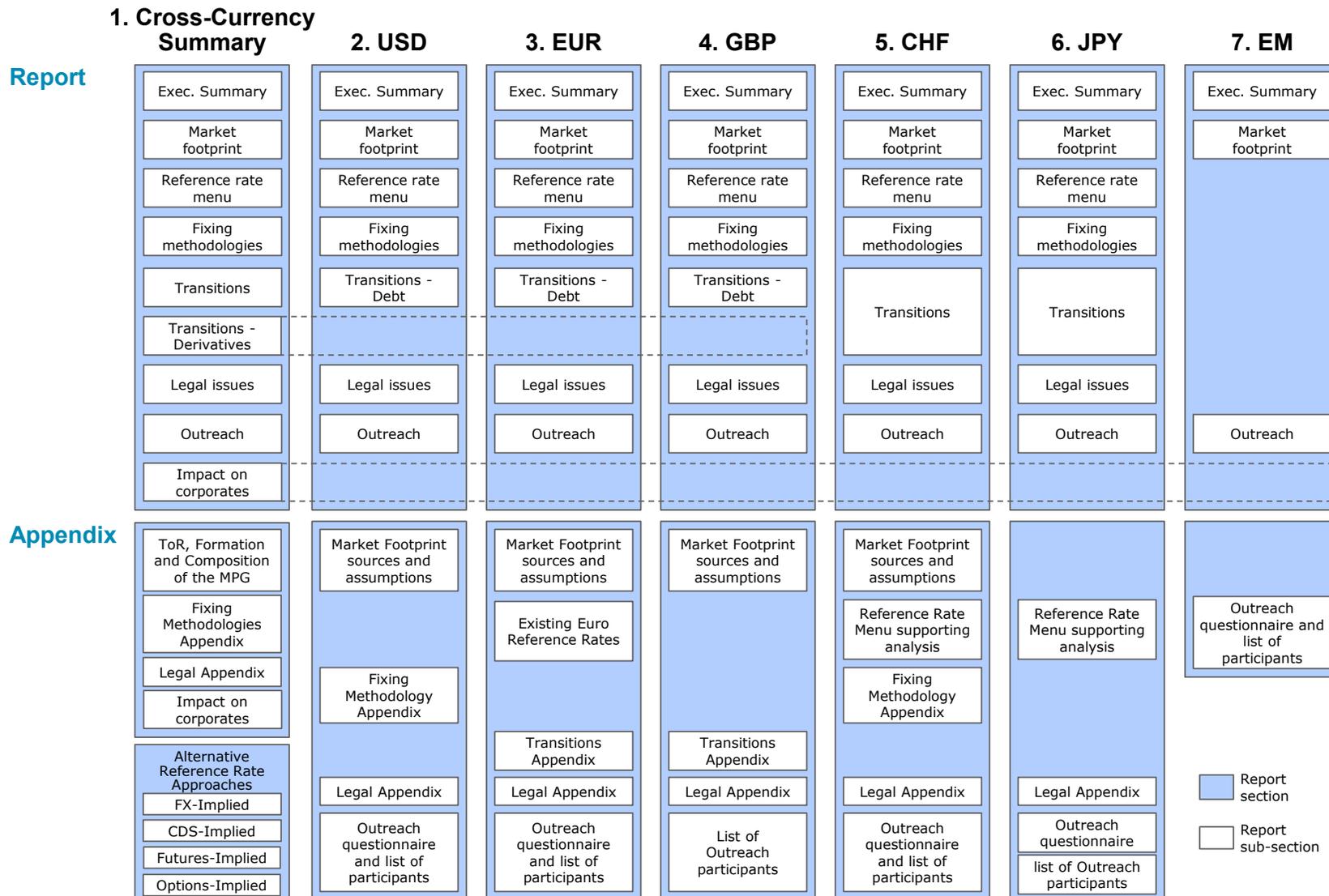
functional workstreams, and an additional sub-section on Transitions that is dedicated to derivatives markets.

Sections 2-6 present the findings associated with each of the respective currencies, [USD](#), [EUR](#), [GBP](#), [CHF](#), and [JPY](#). Each of these currency-level reports contains seven sub-sections: an executive summary and a sub-section for each functional workstream, excluding Impact on Corporates. These report sections provide more detailed findings and recommendations specific to the respective currency and related nationalities and jurisdictions.

[Section 7](#) presents the MPG's findings and recommendations relating to Emerging Markets (EM). This report section contains an executive summary and sub sections on Market Footprint and Outreach to Market Participants

Each report section also contains a number of appendices, shown at the bottom half of Figure 1. These appendices provide background information, additional detail, relevant data, and other findings. In particular, the appendices to the Cross-Currency Report contain a significant amount of additional information that is not fully covered elsewhere in the report, including: [Fixing Methodology for OIS Reference Rates](#), [Alternative Reference Rate Approaches](#), and [Impact of Benchmark Reform on Corporates](#).

Figure 1: Structure of the Interim MPG Report



Summary of Main Findings

The main findings and recommendations of the MPG are summarized below, beginning with alternative reference rates and then turning to transition recommendations.

Alternative Reference Rates

One of our main objectives is to provide a list of recommended alternative reference rates for each of the five currencies (USD, EUR, JPY, GBP, CHF), and for each of a list of key tenors for each currency. For a rate to be recommended under the OSSG Terms of Reference, it must be “feasible,” meaning that it can be given a fixing that is likely to be judged by regulators to be compliant with IOSCO principles, and “viable,” meaning that market participants would in principle adopt it as a useful contractual reference rate, depending in part on what other reference rates are available. When judging feasibility or viability, in some cases we allowed for levels of market activity that are not currently met but that we viewed as reasonably likely to apply under plausible transition scenarios.

Market participants show a preference for access to two general sorts of benchmarks, those including a component for term credit risk, and those that are largely “risk-free”. Market participants also prefer benchmarks that are transparently set and resistant to manipulation. These views can be found in the reports of the workstreams devoted to [Outreach to Market Participants](#) and [Impact of Benchmark Reform on Corporates](#).

Table 1 summarizes the recommended reference rate menus for each currency. In addition to various overnight rates, two types of recommended term rates are common to all menus: unsecured wholesale bank borrowing rates and overnight index swap (OIS) rates. For each OIS rate, Table 1 indicates in parentheses the underlying overnight reference rate.

The rates shown in Table 1 as “IBOR+” are estimates of term interbank borrowing rates that are to be fixed on the basis of interbank loan transactions and other unsecured term borrowing transactions such as commercial paper and wholesale certificates of deposit. Widening the base of transactions in this manner was found to be necessary in order to obtain a volume of transactions that is sufficient to obtain robust estimates of interbank borrowing rates. These alternative rates are further described in the [Reference Rate Menus](#) and [Fixing Methodologies](#) summary reports, and in currency-level sub-stream Reference Rate Menu and Fixing Methodologies reports.

In a few cases, as explained in the respective currency-level Reference Rate Menu sub-stream reports, we currently lack sufficient data to assure that, even after widening the base of transactions in this manner, there will be a volume of transactions that is sufficient for a robust fixing, particularly at tenors beyond 3 months. Given this, we recommend further database and statistical work with the aim of shoring up the quality of fixings of term unsecured bank borrowing rates.

We have recommended a fixing method for OIS term rates that is based on executable quotes available on regulated market trading platforms, as explained in the [Fixing Methodologies summary report](#) and in more detail in [Appendix E](#), which covers fixing methodologies for derivatives. IOSCO principles allow the use of executable quotes as the basis for fixings.

[Appendix G](#) to this report explore a number of alternative fixing methods, or reference rates that rely on liquid related markets, to derive a benchmark rate synthetically or by inference. An example is the use of foreign exchange forward prices and foreign currency interest rates to derive implied domestic currency interest rates. In all cases, these alternative approaches were considered carefully and are not recommended as feasible and viable.

Table 1: Summary Menu of Recommended Reference Rates

| Currency | Overnight | Term |
|--------------------|--|--|
| US Dollar | Interest on excess reserves, Federal Funds Effective Rate, Federal Reserve reverse repurchase facility rate, overnight general collateral rate | LIBOR+, Treasury bill, OIS term rate and OIR compounded overnight rate (FFER or an alternative overnight rate) |
| Euro | EONIA | EURIBOR+, OIS (EONIA) |
| Yen | Uncollateralized overnight call rate (average) | TIBOR+, unsecured interbank money rates, Treasury discount bills, OIS (call rate) |
| Sterling | Bank of England Bank Rate, SONIA | LIBOR+, OIS (SONIA), Bank of England Bank Rate |
| Swiss Franc | SARON, TOIS | LIBOR+, SAR (secured), OIS (TOIS) |

Transition from Reference Rates

A well-constructed and intensively coordinated transition plan will be needed to manage any transition away from key legacy IBOR benchmarks. There would otherwise be significant market disruption. As indicated in the [Market Footprint workstream report](#), the most heavily used IBORs are generally those with tenors of one month, three months, and six months. The volumes (in USD equivalent) of potentially affected contracts include hundreds of trillions notional of interest rate derivatives (including interest rate swaps and options, currency swaps, and exchange-traded derivatives), as well as trillions in principal in each of several major categories of heavily used debt products: syndicated loans, corporate bonds, securitizations, retail mortgages, and commercial mortgages. Retail mortgages linked to IBORs are held by millions of individual homeowners. Transition from a key legacy IBOR would also affect a wide range of other important classes of contracts, including loan guarantees, commercial agreements held by operating companies including intra-group financing arrangements, and loans to small and medium enterprises, among many other types of financial instruments and agreements.

In most cases, fall-back provisions are not sufficiently robust for a permanent discontinuation of a key IBOR. For some types of contracts, bilateral renegotiation of contracts will be successful only when contracting parties are amenable to new terms based on alternative rates. It is possible, however, that some market participants would be unable or unwilling to change the reference rate provided in their contracts under terms agreeable to their counterparties. Without carefully considered alternatives and mitigants, claims of contract frustration could arise. In the worst case, there could be widespread valuation and accounting problems, and workout costs could be severe. Market liquidity could decline out of uncertainty over the most appropriate terms to place in new contracts. Liquidity could fragment across the various potential alternative benchmarks for new contracts. We believe

that if a transition from a key legacy IBOR is necessary, these risks can be well controlled only through extremely well and widely coordinated plans.

Before any transition from a key IBOR is set in motion, all major market participants, financial services regulators, industry trade associations, bar associations, and other affected parties and significant sources of professional advice should be “brought to the table” for consultation and involvement in the planning. Because the key IBORs are used globally and sometimes in tandem across currencies within the same contracts or strategies, these planning efforts should be coordinated internationally. In some settings, including the Eurozone, we also recommend supporting legislation.

The most significant risks to be mitigated by transition design are legal: the loss of contract continuity and the risk of contract frustration. Actual or alleged material differences between old and new reference rates, or old and new fixings of the same reference rate, could lead counterparties to argue that their contracts should be discharged under the doctrine of contract frustration, as explained in the report of the [Legal Analysis workstream](#).

Other important potential transition impacts include tax effects and the costs associated with document searches, adjustments in information technology, and the rewriting of contracts.

In prior major benchmark changes, such as the transition to EURIBOR associated with the formation of the European Monetary Union, significant market disruption was avoided through careful planning, supporting legislation, and the convergence of currency prices prior to formal monetary union. A transition that includes a discontinuation of a highly referenced IBOR, however, could be significantly more challenging in terms of the magnitude of affected contracts and the degree of complexity.

As explained in more depth in the report of the [Transitions workstream](#), we have considered the following four alternative transition approaches, which may be applied depending on the currency, tenor, and a range of legal and business considerations.

Seamless Transition

With a “seamless” transition, a particular IBOR+ would become the new fixing method for the corresponding IBOR. The new methodology would be used, but the legacy name of the reference rate would remain unchanged and the rate would continue to be published on the pages on which it is currently found. Contracts would not need to be changed. This “evolutionary change” in IBOR is the least disruptive transition path, and is less subject to legal challenge and significant changes in the market valuation of contracts to the extent that the IBOR+ is close to the legacy IBOR fixing in value, definition, or volatility.

Successor-Rate Transition

If a particular IBOR+ differs somewhat in definition, value, or volatility from its corresponding IBOR, a “successor-rate” transition may nevertheless be possible in some jurisdictions. After a multi-year lead-in period, the legacy IBOR would cease to exist. Publication of the successor rate would commence on the following day, with the intent of converting all contracts to the new reference rate. An effective successor-rate transition would require careful advance legal groundwork, strong industry and regulatory support, and in some settings such as the Eurozone,

supporting legislation. Even if successful in a legal sense, this form of transition may cause non-trivial changes in the market values of contracts, and thus important accounting and tax effects.

Market-Led Transition

In a “market-led” transition, legacy contracts would be voluntarily renegotiated between their counterparties or allowed to mature over time. New contracts would reference alternative feasible and viable reference rates. Basis swaps between the legacy and alternative rates would assist with managing the mark-to-market risk of transition. Although this form of transition eliminates legal risk, it raises two main concerns. The first is the lengthy period of time that would be required for legacy contracts to mature, during which the legacy IBORs would need to be maintained. This increases the risk of a diminishing set of banks willing to provide the submissions needed to fix IBOR. If there are also concerns about the robustness of the legacy IBOR fixing method, at least some of those concerns would remain during the lengthy phase-out period. The other major risk of a market-led transition is that many market participants may avoid making the transition out of a self-fulfilling assumption regarding the relatively superior liquidity of legacy IBOR over the alternative benchmarks. Regulatory incentives and market-led initiatives may encourage this form of transition.

Parallel-With-Cutover Transition

The last of the transition paths that we considered is a “parallel-with-cutover” approach, under which a final discontinuation date for an affected legacy IBOR would be set. Alternative reference rates would become available during a multi-year phase-in period. Market participants, aware of the impending discontinuation date, would be encouraged to replace their existing contracts with new contracts referencing one of the alternative benchmarks. During the overlap period, basis swaps between the legacy and alternative rates would assist with managing the mark-to-market risk of transition. A key objective is that only a small stock of legacy contracts remains by the final cutover date. Conversion factors for converting legacy contracts could be recommended in protocols. It would be especially difficult, however, to identify conversion factors for volatility-sensitive products, as discussed in the [Derivatives Transitions report](#). Problems with tax and accounting, portfolio management, and corporate treasury systems may arise from running different benchmark rates in parallel. Absent supporting legislation, discontinuation is likely to be extremely disruptive so long as there remains a large stock of legacy contracts.

Wherever it is feasible, the MPG strongly recommends a seamless transition to IBOR+ for debt products. For derivatives products, wherever feasible, the MPG recommends a combination of a market-led transition to OIS and a seamless transition to IBOR+. Creation of a robust OIS benchmark rate will enable a large number of derivatives market participants to transition to OIS, which is a more appropriate reference rate than IBOR for applications that do not benefit from referencing a rate with a credit spread. OIS is already widely used as a discount rate for the purposes of valuation and risk management of OTC derivatives portfolios. However, there will also remain a significant demand for derivatives referencing a rate such as IBOR with a credit component, particularly for users hedging cash products referencing an IBOR.

MPG members are aware that seamless transitions may turn out to be infeasible for some currencies and tenors. In such cases, either a successor-rate transition or a market-led transition is preferred, depending on the final reference rate and on the results of further analysis of tax and accounting impacts, and also depending on the ability to implement a successor-rate transition without undue legal risks, as discussed in the report of the [Legal Analysis workstream](#). A parallel-with-cutover transition is a last resort, given that this involves a forced final conversion with both mark-to-market impacts and, absent aggressive legislation, a likelihood of undesirable tax effects and legal challenges.

In one key area, securitizations, the MPG has not found a tractable approach (other than legislation) for handling the discontinuation of a key IBOR without a successor rate. This application includes structured credit products such as collateralized loan obligations that are issued by a special purpose vehicle whose trustees are typically unwilling or unable to negotiate discretionary changes in terms.

In general, the MPG advises greater market reliance on shorter-tenor IBOR reference rates, given the relatively fewer relevant transactions available at longer tenors from which to fix the corresponding IBORs.

Brief Summary of Conclusions

This MPG report highlights some clear preferences held by market participants. For some applications, market participants strongly prefer access to benchmark rates that include a term credit spread, similar to the term credit spreads of LIBOR, EURIBOR and TIBOR. Market participants also show some preference to use alternative benchmarks for applications that do not require a reference rate with a significant term credit spread. For all currencies, the MPG believes that versions of overnight index swap rates and term unsecured bank borrowing rates are feasible and viable, although questions remain over the feasibility of some longer-tenor unsecured bank borrowing rates. In several cases, therefore, these feasibility recommendations are contingent on improvements in available transactions data or volumes. In certain currencies, treasury bill rates, repo rates, and official central bank rates are also included among the feasible and viable alternative reference rates. Market participants prefer benchmarks that are transparent and robust to manipulation.

Market participants universally wish to avoid the disruption and cost of replacing or re-writing contracts in the face of a forced discontinuation of a key benchmark rate. The complexities and risks associated with key benchmark transition are difficult to overstate. Legal concerns include contract frustration and consumer finance protection rules. In addition to concerns over the potential impact of legal risks, market participants are averse to risks to their financial results arising through changes in the market values of financial instruments, tax effects, and the costs of document searches, changes in information technology, and contract renegotiation.

In order to be successful, a major benchmark transition will require the support and coordination of leading market participants, financial services industry organizations, legal associations, and a range of official sector entities. A broadly coordinated approach is essential to avoid significant disruption and to promote wide market adoption of alternative benchmarks.

1. Market Footprint

1.1. Background and Objectives

The Market Footprint Workstream aims to provide the Market Participants Group (MPG) with detailed information on the use of interest rate benchmarks across currencies and markets. This information is intended to inform the MPG Workstreams tasked with choosing reference rate menus and designing transition strategies.

The benchmarks considered in the Market Footprint analysis are USD Libor, US Treasury bills (T-Bills), Euro Libor, Euribor, JPY Libor, Tibor, GBP Libor and CHF Libor. The Workstream's main output is a catalogue of the key classes of financial contracts that reference these benchmark rates, detailing outstanding volumes, which tenors are most commonly used and, where possible, estimating the projected maturities of these contracts.

The key classes of financial contracts considered include, depending on the currency zone: Bonds, Loans (including syndicated and bilateral corporate loans, commercial and residential mortgages and consumer credit, including student loans credit cards and auto loans), securitisation (including Mortgage Backed Securities (MBS), Asset Backed Securities (ABS) and collateralized loan obligations (CLO)), Exchange-Traded Derivatives (ETD) and Over-The-Counter (OTC) derivatives (including interest rate futures and options, Interest rate swaps, Forward Rate Agreements (FRA), swaptions and cross-currency interest rate swaps) and retail and corporate deposits.

The use of interest rate benchmarks is not limited to financial contracts. The 'Impact on Corporates' section of this report identifies a wide range of additional uses of these benchmarks based on their market outreach efforts. These include interest rates in commercial contracts and discount rates for valuation purposes. Unfortunately, it is not possible to quantify many of these uses in a meaningful way.

1.2. Approach Taken for Research

The findings of the Market Footprint Workstream are set out in six sections of the MPG report. The Market Footprint section in each of the five currency reports (USD, EUR, GBP, CHF, JPY) presents findings on global contract in the respective currency including syndicated loans, bonds, notes, securitization, and derivatives. The currency reports also cover loans and deposits issued in the respective currency's domestic market (e.g. USD loans and deposits in the US). The Market Footprint section in the Emerging Markets report focuses on loans and deposits in the five report currencies issued outside the five domestic markets (e.g. USD loans and deposits in Latin America, Asia excluding Japan and EMEA excluding Euro-zone, UK and CH).⁴

The key results in each Market Footprint section are presented as a table detailing for each contract type the volumes outstanding, related reference rates and tenors and estimated

⁴ No attempt was made to quantify loans and deposits report currencies issued in other report jurisdictions (e.g. USD-LIBOR linked loans and deposits in Switzerland)

maturity of outstanding contracts. Details of sources and explanatory notes are provided in dedicated appendixes.

Wherever possible, volume and maturities data were taken from official public sources. However in many cases, the data publicly available is not sufficient to provide a complete picture and so this was complemented with data that is not publicly available. This included selective approaches to regulators, central banks and market associations for unpublished data and a combination of private data and opinions from market participants gathered through the outreach exercise and through bilateral discussions. Wherever possible, attempts were made to corroborate non-official data by making use of multiple sources such as reports by market analysts, news reports and bank's websites⁵. Table 2 shows key data sources by currency and asset class.

⁵ Data availability for the Emerging Markets section was particularly limited. A number of assumptions were made to overcome this lack of data and these are detailed in the body of the report.

Table 2: Key data sources for Market Footprint Analysis

| | USD | Euro | GBP | JPY Libor | JPY Tibor | CHF |
|-----------------------------------|---------------------------------------|--|--|---|---------------------------|----------------------|
| Syndicated loans | Dealogic, Bloomberg, Thomson Reuters | Dealogic, | Dealogic, | Thomson One | Japan Bankers Association | BIS Quarterly Review |
| Corporate loans | Federal Reserve (Z1 statistics) | ECB statistics | Bank of England statistics | BOJ | Japan Bankers Association | SNB |
| Retail loans | Federal Reserve (Z1 statistics) | ECB statistics | Bank of England statistics | | Japan Bankers Association | No data available |
| Mortgages | Federal reserve | European Mortgage Federation; ECB statistics | Bank of England statistics Council of Mortgage Lender (CML) | BOJ | | SNB |
| Floating Rate Notes (FRNs) | Dealogic, BIS | Dealogic, BIS | Dealogic, BIS | JSDA | Japan Bankers Association | BIS Quarterly Review |
| Securitisation | SIFMA; Dealogic | SIFMA; Dealogic | SIFMA; Dealogic | JSDA; Japan Bankers Association | Japan Bankers Association | No market |
| Derivatives | BIS derivatives statistics; DTCC; CME | BIS derivatives statistics; DTCC; LIFFE | BIS derivatives statistics; DTCC; LIFFE | DTCC; TKX | Japan Bankers Association | DTCC; Bloomberg |
| Deposits | Federal reserve (Z1 statistics) | ECB statistics | Bank of England statistics | BOJ | | SNB |
| Mutual funds | | | | The Investment Trust Association, Japan | | |

1.3. Summary of Findings

Libor is the predominant interest rate benchmark for USD, GBP, CHF and JPY contracts. The notional volumes of outstanding financial contracts indexed to USD, GBP, CHF and JPY Libor are estimated to be greater than \$150 TN, \$30 TN, \$6.5 TN and \$30 TN respectively⁶. In the case of JPY contracts TIBOR is also widely referenced, with estimated outstanding notional amount greater than \$5 TN. For EUR contracts, Euribor is the most widely used interest rate benchmark, with notional volume outstanding estimated to be greater than \$150 TN. Contracts referencing Euro-LIBOR are far less common (~\$2TN).

The main IBOR tenors used across the five currency markets are 1-month, 3-month and 6-month. 12-month rates are used for a small subset of products and other tenors are rarely used. The main classes of contracts indexed to IBOR rates include Over-the-Counter (OTC) and exchange traded derivatives, corporate loans, retail mortgages, floating rate bonds and securitized products. Table 3 and Table 4 below present market footprint by currency, tenor and asset class.

Although many IBOR linked contracts have maturities of 5 years or less, such as many business loans and floating rate notes, a large volume of contracts extend out to 30 years or more. Contracts with particularly long maturities include long dated OTC interest rate swaps (IRS), Mortgage Backed Securities (MBS) and Asset Backed Securities (ABS).

The largest classes of contracts by volume across all currencies are OTC derivatives, followed by ETD which together account for over 80% of total notional outstanding volumes of IBOR linked contracts. Derivatives linked to IBOR rates include Futures, Interest Rate Swaps and Options, Forward rate agreements and Cross Currency Swaps. Data from the DTCC Global Trade Repository (GTR) shows \$106 TN of notional contract outstanding linked to 3-month USD-LIBOR and \$11 TN linked to 1-month. For JPY, GBP, EUR and CHF the most commonly used tenor is 6-month followed by 3-month.

Global outstanding syndicated loans in the five currencies are estimated to be ~\$6TN, almost all of which reference IBOR rates, based on data from Thomson Reuters and Dealogic. The largest concentration of these contracts is in 1- and 3-month USD-Libor, in 3- and 6-month EURIBOR.

Domestic retail and business loan and deposit volumes are taken from official central bank statistics for each currency area. Corporate loans commercial mortgages commonly reference IBOR rates at various tenors. Consumer loans, credit cards and auto loans as well as retail deposits don't commonly reference IBOR rates. Exceptions to this are private USD student loans in the US, where about half of the outstanding \$150MM reference 1- and 3-month USD Libor.

The use of IBOR reference rates for retail mortgages varies significantly from country to country. In the US, of the \$10 TN outstanding Retail mortgages approximately 15% are indexed to 6- and 12-month Libor. In the Euro Area, 3-Month EURIBOR is a common

⁶ \$ figures in this report refer to US Dollar; where values have been converted from other currencies, the exchange rate used are as follows: USDGBP=0.63; USDEUR= 0.76; USDCHF=0.90; USDJPY= 97.50

reference rate for mortgages in Italy, Austria and Ireland, 6-month is common in Portugal and 12-month is common in France and Spain. In Switzerland, 10-20% of mortgages reference Libor, primarily 3-month. In the UK and Japan, it is not common for mortgages to be linked to IBOR rates.

Outside of the domestic markets of the five currency areas considered, there are ~\$1.2 TN of foreign currency Loans, and a similar volume of foreign currency deposits. In Asia, USD Libor products make up the majority (>80%) of these loans and deposits. In Eastern Europe and the Middle East Euro currency deposits represent 25-40% of the overall mix and most of the remainder is USD. The most commonly used reference rate tenor for foreign loans and deposits is 3-month.

IBOR rates are the reference rate most commonly used in the \$5.7TN of outstanding Floating and Variable rate notes. The most commonly used tenors in USD, EUR and GBP is 3-month. In CHF and JPY 3- and 6-months are commonly used. A large proportion of the ~\$13TN of outstanding securitized products in USD, EUR and GBP are linked to IBOR rates. The contractual maturity of many of these contracts is very long (30 year+), although actual realized maturity is expected to be significantly shorter due to the prevalence of call options.

Table 3: Market footprint by reference rate and tenor

| | USD-LIBOR | GBP-LIBOR | EURIBOR | Euro-LIBOR | JPY-LIBOR | TIBOR | CHF-LIBOR |
|------------|-----------|-----------|---------|------------|-----------|--------|-----------|
| 1m | High | Medium | High | Low | Low | Low | Low |
| 3m | High | High | High | Low | Medium | Low | High |
| 6m | Medium | Medium | High | Low | Medium | Medium | High |
| 12m | Low | Low | Medium | Low | Low | Low | Low |

Table 4: Market footprint by reference rate and asset class

| | USD-LIBOR | GBP-LIBOR | EURIBOR | Euro-LIBOR | JPY-LIBOR | TIBOR | CHF-LIBOR |
|-------------------------|-----------|-----------|---------|------------|-----------|--------|-----------|
| Syndicated Loans | High | Medium | Medium | Low | Medium | Medium | Low |
| Business Loans | High | Medium | High | Low | Medium | Medium | Medium |
| Retail Loans | Low | Low | Medium | Low | Low | Low | Medium |
| FRNs | High | Medium | High | Low | Medium | Low | Low |
| Sucuritisation | High | Medium | Medium | Low | Low | Low | Low |
| OTC Derivatives | High | High | High | Low | High | Medium | High |
| ETD | High | High | High | Low | Medium | Medium | Medium |
| Deposits | Low | Low | Low | Low | Low | Low | Low |

High >\$1 TN

Medium \$100 BN<x<\$1 TN

Low <\$100 BN

2. Reference Rate Menus

2.1. Objectives and Process

The main objective of this workstream is to provide recommended reference rates for each of the five currencies (USD, EUR, JPY, GBP, CHF), and for each of a list of key tenors for each currency. For a rate to be recommended under the OSSG Terms of Reference, it must be *feasible*, meaning that it can be given a fixing that is likely to be judged by regulators to be compliant with IOSCO principles, and *viable*, meaning that market participants would in principle find it a useful contractual reference rate, depending in part on what other reference rates are available.

When judging feasibility or viability, in some cases we allowed for levels of market activity that are not currently met but that we viewed as reasonably likely to apply under plausible transition scenarios. For example, in the event of the phase out of a popular legacy benchmark rate due to lack of a feasible fixing, we considered the likely degree of market acceptance for alternative reference rates as a factor in our recommendations.

In reaching our recommendations, we considered information generated by our Outreach, Corporate Impact, Market Footprint, Legal, Transition, and Fixing Methods work streams, and we had extensive collaborative discussion. We divided our work into substreams, one for each of the five currencies. Each substream was managed by MPG members working primarily in the corresponding currency zone. The reference rate menu substream managers for a given currency zone “held the pen” at the first stage of our work, consulting mainly with those involved in other functional sub streams relevant to their own currency zones, through conference calls and document sharing. Cross-currency-zone conference calls and document sharing were also used to coordinate work flow from the various reference rate menu work streams, and to share other related work stream content.

The reference rate menus recommended in this chapter have gone through a process of approval by the entire MPG.⁷ Consistent with the approved MPG Work Plan, this decentralized process involves no attempt to achieve a globally unified set of recommended rates.

Each currency zone’s reference rate menu report provides a discussion of reference rate alternatives, focusing on the feasibility of fixing methods and the usefulness of the rate to market participants as a contractual benchmark. Although we comment on relative costs and benefits, and on the preferences among these alternative rates held by market participants of different types, our reports do not rank order the alternatives nor reduce them to final selections. Among preference-related factors, market participants showed a desire for high transparency, robustness to manipulation, and high correlation with market interest rates to which they are exposed. Many market participants also expressed a desire to avoid a costly disruption to their existing contracts. Further discussion of the preferences

⁷ The reference rate menu for each currency was individually approved by the entire MPG, using the voting rules provided by the OSSG in its Terms of Reference for the MPG. Two additional reference rates, Tibor+ and USD overnight general collateral rate, were subsequently added and approved by virtue of the MPG’s approval of its final report.

of market participants is provided in the MPG’s Outreach and Corporate Impact workstream reports.

All alternative reference rates that we considered and found to be feasible and viable appear here as recommended rates.

The IOSCO standards for reference rates are motivated in part by robustness to manipulation. There are several ways to manipulate rates that are “anchored in transactions.” A typical strategy for manipulating a financial benchmark that is based on transactions data involves the execution of trades in the benchmark instrument that are designed to record prices away from the level that would otherwise reflect current conditions of supply and demand. Executing such a trade may generate a loss that is intended to be more than offset by a gain through positions involving other financial instruments that reference the distorted benchmark rate. Thus, the size of the market referencing the benchmark is relevant to the incentive to manipulate the benchmark. The MPG considered the robustness to manipulation of transactions prices when making its recommendations, and did not rely on a technical or narrow reading of the IOSCO principles.

2.2. Summary of Recommended Reference Rate Menus

Table 5 summarizes the recommended reference rate menus for each currency. In addition to various overnight rates, two types of recommended term rates are common to all menus: unsecured wholesale bank borrowing rates and overnight index swap (OIS) rates. The ordering shown is not meant to convey any form of preference-based ranking. For each OIS rate, the underlying overnight reference rate is indicated in parentheses.

We believe that OIS rates will be feasible and will likely be judged by regulators to be IOSCO compliant once trading activity in swap execution facilities (SEFs), also known as market trading facilities (MTFs), reaches threshold criteria that are provided in our chapter on Fixing Methods.

Table 5: Summary Menu of Recommended Reference Rates

| Currency | Overnight | Term |
|--------------------|--|--|
| US Dollar | interest on excess reserves, federal funds effective rate, Federal Reserve reverse repurchase facility fixed rate, overnight general collateral rate | LIBOR+, Treasury bill, OIS term or compounded overnight rate (FFER or an alternative overnight rate) |
| Euro | EONIA | EURIBOR+, OIS (EONIA) |
| Yen | Uncollateralized overnight call rate (average) | TIBOR+, unsecured interbank money rates, Treasury discount bills, OIS (call rate) |
| Sterling | Bank of England Bank Rate, SONIA | LIBOR+, OIS (SONIA), Bank of England Bank Rate |
| Swiss Franc | SARON, TOIS | LIBOR+, SAR (secured), OIS (TOIS) |

As for term unsecured bank borrowing rates, the likely sufficiency of transactions data for IOSCO-compliant fixings has not yet been determined for some currencies and tenors, as discussed in the MPG's currency-level reports on reference rate menus and fixing methods. In some currencies, there are two types of data uncertainties: whether there are in fact sufficient levels of transactions, and whether (given sufficient transactions for a robust fixing) those data could become available to benchmark administrators and result in fixings that are satisfactory for the purposes of market participants (that is, neither too noisy nor too stale). Thus, our recommendations are in many cases contingent on future data.

In two currencies, US dollars and Yen, treasury bill rates are also on the recommended menu of alternative reference rates. There is no concern regarding the feasibility of US treasury bill rates as benchmarks. If no other USD recommended benchmark rates were available, US T-bill rates would also likely receive wide market acceptance. The secondary market for Japanese Treasury discount bills (TDBs) is not currently sufficiently active to serve as a source of transactions data for a robust fixing, but the primary issuance of TDBs is very active, so there is a potential for the secondary market to become a fixing source.

In Sterling (GBP), the Bank of England Bank Rate is also recommended for consideration as the foundation for new term rates. One-month loans could be quoted at a spread to BoE Bank Rate. Longer tenor rates could potentially be based on the pricing of derivatives settling on Bank Rate, contingent on the development of appropriate new futures or other derivatives markets, and assuming the ability to reasonably interpolate constant-tenor rates from futures prices at calendar-based delivery dates.

We now provide a brief discussion of the two classes of reference rates that appear on all reference rate menus.

2.2.1. Term Unsecured Bank Borrowing Rates

The "IBOR" family of reference rates originated with the use of LIBOR as a loan-pricing benchmark that allowed banks in London to hedge their costs of funds with their floating-rate loan revenues. LIBOR is still popular for this application around the world. Based largely on the same advantages, some market participants, particularly banks and operating companies, prefer that an IBOR or some reasonably close substitute continue to be available as a reference rate, as detailed in the Outreach and Corporate Impact workstream reports, respectively. Low risk rates, such as those of treasury bills and overnight index swaps, are not viewed by banks,, given their desire to hedge their cost of funds with their loan revenues. Operating companies are generally anxious to retain LIBOR because of the cost of transition, and also to some extent out a concern that a rate that leaves banks with greater risk will result in a higher average borrowing cost.

The seed of liquidity that LIBOR obtained from its primary application in bank lending has been an incentive for the introduction over recent decades of a large constellation of IBOR-based derivatives contracts. This self-reinforcing source of liquidity and risk-transfer opportunities has lead IBORs to be referenced by a high volume of contracts whose purposes could be served about as well by other generally representative market interest rates such as those for OIS or treasury bills. Indeed, in terms of volume of contracts, the "follow-the-leader" use of the IBORs probably exceeds their seed use as a cost-of-funds hedge.

Heavily concentrated referencing of the IBORs has raised the incentive for them to be manipulated, thus increasing the critical importance of robust fixing methods. A very large IBOR derivatives position, for example, could experience a large change in value from a small change in an IBOR fixing. A related concern, albeit somewhat less severe, arises from the concentration of operational exposure to a single system of benchmarks, for example through the risk of fixing outages.

A high concentration of liquidity around a system of market benchmarks can improve market efficiency through economies of scope and scale that may accrue to many types of market participants. These benefits arise through lower intermediation risks and costs, lower bid-ask spreads, deeper markets, risk-transfer synergies allowed by closely related types of contracts, higher price transparency, and lower fixed costs associated with contractual protocols, back-office operations, and venues for trading and clearing. An example in the equity market is the synergistic benchmark use of the S&P 500 index in applications related to futures, exchange traded funds, conventional index mutual funds, options, VIX, variance swaps, other derivatives, and a host of related sub-index products, in addition to the underlying equities and their own derivatives. These forms of positive network externality associated with the IBOR complex of benchmarks could in principle apply to an alternative class of benchmark rates such as OIS.

These various negative and positive externalities associated with the concentrated use of benchmarks are not internalized by individual market participants at the point of their choice of a contractual reference rate, leaving scope for beneficial coordinated action by regulators and private-sector organizations.

By necessity, any transactions-based fixing for term unsecured bank borrowing rates involves observations across different types of financial instruments (such as interbank loans, CDs, and commercial paper), and also across banks of various sizes and credit qualities. The Australian BBSW benchmark rate is not heavily affected by this heterogeneity because of the relatively similar qualities of the prime banks whose wholesale debt prices are used to fix BBSW. In other currencies, however, transactions-based fixings of term unsecured bank borrowing rates are likely to be substantially more volatile than opinion-based poll rates. This is already evident from our back-testing results for USD LIBOR+, EURIBOR+ and TIBOR+.

As a result, regardless of the feasibility of transactions-based fixings for unsecured bank borrowing rates, market participants who prefer less volatile rates may, given the option, migrate in their choice of benchmarks for future contracting to less volatile reference rates. Some of this volatility can be mitigated by smoothing and trimming methods, including reliance on significantly lagged transactions data, as suggested in the USD and EUR Fixing Methods workstream reports. Neither staleness, caused by reliance on lagged transactions, nor high volatility, caused by exclusive reliance on very recent transactions, is desirable. We believe that the tradeoff between higher volatility and staleness suggests at least moderate use of lagged transactions, with weights that decline with the age of the transaction. This approach is recommended for IBOR+ in both the USD and EUR fixing methods reports.

For the most heavily used tenors, we believe that LIBOR+ and EURIBOR+ may be used as new fixings for LIBOR and EURIBOR, respectively, without raising undue risk of legal contractual frustration risk. As explained in the USD reference rate menu reports, we believe that "seamless transition" can be achieved for USD LIBOR at 1-month and 3-month tenors. Seamless transition may also be appropriate for USD 6-month LIBOR, although a

final recommendation was not made in this case. The EUR Transition workstream report recommends removing the legal risk of transition of legacy contracts by virtue of legislation. Based on usage data shown in the Market Footprint report, these respective transition approaches would avoid disrupting the vast majority of legacy contracts referencing USD and EUR IBORs.

2.2.2. Overnight Index Swap (OIS) Rates

Overnight index swaps (OIS) are over-the-counter derivative contracts. We illustrate the determination of an OIS rate with the simplified terms of a 3-month OIS contract. At the end of the contract period one counterparty pays the 3-month OIS term rate that was negotiated at the inception of the swap, in exchange for the rate computed by compounding a referenced overnight rate each day during the contract period, from the inception of the swap to the end of the 3-month term. For each of the five currencies, the underlying overnight reference rate for OIS is indicated in parentheses in Table 5.

For USD OIS, we also recommended a variant given by the floating-side compounded rate, which is observed for settlement purposes only at the maturity of the contract period, a disadvantage. However, an advantage of this “backward-looking” rate is that it can be determined directly from a formula based on the daily overnight rates, thus eliminating the potential for sampling noise or manipulation (assuming the underlying daily rates are themselves fixed robustly).

For benchmark applications in which there is no need or desire for the reference rate to include a term credit premium, the OIS rate is a viable choice. OIS rates are based either on a secured overnight rate or on an unsecured rate that includes an average credit risk premium for only a one- day term. Our only other recommended low-risk term rates, treasury bills in USD and JPY, has advantages and disadvantages relative to OIS that we discuss in the USD Reference Rate Menu report.

Because OTC derivatives portfolios are increasingly collateralized on a daily basis, the OIS term rate is now widely used by market participants who execute cleared and collateralized-bilateral derivatives as a discount rate for the purposes of valuation and risk management of OTC derivatives portfolios. Some members of the MPG view OIS as an important benchmark and believe that the OIS market could grow substantially given the opportunity. In the absence of IBOR reference rates, for example, the OIS market could substitute for the extremely large market for IBOR-based interest rate swaps. Provided that OIS rates at the relevant tenors can be robustly fixed, no MPG member has expressed a negative view concerning the usefulness of OIS term rates as benchmarks, although OIS is not recommended by some MPG members for bank lending applications because it lacks a significant a term credit spread.

The proposed fixings for OIS term rates are based on executable quotes for homogeneous underlying financial contracts, avoiding heterogeneity of instrument type or issuer credit quality. Like T-bill rates, OIS fixings therefore involve significantly less sampling noise than transactions-based fixings of unsecured bank borrowing rates. For USD OIS, we also recommend “OIR,” meaning the rate at maturity corresponding to the compounded overnight rate for all days from the inception to the maturity of the referencing contract. This rate is fixed without noise and is robust to manipulation, assuming the underlying overnight rate is robust.

2.3. Alternative Reference Rate Approaches Considered

Appendix G discusses the feasibility of several alternative approaches that we considered for obtaining reference rates. These are:

1. *FX-implied rates*: inferring reference rates in a given currency from reference rates in other currencies and foreign-exchange forward prices, using the covered-interest-parity formula.
2. *CDS-implied rates*: obtaining a term unsecured rate of bank credit quality from a near-risk-free rate and an estimate of credit spreads obtained from credit default swap rates on a panel of referenced banks.
3. *Futures-implied rates*: interpolating, from futures prices on overnight rates, the term rate implied by compounding the overnight rate (which is, in effect, the overnight index swap rate).
4. *Option-implied rates*: inferring a synthetic reference rate from put-call parity pricing relationships between option prices and bond prices.

After evaluating these approaches, the MPG chose not to recommend any of them as a foundation for feasible and viable reference rates, for reasons explained in the dedicated appendix, although we do recommend the use of futures-implied USD OIS rates as a backup fixing method for USD OIS rates.

3. Fixing Methodologies

3.1. Background and Objectives

- The objective of the Fixing Methodologies Workstream is to identify and assess potential methodologies which could be used to fix reference rates proposed by the Reference Rate Menus workstreams, review rates presented as potential reference rates by Currency workstreams and ascertain whether there could be a suitable fixing methodology for each rate that is likely to be judged IOSCO-compliant.
- The Fixing Methodologies sections of the report describe how such fixing methodologies might be designed and discuss the likely feasibility of such designs.
- The MPG aims to propose potential reference rates for each currency which are feasible and viable. This section focuses on assessing a key element of feasibility, which is potential compliance with the IOSCO Principles with regard to fixing methodologies. Key elements of the IOSCO Principles include:
 - Rates should be based on prices formed by competitive supply and demand and anchored in observable transactions (Principles 6, 7).
 - Rates could be based on executable bids and offers (Principle 7).
 - Expert judgment can be used, but in such cases a hierarchy of data inputs, for example from transactions or quotes, and the role of expert judgment, must be clear and transparent (Principle 8).
- A number of different types of rates were reviewed:
 - Rates considered included those that include a bank credit component and those with no bank credit component, such as those based on overnight index rates or government bonds.
 - Rates proposed included rates based on a number of different underlying markets, including interbank lending markets, bank certificate of deposit (CD), commercial paper (CP) and bank bond markets, interest rate swap markets, government bond markets, repo markets and listed derivative markets.
- A range of fixing methodologies was considered for the various proposed rates:
 - Fixings based on observed transactions over a specific time period.
 - Fixings based on committed and executable market quotes taken at a specific moment in time.
 - Fixings based on uncommitted quotes or including an element of expert judgment.
 - A combination of these approaches (either as a primary fixing methodology or as a backup for the event of failure to determine a rate using the primary method).
- Measures for mitigating the shortcomings of some fixing methodologies were also considered.

3.2. Out of Scope for Fixing Methodologies Workstream

The Fixing Methodologies Workstream did not perform any review of existing “IBOR” rates, nor rates proposed by currency workstreams that are published by official sector entities such as central banks, nor rates derived from exchange prices or official repo rates which included:

- Official overnight rates: FFER, USD Overnight Secured Financing Rate, IOER, EONIA, Bank of England Base Rate, Japanese Call Rate
- Official statistics on Treasury Bill yields (US and Japan)
- FFER futures on CBOT
- SARON rate published by SIX Swiss Exchange

3.3. Summary of Major Findings and Priorities

The main types of fixing methodologies considered are described in the table below:

Table 6: Main types of fixing methodologies considered

| | Fixing methods | Advantages | Limitations |
|-------------------------------|--|---|--|
| Transaction data based | Average of executed transactions (e.g. VWAP) over a given period | <ul style="list-style-type: none"> • Rates are objective and verifiable • Disincentive to attempt to manipulate reference rates, due to cost of off-market transactions | <ul style="list-style-type: none"> • Requires high volume of transactions across tenors • Must be averaged over a time period – point-in-time rates not possible • Requires transaction data capture and aggregation infrastructure • May suffer from technical volatility |

| | Fixing methods | Advantages | Limitations |
|---|--|--|--|
| Committed quote based | <ul style="list-style-type: none"> • Snapshot of live, fully executable, bids and offers sourced from the central limit order books (CLOBs) of an MTF/SEF | <ul style="list-style-type: none"> • Rates are objective and verifiable • Fixing is underpinned by the systems and controls of a regulated trading venue • Disincentive to attempt to manipulate rates due to cost of off-market quotes if executed • Point-in-time rates possible | <ul style="list-style-type: none"> • Only possible where sufficient volumes are traded electronically on MTF/SEFs • Potential to manipulate through off-market quotes, if unlikely to be hit |
| Expert judgment/uncommitted quote based | <ul style="list-style-type: none"> • Survey of panel of banks / dealers, with clear hierarchy of information to be considered and robust systems and controls | <ul style="list-style-type: none"> • Simple approach familiar to market participants • Not reliant on large volumes of transactions • Low susceptibility to technical volatility • Point-in-time rates possible | <ul style="list-style-type: none"> • Difficult to manage risk of manipulation, even with strong governance and controls • Banks unwilling to contribute, given cost and risk |
| Synthetic rates | <ul style="list-style-type: none"> • Rates based on other observable market prices | <ul style="list-style-type: none"> • Avoids requirement to capture new data | <ul style="list-style-type: none"> • Dependent on availability and robustness of source prices |

In several cases, a combination of approaches is considered, with a primary approach supported by back-up methodologies⁸.

Primary fixing approaches for the rates reviewed are summarized in the table below, along with an assessment on the likely level of IOSCO compliance.

⁸ See Appendix – Back up Methodologies

Table 7: Primary fixing approaches and likely level of IOSCO Compliance

| | | Transaction based | Committed quotes | Uncommitted quotes | Synthetic rates |
|--|-----------------------|---|---|--------------------|---|
| Alternative rates with a bank credit component | IBOR+ |  | | | |
| | Synthetic bank credit | | | |  |
| Alternative rates with no bank credit component | OIS |  |  | | |
| | T-Bill |  | | | |
| | FFER / Futures | | | |  |
| | Repo |  | | | |

 Feasible / IOSCO compliant
  Possible but not IOSCO compliant

Considerations for the selection of fixing methodologies for each of these categories are discussed further below.

3.3.1. Alternative Reference Rates with a Bank Credit Component

A number of currency workstreams proposed alternatives to the IBOR rates that reflect enhancements to existing IBOR rates. For the purpose of this report the rates are referred to as IBOR+ rates. (Note that, as work moves forward to establish any of these rates; careful consideration must be given to the name to avoid confusion such as “3 month Libor+ +50bps”).

These proposals typically referenced a broader spectrum of bank credit markets, beyond the interbank lending markets. These rates were typically based on observed transactions. They would generally be published on a lagged basis (rates determined by aggregating transactions over a fixed observation period would be published after the end of such period).

Adequacy of liquidity is a concern in many markets, particularly for tenors beyond 1 month. Proposed solutions to the lack of liquidity for longer tenors include interpolation between more liquid maturities and incorporation of quotes or expert judgment.

Currencies that have the most liquid underlying bank credit markets suitable for supporting an IBOR+ approach include USD and EUR.

While the workstreams have focused material resources to the proposed IBOR+ rates at this stage, a significant amount of work still remains to be done to determine whether fixing methodologies will be compliant with IOSCO Principles.

3.3.2. Alternative Reference Rates With No Bank Credit Component

Proposed rates with no bank credit component include official central bank published rates, rates based on Overnight Index Swaps (OIS), rates that reference government bond markets, rates based on futures markets and rates based on repo markets.

Overnight index rates (OIR) such as Fed Funds Effective Rate (FFER), EONIA and SONIA are already used as a floating leg reference rate for the OIS swap markets. Typical swaps have a floating rate which references a daily observed OIR, compounded for the term of the floating leg (e.g. 1 month).

Although OIRs are only published as overnight rates, longer tenors may be fixed using market expectations of forward OIRs, which can be sourced from the OIS market, subject to market liquidity, or on a backward-looking basis, using a daily compounded rate based on observed daily rates over the relevant time horizon.

The OIS swap market has significant liquidity in certain currencies, including USD, EUR and GBP. Liquidity in CHF and JPY is not sufficient to support an OIS benchmark currently, though upcoming regulatory change could increase liquidity and observability of the OIS markets.

The primary proposed fixing methodology for OIS rates is to access real-time executable quotes from order books in Multilateral Trading Facilities (MTFs), also known as Swap Execution Facilities (SEFs) in the US and Organised Trading Facilities (OTFs) in Europe. Liquidity on these platforms is already firm and should increase greatly as laws become effective which mandate the use of such platforms for liquid contracts and institutional parties. OIS fixing methodologies are considered in detail in the Fixing Methodologies for OIS Reference Rates section of the report.

Another type of market with no bank credit component is the government bond market. Central banks typically publish statistics showing yields at key tenors.

In the USD market a futures contract exists on FFER. Market implied forward FFER rates can be calculated from futures prices.

Finally, repo market transactions have been considered. For the CHF market, SARON rates, representing secured lending rates observed on repo transactions are already aggregated and published. In the US, a General Collateral based Treasury repo rate has also been considered.

3.4. Detailed Summary of Material

The table below sets out the rates proposed by the currency workstreams together with the status of work performed by the Fixings Methodologies Workstream. This section contains key findings. Not all types of rates were proposed for all currencies and assessments have been limited to firm proposals from the currency workstreams.

Table 8: Summary of rate proposals

| | | USD | EUR | GBP | CHF | JPY |
|--|--------------------------------------|-----------|-------|-------|------|------|
| Legacy IBORs | LIBOR, EURIBOR, TIBOR | | | | | |
| Alternative Rates with a Bank Credit Component | IBOR+ | | | | | |
| Alternative Rates with No Bank Credit Component | Official overnight rates | FFER/IOER | EONIA | BoE | | CALL |
| | Industry overnight rate | GC Repo | | SONIA | TOIS | |
| | OIS Term Rates | | | | | |
| | Treasury Bill Rates | | | | | |
| | Futures Exchange (FFER/CBOT) | | | | | |
| | Swiss Average Repo Rate (SAR) | | | | | |

Fixing methodology reviewed by MPG
 Rate type not proposed by MPG for this currency
 Rate type discussed for future

Official rate - fixing methodology not reviewed by MPG
 Regulated Exchange -fixing Methodology not reviewed by MPG
 Fixing methodology is out of scope for this report

3.4.1. Alternative Rates with a Bank Credit Component

Enhanced IBOR: IBOR+

All of the IBOR+ proposals are designed to capture a robust and reliable rate that reflects the cost of bank credit. There are material differences in market liquidity, market structure and traded instruments in the currency markets considered, and while the proposed IBOR+ rates share many common features, the market differences have led to locally-driven variants. No two IBOR+ proposals are the same.

All of the rates are primarily transaction based, they access a broader market than the IBOR interbank lending markets and they generally propose to publish rates on a lagged basis (not real time).

The key features of the approaches are shown in Table 9 below.

Table 9: Summary of IBOR+ approaches

| | | USD | EUR | GBP | CHF | JPY |
|---|--|------|-------|-------|-----|-----|
| Reference Market includes | Interbank unsecured money market loans | ● | ● | ● | ● | ● |
| | Bank CD | ● | ● | ● | ● | ● |
| | Bank CP | ● | ● | ● | ● | ● |
| | Bank Bond | ● | | | | |
| | Include other Financials (e.g. Insurers) | | ● | | ● | |
| Number of submitters/issuers | (Approx.) | 100+ | 10-50 | 10-50 | 10 | |
| Credit Variation of underlying names | Rating Filter (What Rating) | | | ⊙ | | |
| | Algo adjustment | ⊙ | | | | |
| Fixing Based on | Transactions | ● | ● | | | ● |
| | Quotes | | | | | |
| | Expert Judgment | | | | | |
| | Combination | | | | ● | ● |
| Data source | Existing official/industry source | ● | | | | |
| | Panel banks | | | ⊙ | ● | ● |
| | Aggregated by benchmark administrator | | ● | ⊙ | | |
| Publication timing | Real Time or Close | | | ● | | |
| | On Lag Basis | ● | ● | | ● | |
| Observation Period | Real time or close | | | ● | | |
| | 1 day | ● | ● | | ● | ● |
| | Multi-Day | | ⊙ | | | |
| Aggregation Methodology | Direct/Raw calculation | ● | ⊙ | | | |
| | Algo smoothing | | ⊙ | ⊙ | | |
| | Judgemental component | | | ⊙ | ● | |
| Weighting/Averaging | Weighting Calculation | ● | | | ⊙ | |
| | Cap per issuer | | | | | |
| | Other | | | | | |
| Interpolation Included | 3m | ○ | | | ○ | |
| | 6m | ● | | ⊙ | ○ | |
| | 1y | | | ⊙ | | |
| | Other | | | | | |
| Fall back methodology in the event of failure of primary methodology | Delay/Second Attempt | | | | | |
| | Quotes | | | | | |
| | Expert Judgment | | ⊙ | | | |
| | Combination | | | ⊙ | ⊙ | |
| Robustness/Reliability | Minimum Daily Volume (for transaction based) | ● | ● | | | |
| | Minimum Number of Reference Banks | ● | ● | | | |
| | Concentration limit (per Firm) | ● | ● | | | |

● Yes ⊙ Possible ○ No

A key aim of the IBOR+ proposals is to access more liquidity, more transactions and to generally be stronger overall than the existing IBOR rates with regard to the IOSCO Principles. The proposals are all in pre-development stage and much more work needs to be done. Key features and issues identified from a fixings perspective for each IBOR+ offering, together with possible next steps are set out below.

USD

- Potential aggregation systems exist already
- 1m and 3m tenors potentially liquid, not 6m; possible interpolation solution to 2-year bank bond yields sourced from TRACE
- Concerns about variability of credit spreads with so many reference names (panel effect/adverse selection) consider algo mechanism to correct

EUR

- Data sufficiently robust for tenors up to six months
- Promising results from ECB/EBF data aggregation exercise
- Back up is panel banks estimate of their funding costs

GBP

- Two possible approaches – panel bank and raw data submissions
- Liquidity in 6m and 12m needs further analysis

CHF

- “Waterfall” hierarchy proposed (first transactions, then quotes, then expert judgments)
- Consider building aggregation venue

JPY

- Reference banks to submit transaction data to authorized administrators for calculation
- Sufficient transactions volumes are available for O/N and 1-week; feasibility of fixing a 1-month rate is uncertain and highly unlikely for longer tenors
- Range of products to be included requires further analysis

Finally, it should be noted that liquidity, even in the most liquid of these broader bank credit markets, while generally much more liquid than interbank lending markets that drive IBOR rates, is very low compared to the derivative markets that might use these reference rates. As a result, the effectiveness of anti-manipulation measures is very important for IBOR+ rates, just as it is for IBOR rates.

Synthetic Bank Credit

An approach involving the development of traded CDS contracts in bank baskets has been considered, but again, no robust proposal has been made at this time. MPG has not carried out any fixing methodology review for these approaches.

3.4.2. Alternative Rates with No Bank Credit Component

Overnight rates and Treasury Bill Rates

MPG has not reviewed fixing methodologies for official overnight rates, including FFER, IOER, EONIA, SONIA, Bank of England Base Rate and the Japanese uncollateralized overnight call rate, nor on treasury yields published by central banks.

Unlike overnight rates in other countries, the Swiss TOIS is not an official overnight rate; it is a bank panel and administrator process. The process is currently being strengthened. Ongoing discussions are taking place as to the future of the TOIS fixing.

OIS Swap Rates

MTF- or SEF-based fixing approaches offer multiple benefits. They are based on live, fully executable prices from central limit order books (CLOBs), offer increased transparency and ease of scrutiny, and are underpinned by the systems and controls of regulated trading venues. They are also aligned with regulatory driven requirements to transact more standardized products on regulated venues. They leverage existing bank streaming of prices to e-trading venues and associated controls, and they eliminate the need for separate submissions to benchmark calculation agents along with the regulatory and operational burden this entails. Another advantage of the MTF-based approach is that it is very easy to query an order book at any given time during the trading day. This makes it possible to calculate multiple fixings across the trading day.

We recommend that an MTF-based rate be calculated by creating an aggregated order book drawing on prices from multiple trading venues. A mid-price would be calculated based on volume weighted average best bids and offers, starting from the top of the order stack and working down to a specified contract size. The contract size would be a typical wholesale market ticket volume which would be set, and periodically reviewed, by the administrator. Figure 4 in Appendix E provides an example of how a swap rate could be set using an aggregated order book.

Best practice governance, controls and surveillance would need to be implemented by the administrator and calculation agent to ensure robust fixings. These could include various sub-methodologies to deal with flash orders and other practices that could undermine the reliability of rate fixings. For example, multiple order book snapshots could be taken over a short time window, or a randomizing algorithm could be used to adjust the precise timing of snapshots. In addition, we believe that an index calculated as an average of multiple fixings across the day (for example, two morning and two afternoon fixings) could be more robust. The administrator could also be charged with monitoring for market manipulation, in addition to the checks currently required of trading venue operators.

The MPG Fixing Methodologies Workstream believes that a well-designed and governed MTF fixing could be compliant with IOSCO Principles

Non-MTF Fixing Methodologies for Term OIS Rates

Deriving rates from futures market order books is only currently viable for a USD OIS fixing. FFER futures trade on the CBOT with reasonable volumes and depth of order book so, at least in principle, it should be feasible to derive a solid fixing. A significant advantage of

this approach is that market rates are readily available today. Hence, there is no need to wait for the development of trading venues with CLOBs for US OIS.

The principal difficulty with this approach is the need to interpolate between futures settlement dates to fix constant maturity 1, 3 and 6 month OIS rates. Standard interpolation methodologies do not work well because of the potential for intra-month step changes in the FFER. Depending on the methodology employed, this fitting error is usually under 1 basis point, but can get much larger during periods of financial stress. This will create problems of acceptance amongst swap market participants. Consequently, we are only recommending this approach as a fallback when reliable MTF-based OIS fixings are not available. The interpolation formula would be calibrated so as to minimize the average discrepancy with the OIS fixing for the corresponding tenor over a prior set of days (to be specified) when both rates are available.

We have also considered the possibility of using transactions data from Swap Data Repositories in order to develop transaction-based OIS fixings. This approach could offer certain advantages. Provided there are sufficient trading volumes the use of a VWAP across an entire trading day would make the fixing difficult to manipulate. In addition, the fixing would only utilize publicly available data for actual completed transactions. It could also be possible in the future to aggregate data from multiple trade repositories in order to develop a more robust fixing.

The EUR Workstream of the MPG has recommended sourcing daily OIS transactions data directly from banks (similar to what is being studied for EURIBOR+). It must be noted, however, that a VWAP of transactions data across a trading day would be a fundamentally different index than the EONIA Swap Index currently published by the EBF, as the latter is an 11 a.m. point-in-time fixing. Similarly, the transactions approach will not provide rate fixings consistent with those sourced from MTF snapshots. The transactions approach should be considered as an alternative to, and not a replacement for, other existing and proposed OIS swap fixings.

With a transactions-based approach, significant market events during the observation period could mean that rates from very different market environments are averaged. In such a scenario the transactions-based index would not correspond to a market rate at the time of publication. This could inhibit its acceptance among certain market participants. Market makers would find the rate difficult to hedge and CCPs would not find it useful for the purposes of calculating intra-day margin requirements.

Repo Rates

The CHF Workstream proposes use of the overnight Swiss Average Rate (SARON). SARON is based on Swiss repo transactions, published by SIX Exchange, under regulation of the Swiss National Banks (SNB).

In the US market, a new benchmark based on the General Collateral (GC) Repo rate for government bond financing transactions has been proposed. The rate would be determined by the aggregation of rates from observed GC Repo transactions

3.5. Summary

The MPG fixing methodology assessment can be summarized as follows:

Alternative Rates with a Bank Credit Component

Promising proposals for IBOR+ rates have been made in a number of currencies. In all cases the proposals need further work. With appropriate build out of the proposals, many will likely be IOSCO compliant.

Alternative Rates with No Bank Credit Component

Official overnight rates are already in use as benchmark rates for daily compounding floating legs in the OIS swap market such as FFER and EONIA. These are IOSCO compliant.

Similarly, official sector treasury yields, which have been proposed for the USD and JPY markets, already exist and are IOSCO compliant.

Term rates in this sector can either be derived from the OIS market or can be calculated, on a backward looking compounded basis from the overnight rates. OIS derived term rates are likely to be IOSCO compliant in USD, EUR and GBP, but not currently for CHF and JPY. Backward looking compounded overnight rates are IOSCO compliant if the underlying overnight rates are IOSCO compliant.

4. Benchmark Transitions – Debt Products

4.1. Objectives & Process

The objective of the Transitions work stream is to provide recommendations for transitioning cash and derivatives products in USD, EUR, JPY, GBP and CHF from their respective “IBOR” frameworks to IOSCO-compliant reference rates as proposed by the MPG.

The Transitions work stream was organised in the following way. JPY and CHF sub-streams considered both cash and derivatives products in their reports whilst USD, EUR and GBP were split into cash products and a dedicated Derivatives sub-stream across the three currencies. This approach was taken due to the homogeneity of issues facing derivatives markets across the three currencies.

Each sub-stream worked with their respective currency horizontals to gather relevant jurisdictional information. Within the Transitions work stream, the development of recommendations was collaborative and discussion took place with regular exchanges of ideas occurring through various channels. Input from all of the other MPG work streams was critical to the formation and refinement of recommendations.

In general, each sub-stream differentiated between proposed reference rates that are similar to current IBOR framework in definition, value and volatility (commonly referred to as IBOR+) and those that are materially different (e.g. OIS, central bank, sovereign, secured rates). The former category of rates is expected to face a more straightforward transition path. The latter is expected to require a more complex transition path and faces increasing legal risk the further the final reference rate is from the legacy reference rate in definition, value or volatility.

This summary provides a brief background to challenges arising, then proceeds with an overview of the possible transition paths and a discussion of various transition considerations before drawing conclusions from the work completed.

4.2. Background

It is the understanding of MPG members that in the absence of a well constructed, well communicated and well managed transition plan, a permanent discontinuation of IBOR would lead to significant market disruption.

Parties to outstanding contracts would be forced to rely on “fall-back provisions” or would have to renegotiate contracts bilaterally to some other benchmark.⁹ However, fall-back provisions are not viewed as sufficiently robust for a permanent discontinuation of IBOR and bilateral renegotiation cannot be relied on entirely, as there may be significant numbers of participants that are not able or willing to transition to a new reference rate. Widespread valuation and accounting problems would ensue and friction costs would increase

⁹ With the exception of cleared derivatives, where it may be possible to invoke emergency powers to force a transition without legal recourse to the clearing house.

dramatically, as liquidity would fragment amongst the various potential alternative benchmarks for new contracts.

Even with a transition plan in place, legal risks may still arise, the most significant of which is legal continuity and the risk of contract frustration. Real or perceived differences between old and new reference rates could lead counterparties to argue that their contracts should be discharged under the doctrine of contract frustration. In the event of a permanent discontinuation or “cut-over” of IBOR, the probability that contract frustration claims will arise increases the further the replacement reference rate is from the original definition of IBOR. For example, a transition to a secured rate from legacy IBOR (an unsecured rate) will result in a higher probability of contract frustration claims than a transition to another unsecured rate.

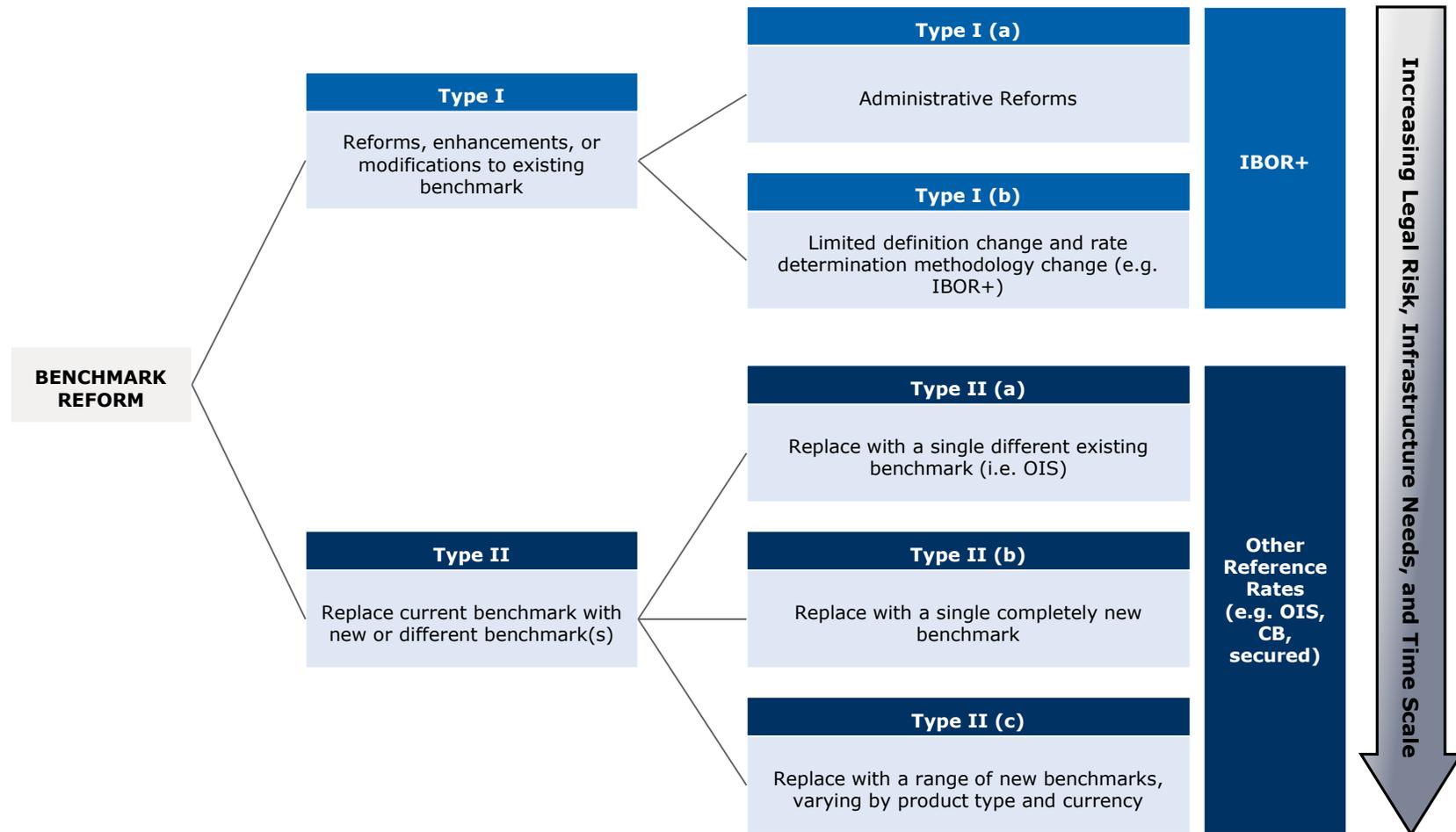
However, MPG members note that whilst constructing a new reference rate with a consistent or similar definition to IBOR may reduce legal risk, if such a rate is systematically different to legacy IBOR in value or volatility, parties to outstanding contracts may experience present value changes, which would lead to undesirable tax effects and could trigger legal challenges.

A successful transition plan, therefore, would minimise market disruption and the risk of legal challenges. Successful transitions have been implemented in the past. For example, neither the transition to EURIBOR for European Monetary Union nor the implementation of the Wheatley Review’s recommendations caused significant market disruption. However, there can be no guarantee of success in transitioning away from the current IBOR framework as a transition of such a magnitude has never before been attempted.

4.3. Overview of Transition Paths

Most sub-streams segregated their analysis into a Type I transition to some form of IBOR+ (a reformed IBOR that may or may not be similar in definition, value and volatility to IBOR) and a Type II transition to reference rates materially different to IBOR. Those that did not differentiate in this manner took a more conservative approach, recommending a transition path that would fit all final outcomes for reference rates. The thought process used to arrive at possible transition paths is depicted in the Figure below.

Figure 2: Transition thought process and categorization



The transition paths presented here are interchangeable across currencies and are not mutually exclusive, so transition to multiple rates within a currency and across currencies is possible. This approach allows cash and derivatives products to take different routes without leading to increased disruption.

4.3.1. Type I Transitions: To IBOR+

Seamless Transition (Type 1a)

- If IBOR+ is similar in definition, value and volatility to IBOR, a *Seamless* transition is possible. IBOR+ would replace IBOR on the relevant data publication pages and contracts would automatically reference the new reference rate.¹⁰
- This evolutionary change would be the most efficient possible transition. At the very least, no transition measures need to be implemented. At most, a market-wide protocol to introduce a new definition or fixing method for IBOR could be implemented by relevant trade bodies.
- This transition can be based on a proposed rate that is materially similar to legacy IBOR in value, definition, or volatility, as a non-PV neutral transition might occur for some products if there are significant differences. Non-PV neutral transitions may provoke legal challenges and jeopardise contractual continuity. However, taking the implementation of the Wheatley recommendations as a precedent, implementing minor changes to IBOR should not result in such challenges. Moreover, even if there is a material difference, in some situations a case could be made that the proposed rate is actually more representative of the intended legal definition of the benchmark than that provided by the legacy fixing.
- A lead-in period of 18 months would be sufficient for infrastructure development by the administrator and submitters to adjust to the new fixing methodology, and for any requisite testing to be undertaken by the Benchmark Administrator to ensure the robustness of the new fixing.
- It should be noted that the availability of IOSCO-compliant IBOR+ fixings (that would enable a *Seamless* transition) is not a given in all currencies and tenors¹¹.

Successor Rate Transition (Type 1b)

- For a IBOR+, or another unsecured benchmark rate, that differs in definition, value or volatility to IBOR, a *Successor Rate* transition may be possible.
- After a minimum two year lead-in period, the publication of legacy IBOR would cease and publication of the successor rate would commence on the following day, effectively

¹⁰ Though the terminology IBOR+ is used, in respect of a *Seamless* transition the resulting reference rate would still be called IBOR (i.e. there would be no change of name to IBOR+).

¹¹ See USD, GBP & EUR Reference Rate Menu & Fixing Methodology reports

converting all contracts to the new reference rate. The lead-in period is longer than for a *Seamless* transition above, due to the extra preparatory work to develop risk mitigants as described below.

- This transition relies on the assumption that courts would rule that parties had originally entered into contracts with a view to preserving legal continuity, and therefore the new reference rate can be deemed an implicit successor rate for the discontinued legacy IBOR.
- Whilst this can be a viable strategy (with successful precedents), there are drawbacks. Firstly, the doctrine of implied terms is not available in civil law systems. Therefore, a different strategy would need to be developed for such jurisdictions (which include much of Europe and Japan, for example) and legislation may be required, potentially undermining global coordination efforts. Secondly, whilst the probability of success can be gauged by obtaining legal opinions, success itself cannot be ascertained until after implementation. Finally, transitions to reference rates that are systematically different in value or volatility to legacy IBOR may cause PV effects, which may lead to undesirable tax effects and could trigger legal challenges.
- The following options would mitigate against legal challenges and promote the success of a *Successor Rate* transition:
 - Published legal opinions in support of IBOR+ as an implied successor rate (common law jurisdictions)
 - Legislation (civil law jurisdictions)
 - Industry and regulatory opinions of support
 - Aligning specifics of new rate to legacy LIBOR (e.g. publishing location, time, administrator)
 - A lead-in period for the new IBOR definition/fixing method to aid the convergence of IBOR and IBOR+ prior to transition (see Derivatives and GBP Debt sub-stream reports for further discussion).
- The EUR sub-stream notes that any legislation would need to be implemented on a supranational basis whilst the JPY sub-stream suggests a very low probability of success for this path.

4.3.2. Type II Transitions: To Other Reference Rates (Type 2a, b, c)

Market Led-Transition

- A *Market-Led* transition where transition to a newly introduced benchmark is voluntary would eliminate legal risk entirely as outstanding contracts are grandfathered and allowed to mature naturally.
- Market participants would have the option to enter new contracts referencing the new benchmark and convert portfolios to the new rate via basis swaps. Transition to the new rate would be entirely voluntary.

- Problems that may arise include inertia in moving to the new reference rate and bifurcated liquidity between contracts referencing the legacy and new reference rates. Incentives to transition voluntarily and promote attrition of legacy IBOR contracts could help to address these problems. The requirement of a parallel transition period may also lead to problems with tax and accounting, portfolio management and corporate treasury systems.
- Under this transition path, legacy IBOR may need to continue for a period at least long enough that outstanding residual contracts have run off to a level where a final discontinuation of IBOR is deemed not to represent a systemic risk. Submitting banks are likely to object due to the burden of providing legacy IBOR submissions and the ongoing potential legal liability.
- For certain products (e.g. securitised products) and IBOR tenors (see dedicated section on discontinuing 6m, 12m tenors), a market-led/voluntary transition is preferred as it is the only foreseeable way of minimising the risk of legal challenges associated with a final cut-over.

Parallel with Cut-Over Transition

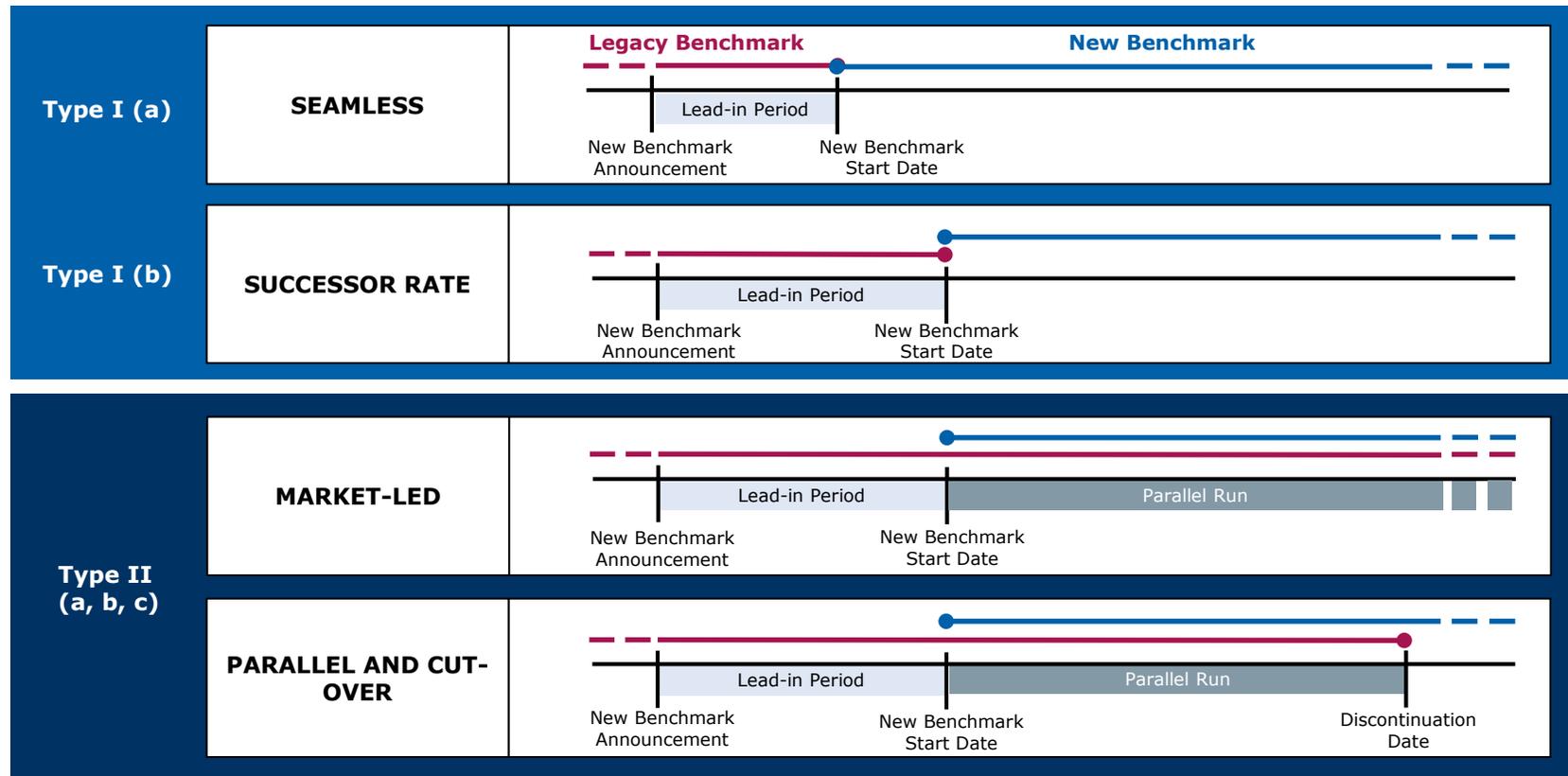
- Should a final cut-over be required by policymakers, any new reference rate should be run in parallel with legacy IBOR before the forced final transition (which would occur by means of a discontinuation in legacy IBOR).
- The key difference to the *Market-Led* approach is the ex-ante announcement of a discontinuation in legacy IBOR at some future cut-over date. Such an announcement is likely to serve as a strong incentive to transition voluntarily, thereby increasing attrition, though it may cause PV effects on the day of announcement and reduce liquidity for those unable to transition voluntarily ahead of the cut-over.
- The parallel transition period would reduce risk of market disruption and legal challenges by providing time for outstanding contracts to mature, thereby reducing the stock of outstanding contracts at the final discontinuation date. Market-led initiatives such as compression/conversion cycles and bilateral renegotiation could further reduce the residual stock of legacy contracts before the final transition date. Such a period would also allow for testing and infrastructure development.
- Sub-streams recommend that the new reference rate is run in parallel to legacy IBOR for a period of time ranging from three to ten years.
- On the discontinuation date, in the absence of specific legislation to force conversion, residual outstanding contracts would not automatically convert to the new rate. It may be possible to convert residual outstanding contracts using a conversion factor approach, though this would have to be negotiated bilaterally or take place as part of a protocol (only available for some markets). Contracts that do not convert voluntarily before, or at, the discontinuation date would not necessarily become unenforceable, as they may have some success using fall-back provisions, though such an approach is seen as highly risky.
- Following the parallel transition period, it is believed that IBOR could be discontinued in JPY and CHF without significant disruption. However, in USD, GBP, EUR and Derivatives there are products (e.g. securitised products) where transition risk is particularly high

and hence a final cut-over could cause significant market disruption. The official sector must weigh the cost of this potential disruption with the benefit of a final conversion in deciding between the *Market-Led* and *Parallel with Cut-Over* transition paths.

- The use of a conversion factor to fix the basis between LIBOR and the new benchmark rate may help to reduce PV effects for linear products, and therefore reduce the risk of legal challenges. However, it is not possible to identify a conversion factor for volatility term structures, so the imposition of a conversion factor may cause non-PV neutral effects for non-linear products. See the Derivatives Transitions report for a detailed discussion on conversion factors.

Problems with tax and accounting, portfolio management, and corporate treasury systems may arise from running benchmark rates in parallel. In this respect, it may be advisable to consider a longer lead-in period coupled with the introduction of a successor rate clause for any new contracts to ease the forced final transition.

Figure 3: Graphical representation of transition paths



4.4. Transition Considerations

Transition Management

To manage any transition effectively, the official sector is strongly advised to form a working group comprising global official sector bodies, industry bodies, benchmark administrators and market participants. Such a group would be able to provide central coordination on transition issues and prevent fragmentation of transition plans. Indeed, MPG members expressed concern that such fragmentation is already occurring, with some jurisdictions pushing forward with proposals to change benchmark rates without considering effects on other jurisdictions.

Central transition management would allow for central communication and dissemination of information, which is considered key by MPG members. Due to the potentially market moving nature of communications surrounding any transition, MPG members recommend that communication is handled at the highest level of global official sector bodies (FSB, BCBS), and legal advice is sought before any public release. To minimise confusion and prevent market fragmentation, a clear framework must be presented. Policymakers must also consider context as well as content in respect of any communication.

Where appropriate, the choice of benchmark administrator should be reviewed, with a focus on infrastructure reliability over the long term. The official sector should also take steps towards greater centralisation of data captured by the different trade data repositories, and should take action to develop repositories in jurisdictions where they are inadequate (e.g. the UK). MPG members felt better data on underlying unsecured bank transactions was required to form clear views on the likelihood of success of certain reference rate proposals. It is also thought that greater access to data would provide greater transparency to benchmarks. MPG members do not suggest the publication of raw data is necessary for this to be workable, as anonymised data or aggregate measures (e.g. averages by contract type and/or counterparty type) may suffice.

Transition Timing

Whilst *Seamless* and *Market-Led* transitions can be timed independently within currencies and across currencies, *Successor Rate* and *Parallel with Cut-over* transitions would require synchronisation across currencies, products and instruments, or would otherwise risk disruption to cashflows and failure of hedges. Synchronisation on such a global scale will be extremely challenging to execute, particularly for a *Successor Rate* transition as common law jurisdictions and civil law jurisdictions will require significantly different transition frameworks (legal opinions in the former, legislation in the latter).

In considering specific timing issues, MPG members considered the impact that the choice of a specific final cut-over day might have across products that are being used to hedge or offset other products. For example, products with mismatches in fixing schedules need particularly careful consideration when determining a final cut-over day. Protocol solutions where contracts are transitioned to standardised fixing dates around the transition date or an additional, one off re-fix is inserted on the transition date may solve this problem.

MPG members also discussed encouraging standardised fixing schedules (e.g. on IMM dates) for new contracts. The benefits would include greater cashflow matching within

portfolios, increased fungibility of contracts and greater synchronisation for transition planning. However, large spikes in volumes of contracts fixing on certain days could encourage manipulation, and standardised fixings do not make sense for large sections of the market (e.g. corporates) as flexibility in fixing schedules is needed to match expected cashflows.

Products Presenting Additional Transition Challenges

The four transition paths outlined above apply generally across products and currencies. However, in their reports, Transitions work stream members have identified several product types – particularly retail, securitised and non-linear products – that present additional transition challenges, and which may require bespoke solutions.

For retail products (particularly mortgages), the sheer number of outstanding contracts renders bilateral renegotiation impossible whilst protocol solutions are unlikely to be effective in transitioning all borrowers due to the heterogeneity of mortgage terms. Furthermore, if the transition is considered to be disadvantageous for borrowers, legal challenges may arise. Recommendations for overcoming these challenges are currency specific and can be found in the respective sub-stream reports. However, the official sector should take the lead in educating the public regarding the reasons for transition and in directing any forced final transition. This is particularly true given the public's view of the financial sector and the heightened risk of contract frustration that a forced transition would carry.

For securitised and structured credit products, three broad challenges arise. Firstly, documentation is not standardised. Secondly, trustees may not be able or willing to implement transition changes and, thirdly, there tend to be a number of embedded instruments and hedges referencing IBOR for which simultaneous changes would be required. Further considerations include whether a change in benchmark rate may impact the ability of a structure to pay out as originally intended and whether any proposed change constitutes a restructuring event. In both cases, trustees may be unable to act without noteholder approval, which in the event of a restructuring event is likely to require a supermajority. Before any attempt is made at transitioning securitised products, testing should be undertaken to fully understand the impact on cashflow waterfalls of a change in benchmark rate as well as any role that conversion factors have to play in ensuring a present value neutral transition. MPG members were not able to determine an elegant solution for transitioning securitised products and so are forced to recommend a *Market-Led* approach (grandfathering).

For non-linear products, *Successor Rate* or *Parallel with Cut-over* transitions may impose volatility term structures that are different to legacy IBOR, leading to non-PV neutral effects that may occur as early as the time of announcement of such plans. Because of the potential for such effects, Transitions members prefer *Seamless* and *Market-Led* transitions for non-linear products.

Incentives/Disincentives for Market Led & Parallel with Cut-Over Transitions

For transition paths that include a parallel transition period, the official sector may wish to consider incentives (disincentives) to encourage (discourage) the use of the new reference

rate (legacy IBOR). Such actions would increase the probability of success of the new rate by reducing inertia.

Incentives (disincentives) could take the form of preferential (disadvantageous) tax, accounting or capital treatment for contracts referencing the new rate (legacy IBOR). Stronger transition incentives such as restricting or prohibiting new contracts written on legacy IBOR would maximise attrition of legacy contracts, though it is thought that any actions to disincentivise transactions based on legacy IBOR would be detrimental to liquidity in derivatives markets. As a result, MPG members recommend a lighter touch whereby the use of contracts referencing the new rate (legacy IBOR) is encouraged (discouraged) by the official sector.

Actions such as compression/conversion cycles could be implemented to promote liquidity in the new rate, aiding transition of legacy LIBOR portfolios before the final conversion date. Explicit conversion targets could be agreed with dealers, other financial sector and non-financial sector participants in derivatives markets to expand the use of the new rate during the parallel run (a similar action was taken by the Fed in 2009 to encourage central counterparty clearing for OTC derivatives).

Given the variety of considerations facing different market participants, transition incentives would need to be tailored to the various participant types. Corporates, for example, would require different transition incentives than financial sector participants.

“Closing the Faucet”

To ease any future transition, MPG members discussed amending standard documentation language in new contracts going forward to improve fall-back provisions to more easily allow a conversion of the benchmark should it be necessary. This mechanism was given the term “closing the faucet” as it refers to reducing the volume of difficult-to-handle legacy contracts that would otherwise need to be dealt with at a later date.

The MPG discussed in detail the potential implications of introducing provisions/clauses into interim contracts. The clear benefit of such a move would be the increased ease of transition for contracts that include the new language, and the reduced number of outstanding legacy contracts as volumes mature. The disadvantages of such an action would be the potential bifurcation of contracts, which could lead to pricing differences between new and legacy contracts, and the detrimental effect on liquidity in both the new and the old contracts. “Closing the faucet” could also convey negative connotations about old contracts and may increase the legal burden of transition for contracts that do not contain the new provisions.

For these reasons, MPG members recommend caution when adopting such a strategy to avoid the risk of bifurcation. This may be achieved by publishing legal opinions stating that the language contained in new contracts would be implied into legacy contracts, and/or obtaining the public support of industry and regulatory bodies. Whilst the MPG was not able to consider an exhaustive list of potential language options, the inclusion of the language “or any successor rate” into fall-back provisions was considered by MPG members to be consistent with industry moves to update language in documentation whilst minimising risk of bifurcation. Any such language should be standardised across products and markets.

Tax and Accounting

A preliminary impact review which sought to identify tax and accounting issues that may arise (under IFRS) from the use of the various benchmark transition paths has been conducted with external assistance. From an accounting perspective, the primary complications arise in the areas of fair value designation and hedge accounting (also pointed out in the EUR Debt Transitions report).

With the fair value designation, a change in input data such as a change in interest rate could lead to problems with regards to valuation techniques under the IFRS 13 requirements. Different input data could also result in an economic effect in the case of early termination or settlement of asset or liability.

Hedge accounting issues arise mainly with the introduction of a second interest rate curve, as would be the case in the transitions with parallel periods (*Market-Led* or *Parallel with Cut-over*). In certain scenarios, measurements of hedge instruments with different curves could result in mismatches and inconsistencies that would lead to ineffectiveness of the hedge.

The risk of a significant accounting issue arising depends on the rate and transition path chosen. While a *Seamless* transition would not be impacted by the accounting issues described, Type II transitions (*Market-Led* and *Parallel with Cut-over*) are likely to be impacted heavily as it is reasonable to expect that only one discounting curve for similar financial assets would be defined, though accruals of assets may use differing benchmark rates. Different accrual and discounting curves on assets could lead to accounting impacts during any parallel transition period. If it is possible that only *new* financial assets / liabilities use the new reference rate, then this problem could be mitigated. However, the *Parallel with Cut-over* transition would still face problems at the cut-over date as the changing of valuation curves is likely to disrupt hedge effectiveness tests, leading to income statement effects.

With regards to tax, a change in profit or loss due to a change in benchmark rates will have an impact in the tax year in which it occurs. Changes in income that are recognised under equity are deferred, giving rise to deferred tax assets / liabilities. This is likely to be a greater issue for *Parallel with Cut-over* transitions due to the potential for PV changes on the day of conversion.

The tax and accounting implications of benchmark transition will be extremely important for market participants, thus any uncertainty surrounding these issues could lead to serious market confusion and disruption. For this reason, MPG members recommend that the official sector conduct a much more detailed review of tax and accounting issues before taking further steps towards benchmark transition.

Discontinuation of Legacy IBOR at 6m and 12m Tenors

Should IOSCO-compliant fixings for IBOR+ be not available in all currencies at 6m and 12m tenors, *Seamless* transitions would be impossible, leaving only the *Successor Rate*, *Market-Led* and *Parallel with Cut-over* transition paths available to either a shorter tenor of IBOR+ or to the same tenor of a different benchmark.

As the remaining available transition paths contain different elements of transition risk, MPG members were not able to determine an elegant solution for the discontinuation of legacy IBOR at these tenors. As such, MPG members strongly recommend encouraging the use of shorter tenors in international markets for new contracts and taking a *Market-Led* approach for outstanding contracts that reference longer tenors, with regular monitoring of outstanding volumes to determine when legacy IBOR can be safely discontinued. The recommendation to use shorter tenors in international markets is a broad recommendation that covers all markets where market convention is to transact at longer tenors. For example, the convention for GBP & EUR interest rate swap markets is to quote versus 6m fixings, whilst EUR retail mortgages often reference 6m and 12m tenors. Where transactions referencing longer tenors occur solely due to market convention, the official sector should take action to promote the use of shorter tenors for new transactions.

Whilst MPG members generally recommend a *Market-Led* approach for the discontinuation of longer tenors, two potential exceptions should be noted. Firstly, clearing houses may be able to invoke emergency powers to transition cleared derivatives to shorter tenors without recourse from counterparties if given sufficient advance notice (at least six months) – effectively a *Parallel with Cut-over* approach. However, this approach may be counterproductive if implemented without consideration to cash products at these tenors. Secondly, MPG members noted it may be possible to transition EUR retail mortgages to local country central bank fixings using a *Successor Rate* transition, though this would need to be studied in detail to determine viability.

Given the challenges presented by the possible discontinuation of some longer tenors, MPG members note it may be more palatable to the official sector and participants to ensure IOSCO-compliant IBOR+ fixings are available. It should be noted, however, that the availability of IOSCO-compliant IBOR+ fixings *per se* does not eliminate legal risk. For example, in USD, though a 6m LIBOR+ will be available, it still may not be possible to effect a *Seamless* or *Successor Rate* transition without significant risk of triggering contract frustration claims or other fiduciary challenges.

4.5. Transition Conclusions

Given the potential for serious negative knock-on effects triggered by successful contract frustration claims, or legal challenges due to non-PV neutral transitions, MPG members have a strong preference to avoid, or at the very least minimise, such risk.

Therefore, whilst the Transitions work stream presents transition paths that encompass all proposed reference rate frameworks, the work conducted has led the group to a strong preference for a transition to IBOR+ (*Seamless*) for debt products and for a dual transition to OIS (*Market-Led*) and IBOR+ (*Seamless*) for derivatives. Although many derivatives market participants would have good reasons to welcome the transition to OIS, as it is the predominant contractually specified discount rate for cleared and collateralised bilateral swaps, there is a legitimate demand for derivatives referencing a credit risky rate, so the group would not advocate a forced final conversion to OIS.

MPG members are aware that *Seamless* transitions may not exist for some currencies and tenors. In such cases, either a *Successor Rate* transition or *Market-Led* transition would be preferred by MPG members, depending on the final reference rate and the results of further study with regards to i) tax and accounting issues and ii) the ability to implement a *Successor Rate* transition.

A *Parallel with Cut-over* transition is not preferred in any scenario as the use of a forced final conversion may cause non-PV neutral transitions, which may lead to undesirable tax effects and legal challenges.

Finally, the inclusion of the language “or any successor rate” in fallback provisions for new contracts may assist in any future transition without being seen to significantly increase risk of bifurcation of liquidity.

5. Benchmark Transitions – Derivatives Markets

5.1. Overview and objectives

We outline below the findings and recommendations of the Transitions workstreams for OTC derivatives markets. We address here transition issues which apply across the Euro, USD and GBP markets and refer to the “EURIBOR”, “USD LIBOR” and “GBP LIBOR” rates collectively as “IBOR”. These recommendations are intended to provide guidance to the OSSG for further discussion between market participants and the official sector.

We consider two scenarios: 1) the transition from existing IBOR rates to Overnight Index Rates (OIR) and/or Overnight Index Swap (OIS) rates and 2) the transition from existing IBOR rates to new, modified “IBOR+” rates. We also consider the transition of longer tenor IBOR to the 3-month tenor as a possible additional step in scenario 2. We consider this transition as longer dated IBOR+ fixings may prove to be less robust in certain markets.

A third scenario would be a possible transition for USD LIBOR to T-Bill rates. This is a possibility considered by the USD workstream; however, the Euro and GBP workstreams believe that only OIS or IBOR+ are feasible term reference rates for their markets. We discuss this transition in section 5.3.3 below.

Scenarios one and two are not mutually exclusive; indeed, both should proceed in parallel in order to provide market participants with a choice of IOSCO compliant reference rates. While some are likely to welcome the transition to OIS, others may wish to retain a reference rate with a component of credit and liquidity risk. We anticipate that dealers, active funds and end users seeking primarily to manage interest rate duration risk would transition most of their activity to OIS. Conversely, market participants hedging or match funding IBOR-linked cash portfolios would welcome a transition to IBOR+. Broader acceptance of OIS amongst end users will be dependent on whether related cash products also transition to OIS.

5.2. Summary of key findings and recommendations:

5.2.1. Transition from IBOR to OIS

- A transition to OIS should not be imposed by regulators, but should be adopted and led by active markets participants. We believe that many will welcome a transition to OIS and that it should be possible voluntarily to transition the majority of contracts (including legacy contracts) from IBOR to OIS. ISDA should take a lead role in coordinating the transition, with appropriate support to facilitate the transition from the official sector (sections 5.3.1.2 and 5.3.1.3 below elaborate on the steps in this transition).
- Dealers and other active market participants would lead the transition process by converting existing swap positions to OIS to the greatest extent possible. The transition would be effected through the execution of OIS/IBOR basis trades to convert legacy positions and through the increased adoption of OIS as the format of choice for new term IRS.

- Converting active market participants would stimulate liquidity and price transparency of longer tenor OIS. Over time, this would promote increasing acceptance of OIS as an effective reference rate among the end user community (including both financial firms and corporates). This could encourage a broader transition to OIS throughout the market.
- A full and final conversion to OIS (via a market-wide conversion protocol) for all legacy contracts is unlikely to be feasible or advisable. Consequently, we strongly recommend that the official sector, administrators and panel banks take all necessary steps to ensure that IOSCO compliant IBOR or IBOR+ fixings remain available in critical tenors for those contracts that do not voluntarily transition.

5.2.2. Transition of IBOR to IBOR+ (including potential tenor transition to 3 months)

- The development of, and transition to, EURIBOR+ should be jointly led by the EBF and the official sector. Similarly, ICE Benchmark Administration should lead the transition to LIBOR+ in consultation with the official sector.
- A key objective of IBOR+ development should be to encourage evolutionary change to existing IBOR rates and thereby facilitate a seamless/successor rate transition; otherwise, the transition process could be complex, give rise to legal risks, and may not ultimately prove successful.
- A seamless/successor rate transition to IBOR+ should be adopted if the legal risk is deemed to be acceptable or manageable. This would involve a cut over in methodology on a designated date, following a notice period. IBOR and IBOR+ should not be allowed to run in parallel prior to cut over as this could increase the risk of legal challenge. In this scenario, a notice period of 18 months should be sufficient time for the benchmark administrator to build systems and infrastructure and to test the resilience of the new methodology.
- Otherwise, IBOR and IBOR+ would need to run in parallel during an extended (5 to 7 year) transition period prior to a market-wide protocol. We believe that this transition path for IBOR+ would prove at least as challenging as the transition to OIS.
- We also think that a market wide protocol to convert 6 and 12-month IBOR tenors to 3 months should be avoided if possible. This transition would have very significant market impact. In the Euro market, for example, we estimate that over 75% of contracts reference tenors beyond 3 months.

5.3. Review of benchmark transition options:

5.3.1. IBOR to OIS

5.3.1.1. Overview

A priori, a transition to OIS would appear to present significant challenges. OIS is a fundamentally different rate from the IBORs as it does not include a term credit or liquidity premium. On the other hand, there are already well-established, clearable OIS markets with

robust liquidity out to two years and IBOR/OIS basis markets which are liquid out to 50 years. The existence of these markets could help to facilitate an orderly transition.

Moreover, many market participants would have good reasons to welcome the transition to OIS. OIS are the predominant contractual discount rates for cleared and collateralized bilateral swaps. Hence, swaps that reference IBOR rates generate IBOR/OIS basis exposures (i.e. the basis between the reference rate and the discount rate). Clearly, a move to standardize OIS for both discount and reference rates would remove that basis risk.

Consequently, we believe that an industry-led transition is both possible and desirable. However, we believe appropriate support from the official sector could greatly facilitate the process. This is because transition will require broad and active participation to be successful. Moreover, the investment in firm level and industry level systems and infrastructure will be significant. We believe that official sector support could help to ensure requisite levels of investment are made.

The USD and GBP workstreams also consider alternative overnight rates. The USD workstream is considering the Fed's reverse repurchase facility rate (RRP), interest on excess reserves (IOER), and the overnight general collateral repo rate (ONGCR). The GBP workstream has proposed the use of the BOE base rate. If any of these were to be adopted, an alternative OIS market would need to be developed. However, these new rates would almost certainly not be able to replace existing OIR as the basis for discounting cleared and collateralized bilateral derivatives as OIS is contractually specified. In this scenario, a transition of the existing OIS market to the new overnight rate would need to precede transition from IBOR to OIS. This would materially increase the cost and complexity of transition. If the OSSG believe that OIR transitions may be necessary or desirable, we recommend careful planning in close coordination with market participants in order to minimize the risk of unexpected consequences for existing contracts.

5.3.1.2. *Role of industry*

ISDA should take a lead role in coordinating the transition to OIS. Dealers and active markets participants should move first and this would stimulate liquidity and price transparency for longer tenor OIS. The industry could lead a number of initiatives as part of this transition process:

- The design and implementation of compression and conversion cycles designed to convert legacy portfolios to the new rate en masse.
- An auction process whereby active derivatives market participants would agree to convert submitted portfolios at a basis curve established via auction.
- The development of OIS benchmarks across the yield curve.
- The development of OIS trading on electronic platforms.
- Futures exchanges would need to work with prospective market makers to launch, re-launch or enhance liquidity in OIR and OIS futures contracts. As the market transitions to OIS, there should be significant demand for these hedging instruments. There are relatively liquid USD FFER futures contracts listed on the CME, for example, though currently there is no liquidity in similar contracts for the Euro and GBP markets.

As liquidity and price transparency increases in longer-dated OIS, acceptance of OIS should gradually increase. We believe that many active market participants would choose OIS for new positions and voluntarily execute basis trades to convert existing positions from IBOR to OIS.

A potential risk, however, would be a bifurcation of liquidity between IBOR swaps and OIS. In the end case, OIS would become market standard across all tenors and IBOR would primarily be traded as a basis vs. OIS (the inverse of today's market reality). This might increase bid offer spreads for those market participants still requiring IBOR based swap hedges, which would act as an increased incentive to switch to OIS.

5.3.1.3. *Role of official sector*

The official sector could greatly assist the transition process. Firstly, the official sector could agree a timeline for explicit conversion targets with dealers and other major market participants who are willing to take part. This could be similar to the commitments made by major dealers to the New York Fed, beginning in 2009, to facilitate the transition to central clearing. Commitments could be made to convert specific volumes of outstanding portfolios by specified dates, either in absolute terms (\$ values) or in relative terms (% notional outstanding).

The official sector could also clearly communicate all methodological (or other) changes to IBOR and a timeline for their introduction. In addition, any methodology that might be used to establish a future protocol conversion basis to OIS must be clearly communicated well in advance. This will help promote liquidity in basis markets.

In addition, the official sector could lead a review of any regulatory capital, accounting and tax rules that might discourage users from transitioning to OIS. For example, European insurance and pension funds may have concerns over a potential increase in the present value of their liabilities when these are discounted using an OIS curve rather than a EURIBOR curve. This could be mitigated if accounting bodies were open to discounting liabilities at a spread to the OIS rate. National regulators could also provide incentives for banks to transition benchmarks through targeted changes in capital adequacy requirements.

We do not recommend imposing outright restrictions on new contracts referencing IBOR as this could disrupt market liquidity. However, we could support the proposal that contracts originated during a transition period have adequate provisions and mechanisms to help ensure orderly conversion at a later date, provided these amendments could be implemented without adversely impacting liquidity in legacy contracts.

5.3.1.4. *Risks of market-wide conversion protocol*

Only a relatively small proportion of current outstanding derivative notionals are directly associated with hedges of IBOR-linked cash positions. Consequently, we believe that a significant majority of the market could voluntarily transition to OIS over the medium term.

Following a 5 to 7 year transition period, it would be possible to attempt to convert the residual contracts using a market wide protocol. Due to the inter-connected nature of cash and derivatives markets, this would only be effective if it were coordinated across all asset classes. This would be a daunting task and would require coordination amongst all relevant industry associations, including ISDA, the LMA, SIFMA, and AFME among others. Moreover,

as protocol-based or other negotiated conversions may not be plausible for many cash market instruments, it would be necessary to rely on automatic conversion of contractual references for these contracts.

Any full and final transition to OIS, followed by a discontinuation of IBOR, is ultimately a public policy choice that would require significant support and coordination from the official sector. Moreover, this choice would be based on the presumption that all derivatives and cash market end users agree that a transition to OIS is desirable. While we think such consensus is unlikely in the near term, it is an option we consider here if only to highlight the issues and challenges a protocol-based conversion would entail.

In order to secure voluntary adherence to the protocol, a fair market term structure for the IBOR/OIS basis would need to be fixed at the time of conversion. Notwithstanding some significant reservations regarding how the term structure is fixed, conceptually this could work well for linear products. For instruments which embed volatility (caps, floors, swaptions and other structured volatility dependent payoffs), we think it will be more difficult to establish a present value (PV) neutral conversion mechanism. The term volatility structure of IBOR would simply be replaced by that of OIS from the date of conversion. Any market participant with volatility sensitive contracts beyond the conversion date could face an immediate gain or loss from the date conversion is announced. However, very few long-dated OIS-linked instruments which embed volatility are currently traded and, a priori, it is not obvious whether implied OIS volatility would be higher or lower than IBOR volatility. An extended transition period could allow market participants to voluntarily adjust their volatility exposure. OIS and IBOR volatility levels would gradually converge as we approached the final conversion date, thus minimizing any PV gains or losses.

Fixing a final and irrevocable conversion basis will also be challenging. A fixing on a single day would seem arbitrary and may not produce a satisfactory result. The knowledge that a significant volume of contracts would convert on a pre-determined date could significantly affect basis trading levels going into the fix. A fixing that represents an 'average' over a longer time horizon could be preferable. In addition, a fixing for the entire term structure may be overly complicated and difficult to explain and implement.

An alternative would be to fix a single IBOR/OIS spread for the entire term structure. One possible approach is to use the 1y1y forward basis set one year prior to the transition (based on an average of multiple fixings over, for example, a 30-day period). This will not be entirely PV neutral, as it will flatten the forward basis from the date of announcement. However, this approach could be workable.

Finally, a protocol may be difficult to agree if some market participants are uncertain about the tax and accounting implications of conversion. Such participants may include counterparties who account for derivatives on an accruals basis. In addition, those who use derivatives to hedge cash market instruments may be unwilling to convert if their positions would take on material basis risk in consequence.

Initial legal input suggests that automatic conversion of residential mortgages and other consumer loans to a fundamentally different index like OIS would entail material legal risk. The situation could be similar for other cash markets where protocol-based or negotiated conversions are implausible (e.g. securitizations and other broadly distributed securities referencing IBOR). We would also face challenges with any attempt to convert swaps with securitization vehicles.

Consequently, we do not believe a full and final conversion to OIS via protocol is a viable option across all instruments and all market participants. We believe a significant proportion, but not all, of the OTC derivatives market could voluntarily transition to OIS. Therefore, we strongly recommend that the official sector, administrators and panel banks take all necessary steps to ensure that IOSCO compliant IBOR or IBOR+ fixings remain available in critical tenors for those contracts that do not voluntarily transition.

In the event IBOR is discontinued in some tenors with no successor rate, we note that ISDA has a well-accepted protocol for dealing with cessation of tenors which relies on interpolation. This protocol has been used to eliminate less critical, intermediate, IBOR tenors. However, if all longer dated tenors were discontinued in a given market, there can be no assurance that a protocol based solution could be agreed and implemented. We also note that CCPs may be able to invoke emergency powers to transition cleared derivatives to shorter tenors if given sufficient advance notice. However, any potential solution for cleared contracts may be constrained by traded levels in tenor basis markets, and how related bilateral OTC and cash market products are dealt with. Consequently, we believe that the cessation of all longer dated tenors in a given market could result in widespread market disruption and contract frustration.

5.3.2. IBOR to IBOR+

5.3.2.1. Overview

In principle, this should be a more straightforward conversion as the two rates are conceptually similar. Both include bank credit and liquidity premiums and it could be argued that IBOR+ is simply a transactions-based representation of IBOR. However, there are material differences: IBOR+ is based on both a wider range of transaction types and a broader participation of banks, could require a redrafted definition, and might result in different benchmark levels and volatilities.

5.3.2.2. Seamless/Successor rate transition

A critical question is whether IBOR+ could be considered, from a legal perspective, to be simply a methodological change to IBOR, or if instead it should be considered a distinct index. If the legal risk proves acceptable, then a seamless/successor rate transition to IBOR+ should be adopted. This would involve a cut over in methodology on a designated date, following a notice period. Ideally, the IBOR name would be retained post transition. We would expect all contractual references to IBOR to use the revised fixings from the date of transition. In order to reduce the risk of legal challenge, we recommend adopting an IBOR+ that performs well in back tests against IBOR, both in terms of average level and volatility. However, IBOR and IBOR+ should not be allowed to run in parallel prior to transition as this could increase the risk of legal challenge.

In this scenario, the length of the notice period prior to cut over should be determined by the time required to build systems and infrastructure supporting the new calculations. In addition, we would need to allow sufficient time to test the resilience of the new approach under stressed market conditions. We believe a notice period of approximately 18 months would be required.

5.3.2.3. *Risks of market-wide conversion protocol*

If the legal and operational risks associated with a seamless/successor rate transition are deemed to be unacceptable or unmanageable, IBOR+ would need to be launched in parallel with IBOR for an extended period, leading up to an eventual market wide conversion. During this time, we would expect an IBOR/IBOR+ basis market to develop (similar to the basis market that currently exists between EURIBOR and Euro LIBOR).

However, following the logic of section 5.3.1, it is likely that the majority of dealers and active funds would transition to OIS rather than IBOR+ in the event that IBOR is phased out. Hence, there will not be the same stimulus of increased liquidity and price transparency for a transition to IBOR+. Liquidity flows between end users would need to develop, which could take time. This will add complexity to achieving a basis fixing for a PV neutral market wide conversion. Full and final conversion to IBOR+ presents all the same challenges, and more, as a conversion to OIS.

5.3.2.4. *IBOR/IBOR+ convergence*

More fundamentally, we suspect that many end users may have concerns over any basis between the two indices as they ostensibly represent the same market rate. In order to mitigate the risks of conversion, the benchmark administrator and official sector might consider steps that could promote convergence of the two indices in the run up to conversion. For example, during the notice period the administrator could collect and publish inputs used in the IBOR+ calculation methodology. Contributing banks could then be encouraged to use this data to refine their own IBOR submissions. The objective would be to align IBOR and IBOR+ fixings as closely as possible, or at least for any basis to be readily understood and predictable.

5.3.2.5. *Tenor transition to 3-month IBOR*

We consider this specific transition in the context of the Euro markets, though a similar analysis could apply in other markets. There are active basis markets for 3-6s in Euros (and to a lesser extent in 3-12s) so voluntary conversion could begin immediately (arguably, it is already ongoing de facto). Active market participants would likely welcome transition as EURIBOR futures liquidity is concentrated in the 3-month tenor. However, a market wide conversion protocol presents similar issues to those already discussed. A full term structure would need to be fixed for the basis on the conversion date. Conversion would flatten the term structure of EURIBOR volatility, so would not be PV neutral. This could be minimised, but not eliminated, by pushing out the date of conversion.

This transition would have a very significant market impact as we estimate that over 75% of EURIBOR linked contracts reference tenors beyond 3 months. In addition, the Euro 1 trillion residential mortgage market (where legal risk is arguably highest) most often references 6 to 12 month tenors. Consequently, we think a transition of EURIBOR tenors via protocol should be avoided if possible. Rather, we should strive to develop acceptable EURIBOR+ fixings for 6 and 12 months. We also should encourage counterparties to new contracts to reference 3-month tenors.

5.3.3. Transition of USD LIBOR to T-Bills

We believe T-Bills could offer an attractive reference rate alternative for cash markets, and we welcome the announcement of floating rate US Treasury issuance indexed to 3-month T-Bills. As the market grows, we could envision the development of T-Bill basis swap markets (vs. OIS or IBOR+). However, we do not believe that the market would readily adopt T-Bills as a market standard reference rate for IRS. Following the logic of 3.1, we believe that the majority of dealers and active funds would more naturally transition to OIS in the event IBOR is phased out. Indeed, as the discounting rate is contractually specified as OIS, any choice of T-bills as a benchmark would have to be *in addition* to OIS, rather than instead of. Given the added complexity and negative liquidity implications of an extra benchmark, we are not advocating transition strategies designed to incentivize and promote the broad based adoption of T-Bills as a reference rate for US derivatives markets.

6. Legal Analysis

6.1. Overview of Legal Analysis Reports

Introduction

The work of the legal work stream was divided into two “phases” and an individual report was produced across five major currencies at each of those two stages, in each case targeting the legal system with the closest connection to the currency in question. This paper summarises all ten reports, covering existing systemically-important benchmarks as follows: (i) USD LIBOR for contracts governed by New York law; (ii) GBP LIBOR for contracts governed under English law; (iii) JPY LIBOR, YEN TIBOR and Euroyen TIBOR for contracts governed under Japanese law; (iv) EURIBOR for contracts governed under Belgian, French, German, Irish, Italian, Portuguese and Spanish law; and (v) CHF LIBOR for contracts governed under Swiss law. Each legal issues sub-stream has focused on transition issues (in Phase 1) and legal risk mitigants (in Phase 2) affecting the dominant benchmark for contracts in that currency/jurisdiction.

Phase 1: overview of findings

The Phase 1 legal reports analysed contracts incorporating market standard terms which refer to the existing benchmark and examined how the terms in question may give rise to contractual continuity challenges in circumstances of benchmark transition.

The legal reports conclude that the chances of legacy market contracts terminating *en masse* under most transition hypotheses were relatively slim. Whilst the reports outline the widespread use of fall-back provisions in market standard terms, which will normally prevent parties treating contracts as terminated automatically, they note that fall-back provisions are not expected to operate indefinitely. All reports considered that a very promising avenue for preventing contractual discontinuity would be a market-led solution involving the use of protocols. Further analysis of legal risk mitigants is provided in the Phase 2 reports and an overview of findings is presented immediately below.

Phase 2: overview of findings

The Phase 2 reports focus on specific reference rate alternatives which have been identified by the Fixing Methodologies, Transitions and Reference Rate Menu teams and consider, in greater depth, the legal risks that transition to these alternatives may represent for legacy financial contracts. This allows for an assessment of the degree to which the alternative reference rates can be classified as (i) a continuation of LIBOR, (ii) a successor to LIBOR or an (iii) alternative reference rate. The greater the disjunction between the existing benchmark and the alternative reference rate, the more likely transition will need to be carefully managed and legal risk mitigants will need to be applied.

Most reports suggest that transition within an existing benchmark to a revised fixing methodology would present fewest challenges and, conversely, that transition to alternative reference rates would present the greatest risk to contractual continuity. Whilst conclusions on the question of which legal mitigants would prove most useful differed markedly, this is representative of the diverse nature of the jurisdictions examined under this project. The legal mitigants considered include: market-led solutions such as the introduction of

successor rate language; the application of legal doctrines, legal opinions and market guidance; and legislation.

6.2. Legal Analyses – Phase 1

6.2.1. Introduction

6.2.1.1. Background and Objectives

The Market Participants Group (“MPG”) has undertaken to examine the feasibility and viability of adopting additional reference rates and to consider potential transition issues for market contracts.¹²

The work of the MPG has been organised (“horizontally”) by currency and (“vertically”) by issue. One of the vertical work streams which the MPG is undertaking is an assessment of the *legal issues*, or legal risks, arising for existing financial or “legacy” contracts from a transition to a new reference rate. This paper provides a summary account of the various reports which have been compiled on a currency-by-currency basis to examine such issues.

Although the horizontal division of the legal issues work stream broadly accords with the currency classification reflected in the project as a whole, the legal risk analysis has, in fact, been undertaken on a jurisdictional basis. Each legal issues sub-stream has focused on transition issues affecting the dominant benchmark for contracts in that currency *under the legal system which chiefly applies to those contracts*.

6.2.1.2. Overview

The legal reports identify possible legal risks for contracts incorporating market standard terms which refer to the commonest reference rates for a particular jurisdiction. These reports cover the following benchmarks and jurisdictions: (i) USD LIBOR for contracts governed by New York law; (ii) GBP LIBOR for contracts governed under English law; (iii) GPY LIBOR, YEN TIBOR and Euro YEN TIBOR for contracts governed under Japanese law; (iv) EURIBOR for contracts governed under Belgian, French, German, Irish, Portuguese and Spanish law; and (v) CHF LIBOR for contracts governed under Swiss law.

Each legal report is intended to provide an account of the legal doctrine and legal risk profile in respect of each jurisdiction for each of the financial products and contracts outlined in Appendix C.1. against the hypothetical cases of transition considered in Appendix C.4. Section 6.2.3 below provides a summary of legal risk on a product-by-product and hypothesis-by-hypothesis basis. It is an assumption shared by all reports that legal risk is most likely to materialise in the context of litigation as a result of one or more contracting parties seeking to have its contract brought to an end following transition to a new or revised reference rate. It is a further assumption shared by all reports that a court decision

¹² See FSB Publication, *Progress report on the oversight and governance framework for financial benchmark reform: Report to G20 Finance Ministers and Central Bank Governors* (available at http://www.financialstabilityboard.org/publications/r_130829f.pdf).

to declare or find a contract to be terminated in these circumstances could create a precedent for other contracts on similar terms. Since financial instruments are normally created on market standard terms, a precedent of this kind could theoretically cause widespread disruption.

6.2.1.3. Summary

The legal reports concluded that the chances of legacy market contracts terminating *en masse* under most transition hypotheses were relatively slim; although an unstructured transposition to a new benchmark with a materially different identity—for example, from a benchmark for unsecured lending to a benchmark for secured lending—may well be the exception. The reports drew comfort from the fact that courts in all jurisdictions under review are expected to use the tools provided by their legal system flexibly to uphold commercial contracts wherever possible.

The widespread use of fall-back provisions in market standard terms will normally prevent parties treating contracts as terminated automatically by operation of the law once transition comes into effect. However, fall-back provisions are cumbersome to apply and not expected to operate indefinitely. In the mid- to long-term, parties will consider whether to apply to court for a decision that their contracts have been terminated as a result of any very significant changes to the benchmark in question.

If a contract on market standard terms were held by courts to have been abruptly terminated (say, frustrated) by transition, this would likely set a precedent for legacy contracts on the same market standard terms which, given the prevalence of the terms in question, would cause widespread market disruption.

Thus, where the legal risk identified is *the risk of legal doctrine operating to terminate contracts (i) on any given set of market standard terms; (ii) under a specified governing law; (iii) in respect of an identified benchmark*: a) the probability of the risk materialising is generally assessed as being modest but b) the impact of the risk materialising is assessed as being very significant indeed.

All reports considered that a very promising avenue for developing a structured transition to a new benchmark with a materially different identity would be a market-led solution involving the use of protocols in which trade associations would take a leading role in encouraging market participants to adopt the protocols in question, once they had been drafted, subject to consultation and finalised. Several reports thought that such an initiative could helpfully be supported by national legislation drafted with the objective of specifying the meaning of contract terms defining benchmarks in agreements governed by the system of law in question.

6.2.2. Research Methodology

The authors of the legal reports conducted research by a variety of means: conducting informal interviews and conference calls with expert lawyers across various jurisdictions and market participants, considering published reports and consultation papers and through the use of questionnaires and surveys.

The GBP report compiled its research through interviews with Members of the Financial Markets Law Committee as well as external contacts (expert lawyers and finance experts).

The EUR report also conducted questionnaires with trade associations in the relevant jurisdictions, such as the International Capital Markets Association and the European Banking Association.

The YEN and CHF legal analysis reports also sought legal opinions from law firms.

6.2.3. Legal risk profile for legacy contracts

6.2.3.1. Doctrinal features of governing law

Contractual construction and fall-back

Across all jurisdictions, market participants report that heavy reliance on contingency provisions (discussed in Appendix C.2) over a lengthy period would be unworkable. If fall-backs are expected to apply permanently, this will give rise to significant practical difficulties for the markets and may even prove impossible to sustain. Notwithstanding, it should not be assumed that fall-back provisions will play no useful role in ensuring contractual continuity. On the one hand, fall-back provisions will provide an initial safety-net to ensure contractual continuity at least for a certain period of time. On the other, in some jurisdictions the courts may infer that the inclusion of fall-back provisions will be a reflection of the parties' intent to mitigate any risk of frustration occurring or the termination of their contract. Below is a summary of the similarities and differences across each jurisdiction.

USD

It is possible that a court will consider the inclusion of fall-back provisions to be a contractual reflection of the parties' foresight in risk mitigation, thereby undermining a frustration of purpose claim.

GBP

An English court will infer from the fall-back provisions an intention on the part of contracting parties' to avoid as far as possible the frustration of their contracts and it will endeavour to uphold that intention (see section 5.2.2.1(b) of the GBP Legal Analysis report).

EUR

Fall-back provisions in contracts governed by Belgian law will provide comfort to markets where any transition takes place. Many OTC derivatives are governed by English law but those under the European Master Agreements (incorporating similar fall-backs) are governed by Belgium law (See Appendix C.1.1 of the EUR Currency Report).

Contracts governed by French law can include provisions which allow for the direct application of the substitute interest rates which will have been agreed when parties entered into their contracts (see section 5.2.4.2 of EUR Currency Report).

Contracts governed by German law may incorporate the 2006 International Swaps and Derivatives ("ISDA") definitions, including the fall-back provisions set out there, or be based on the German Master Agreement for Financial Derivatives Transactions (*Deutscher*

Rahmenvertrag für Finanztermingeschäfte). (See Appendix C.1.1 and C.1.3 of the EUR Currency Report for further detail)

CHF

A common fall-back provision in contracts governed under Swiss law allows one party unilaterally to amend the terms of the contract where there has been a change in circumstances. Such a provision would preserve contractual continuity where transition to a revised fixing-methodology for a particular benchmark is implemented.

Frustration

The doctrine of frustration operates to discharge a contract where, after the formation of the contract something occurs which renders the contract impossible, destroys the subject matter of the contract or renders performance radically different from that which was in the contemplation of the parties. The courts of the United States and England and Wales apply this doctrine. For the most part, the other jurisdictions considered as part of the Legal Analyses work stream have equivalent doctrines or principles. In most cases, high thresholds are established for proving that a frustrating event or equivalent has arisen.

USD

New York law takes a narrow approach and limits frustration claims to instances in which a “cataclysmic, unforeseeable event renders the contract valueless to one party.”¹³ This is a very high threshold and the courts will, therefore, look to establish that the intervening event was substantial (and not simply an event resulting in price increases), the principal purpose of the contract was thwarted and the parties did not anticipate the possibility of the occurrence of such an intervening event.

YEN

The civil law principle of circumstantial change allows a contract to be terminated or provisions within it to be revised where a change occurs. The criterion for establishing that a circumstantial change has arisen in respect of a contract is very similar to that of frustration under English law. The requirements which must be satisfied include there has been a change of circumstance which renders the subject matter or the basis on which the contract was entered into by the parties radically different to that existing at the date of contracting. Another requirement which differentiates the Japanese principle from the English doctrine of frustration is that as a result of the circumstantial change, binding the party to the terms of the initial agreement would be deemed extremely unfair in light of the “good faith principle” which is applied by the Japanese courts.

¹³ *Noble Americas Corp. v. CT Group/Equipment*, No. 602269/2009. slip op. at 4 (Sup. Ct. N.Y. Co. Dec. 4, 2009), cited by George Bundy Smith and Thomas J. Hall, “The Frustration of Purpose Doctrine is Alive and Well”, *New York Law Journal*, v. 246, no. 78 (Oct. 21, 2011).

EUR

The principle of “Wegfall der Geschäftsgrundlage” under German law is similar to the doctrine of frustration. The EUR Legal Analysis report stipulates that it is unlikely that parties will successfully argue that this principle should apply in respect of their contract—even if the old EURIBOR benchmark was immediately discontinued. This demonstrates that like the English and US courts, the German courts are very reluctant indeed to find that the principle of “Wegfall der Geschäftsgrundlage” should be applied.

CHF

Under Swiss statute, if an “error as to the basis of the contract” is deemed to have arisen, the contract may be voided. Swiss statute excuses performance of a contract if it is deemed impossible—“subsequent impossibility”. If the doctrine of subsequent impossibility is applied, the parties are discharged of their obligations and the contract is effectively terminated. (See Appendix D.2 paragraphs 3.2 and 3.3 of the CHF Currency Report for more detail.)

Implied terms

One way in which contractual continuity could be preserved would be by the courts implying a term into the contract to the effect that in the event of the withdrawal of the relevant benchmark, the nearest substitute benchmark should apply to the parties’ agreement. The UK has a well-established Legal Opinion examining the likelihood that an English court would imply a term into a contract linking the existing contractual benchmark definition to a new or substitute benchmark (mentioned below). In other jurisdictions, the view has been taken the existence of fall-back provisions may possibly aid a court in coming to this conclusion but with varying degrees of likelihood.

YEN

Through a “rational interpretation” of the intention of the parties’, a court may infer that the parties intended that any successor rate to GPY LIBOR or Yen TIBOR (where the relevant rate has been withdrawn) should automatically apply instead of the reference rate referred to in their contract. It is, however, unlikely that such a term will be implied.

CHF

Under Swiss law, the doctrine of “*clausula rebus sic stantibus*” allows a party to amend the terms of a contract (under very specific circumstances). Where the parties enter into a dispute regarding such an amendment, an application may be made to the courts to amend the terms of the contract. This principle is distinguished from “error as to the basis of the contract” mentioned below (for analysis, see section 5.3.1(b) of the CHF Currency Report).

The principle of “supplementary interpretation of the contract” allows a court to ensure that continuity of the contract is preserved by inferring that, notwithstanding a change in circumstances, the current terms of the contract still apply. It is possible that where a legacy contract contains terms referring to a benchmark which is subsequently moved to a related-but-different fixing methodology, this doctrine will preserve contractual continuity. (See section 5.3.1 of the CHF Currency Report.)

Market-led solutions

Across all jurisdictions and currencies, market-led protocols are considered to offer the brightest hope for increasing standardisation of documentation for contract terms. In particular a short transition period to a reformed benchmark or a substitute benchmark would cause material legal risk and market disruption. Designing standardized protocols across both loan and derivatives contracts could promote uniformity across back-to-back contracts and prevent mismatching of interest rates. It is noted, however, that the express consent of the contracting parties' would be sought in order to incorporate revised terms, introduced by way of protocol, into existing contracts.

USD

Over-the-counter derivatives use the 2006 ISDA Definitions as the principal document for the reference and definition of LIBOR rates. The ISDA documentation permits the amendment of ISDA Definitions booklets through the publication of a Supplement. A Supplement to the Definitions could incorporate any newly published rates or address any new Screen page locations for the electronic venues that publish LIBOR rates.

In addition, ISDA has relied on the Protocol as a mechanism to allow market participants multi-laterally to amend ISDA documentation such as the Definitions.

YEN

The shift to a new reference rate could be expressly agreed by executing a new memorandum or amendment agreement. Transition to a new reference rate could also be achieved by way of protocol, particularly in respect of derivatives on ISDA terms. It is noted that for products cleared through a central counterparty ("CCP"), the CCP's business rules will also need to be amended.

6.2.3.2. Risk factors for material change: by product

The paragraphs below summarise key features of the benchmark definitions outlined in the respective sub-stream reports which may give rise to legal risk. Some of the issues may become litigious. Even where there is a slim chance of frustration or the equivalent doctrine being applied, should that risk materialize, it would likely set a precedent for legacy contracts on the same market standard terms which would cause considerable market disruption.

Derivatives

Derivatives on the 2006 ISDA Definitions define the various benchmarks considered across the Legal Analyses sub-stream reports in a standardised way, often as the rate for the making of "deposits" (see definitions in Appendix C.1).

The mere fact that LIBOR, EURIBOR and TIBOR may no longer be calculated from submissions based chiefly on deposits under a revised fixing methodology does not *ipso facto* mean that it is not a rate for deposits. If any of these benchmarks is administered with the objective of identifying a rate for deposits or unsecured borrowing, then the better view

is that it does not matter if submissions are extrapolated chiefly, or even entirely, from different transactions.

Loans

Many loan documents across the jurisdictions and currencies considered in the Legal Analyses reports use the LMA terms to define a relevant benchmark chosen by the parties. The benchmark is defined as the Screen Rate. Under these contracts, one can infer from the “cost of funds” trigger that LIBOR, EURIBOR and TIBOR are intended to reflect the cost of unsecured interbank borrowing and legal risk may arise if one of these reference rates could no longer be reasonably regarded as a rate for unsecured interbank borrowing.

Other products

Documentation in respect of debt securities often mirrors the terms set out in the ISDA definitions. Other standard terms, which are unique to particular jurisdictions (e.g. LIBOR cap warrants under Swiss law) are outlined in Appendix C.1.

6.2.3.3. Mitigating factors

Some market standard terms refer to the benchmark publisher or publication venue (e.g. a particular webpage), particularly OTC derivatives on ISDA terms. Provided that there is no change in publisher or publication venue, this aspect may promote contractual continuity.

As well as market-based protocols and amendments, in some jurisdictions, particularly those in the Eurozone, transition would be aided by the passing of national and/or supranational legislation.

6.2.3.4. Risk profile: by transition hypothesis

Transition to a new benchmark rate

Across the various jurisdictions considered, it is not possible to conclude definitively which legal risks would arise on transition to a new rate for unsecured interbank deposits or borrowing, with the consequential withdrawal of LIBOR, EURIBOR or TIBOR. Much would depend on the publication venue. Other factors include:

- i. the support of market participants, i.e. through the publication of protocols and mapping;
- ii. the support of regulators and relevant authorities in each jurisdiction; and
- iii. the timing (see Transition reports) as regards the transition to a substitute benchmark and the appropriate advance notice given to the markets.

Transition to a secured benchmark would give rise to the greatest legal risk across every jurisdiction considered, given the degree of dislocation from LIBOR, EURIBOR and TIBOR. The CHF report states, for instance, that a transition to SARON and OIS would deviate significantly from LIBOR both in terms of spreads and volatility of fixings. Whilst the impact of spreads and volatility following transition (as assessed by back-testing, for example) is

not considered extensively across the reports—the expected rate path being no part of the contractual definition—some recognise that this may increase the likelihood of parties to legacy contracts re-examining their contractual provisions.

Contractual continuity may best be preserved through the operation of market-led solutions and, in some of the Eurozone jurisdictions as well as Japan, with the backing of the relevant authorities. The reports' authors take the view that consideration should be given to whether national legislation has a role to play in (re)defining the meaning of contract terms linked to benchmarks so as to preserve contractual continuity.

Modification of the fixing methodology

The risks associated with a revised fixing methodology would depend on the nature and extent of the revisions. Given the reference in the IOSCO Principles to rates which are “anchored in an active market having observable bona fide, arms-length transactions” Reports by and large chose to consider proposed fixing methodologies which could be said to anchor the rate in transactions.¹⁴ These were contrasted to “poll-based” or “judgement-based” methodologies.

Under the current arrangements for LIBOR panel banks are asked to base their submissions on the following question:

“At what rate could you borrow funds, were you to do so by asking for and then accepting inter-bank offers in a reasonable market size just prior to 11 am?”

Similarly, EURIBOR is the rate at which euro interbank term deposits are being offered by one prime bank to another within the EMU zone and TIBOR is based on the interest rates at which banks offer to lend unsecured funds to other banks in the Japan wholesale money market.

A transaction-anchored fixing methodology would require panel banks to calculate their own cost of funds from certain permissible, specified data sources. Where a panel bank has few transactions in interbank deposits, or those transactions are not representative of the inter-bank market, then interpolation, broad categories of transactions, observed 3rd part transactions and certain adjustments can be used by panel banks (see Appendix A.2.3 of the GBP Currency report). Some respondents to the EUR legal report stated that as most contracts do not contain detailed provisions relating to the applied calculation methodologies, a change to the fixing methodology would be unlikely give rise to material legal risk (see section 5.2.3.3 of EUR Currency report). The GBP report concluded that a revised fixing methodology posed less risk than other transitions (say, transition to a benchmark for secured lending) but that the nature of the risk would depend way in which the revised methodology was reflected in the administrator's definition and in the question posed to panel banks.

¹⁴ See IOSCO Principle 7 at <http://iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf>.

6.2.4. Conclusion

Legal reports concluded that the risk of legal doctrine operating to terminate contracts *en masse* across one or more markets is: a) modest in respect of the probability of the risk materialising; but b) very significant indeed in respect of the potential impact of the risk materialising.

All reports considered that a very promising avenue for developing a structured transition to a new benchmark with a materially different identity would be a market-led solution involving the use of protocols in which trade associations would take a leading role in encouraging market participants to adopt the protocols in question, once they had been drafted, subject to consultation and finalised.

Several reports thought that such an initiative could helpfully be supported by national legislation drafted with the objective of specifying the meaning of contract terms defining benchmarks in agreements governed by the system of law in question.

6.3. Legal Analysis – Phase 2

6.3.1. Overview

The reports supplement an earlier analysis of legal issues arising from benchmark transition for financial products denominated in the following currencies: US Dollar, GBP Sterling, Japanese YEN, euro, and CHF Swiss Franc. The reports examine legal issues within the jurisdiction to which one of the currencies set out above is domestic currency. They focus on specific reference rate alternatives which have been identified by the Fixing Methodologies, Transitions and Reference Rate Menu teams and consider, in greater depth, the legal risks that these alternatives may represent for legacy financial contracts. The degree to which contractual continuity (e.g. in respect of LIBOR definitions in legacy contracts) might be affected by transition to an alternative reference rate is assessed. Each alternative reference rate is then identified as (i) a continuation of the same rate, (ii) a successor rate or (iii) an alternative reference rate. The mitigants which may address legal risks and the circumstances under which these mitigants may be of most use is examined. The paragraph immediately below provides a summary of conclusions.

6.3.1.1. Summary

Most reports concluded that transition within an existing benchmark to a revised fixing methodology (“IBOR+”) would, in most cases, represent a less significant departure than a transition to the other alternative reference rates outlined. The advantage of a transition of this kind is that the existing features of the benchmark, which are incorporated into market standard terms and legacy contracts, would be retained: so, the risk to contractual continuity in this case would be considerably ameliorated.

The GBP, YEN and USD reports state that transition to IBOR+ would likely be categorized as a “continuation of the same rate”, provided that the changes consist of minor methodological alterations. The CHF report, in contrast, concluded that transition to IBOR+ would be a “successor rate”, as more substantial changes were envisaged.

Where alternative reference rates are suggested, it is clear that the transition would present a greater risk to contractual continuity. Although the EUR report considered an option described as “EURIBOR+”, this was identified in the legal analysis as sufficiently divergent from EURIBOR to be characterized as an alternative benchmark, presenting a challenge for transition and contractual continuity. Most reports found that the other alternative reference rates—for instance, Overnight Index Swap (“OIS”), a central bank rate or Treasury Discount Bills (“TDB”)—would also represent a very considerable transition challenge.

All reports differed markedly in their conclusions on the question of which legal mitigants would prove most useful. Whilst the GBP and CHF reports noted the practical difficulties in implementing legislation, the EUR report strongly recommended the introduction of supranational law through EU Regulation. The GBP and USD reports outlined a variety of other legal risk mitigants which included: the publication of legal opinions and market guidance, introducing successor rate language and the operation of the doctrine of implied terms. The CHF report recommended the publication of opinions aimed at facilitating the amendment of contracts through protocols or guidance as well as running a parallel track in certain circumstances. The YEN report provided analysis on the benefits of running a parallel track and found that this legal risk mitigant would be desirable.

6.3.2. Transition Alternatives

The reference rate alternatives proposed by the Transitions and Fixing Methodologies teams for the domestic currency in each jurisdiction (see above for list of currencies), were considered. Analysis of the degree of “fit” between the new alternatives postulated and the existing contractual definitions of the benchmark being considered for withdrawal was outlined. In most instances, “IBOR+” was considered to be an alternative which represented the closest “fit” with contractual definitions to the existing benchmark. The findings of the reports are summarized below.

USD

The reference rates considered include LIBOR+, OIS (of two variants), Treasury Bill rates, and a range of overnight rates. The overnight rates could be used as potential substitute for the overnight index underlying OIS in the event that the current OIS index, the Federal Funds Effective Rate, is judged ineffective for this purpose. The alternative overnight rates are Interest on Excess Reserves, the rate set by the Fed on repos at its Reverse Repurchase Facility, and a proposed new overnight general collateral repo rate. LIBOR+ would likely preserve the general economic nature of the existing LIBOR benchmark.

GBP

The three alternatives considered were LIBOR+, Sterling Overnight Index Average (“SONIA”) and the Bank of England rate. As LIBOR+ would involve minor methodological changes only, it would represent a relatively good fit with contractual definitions of LIBOR in key financial contracts. Contractual continuity would be facilitated by the current administrator as well as the rate being fixed “as of” 11.00 am on a daily basis and being published on the Reuters LIBOR01 page.

SONIA and the Bank of England rate would represent a much more radical transition and would not represent a good contractual fit. SONIA is an overnight rate and does not attempt to fix that rate “as of 11.00 am”, nor does it represent a rate exclusively reflecting the

interbank market. In addition, banks do not fund at Bank Rate and the rate does not represent what is perceived to be a bank's "cost of funds" or a rate for the making of "deposits" in Sterling, which means that the rate would not be a good fit with contractual terms referring to LIBOR.

YEN

The four alternative reference rates examined in the YEN report are TIBOR+, Unsecured Interbank Money Rates ("UIMR"), TDB and OIS rates. As TIBOR+ and UIMR would likely involve only minor changes to the fixing methodology, transition to these reference rates would represent a good fit with contractual definitions of TIBOR and YEN LIBOR. More significant changes might be envisaged for TIBOR+, however, and the greater the disjunction, the more likely transition to this reference rate would not represent a good contractual fit. Transition to TDB and OIS would also represent a more significant change.

EUR

The implications of transition to EURIBOR+ were examined in the EUR report. For the purposes of the report, it was assumed that significant methodological changes would be made to existing EURIBOR and that the rate itself might be fundamentally altered, where transition to EURIBOR+ is facilitated, affecting the economic equivalence for the parties.

CHF

The alternative reference rates considered include LIBOR+, Repo – Swiss Average Rates ("SAR") and OIS. As LIBOR+ would likely preserve the economic nature of the existing CHF LIBOR benchmark and would still be a rate for unsecured funding, it would represent a better contractual fit than the SAR or OIS reference rate alternatives.

6.3.3. Transition Path

6.3.3.1. Continuation of the same rate

The alternatives listed [above](#) which are said to involve only minor changes to the existing benchmark (i.e. minor methodological changes), were in the most part categorized as being representative of a continuation of the same rate. Some reports indicated that this transition path could be managed seamlessly and involve a hard cut-over.

USD

Transition from LIBOR to a new transactions-based fixing methodology based on LIBOR+ would represent the continuation of the same rate at the one-month and three-month tenors, and possibly also at the six-month tenor (depending on future testing and additional analysis).

GBP

LIBOR+ only includes methodological changes—which would arguably be no more significant than the transition which LIBOR underwent in 1998 from a "prime banks" fixing methodology to an "own cost of funds" fixing methodology—therefore, this transition was categorized as a "continuation of the same rate" i.e. existing LIBOR. The degree to which

LIBOR+ diverges from existing LIBOR would likely confirm whether this alternative reference rate can be regarded as a continuation of the same rate or a “successor rate”.

YEN

Transition to TIBOR+ or UIMR would represent the continuation of the same rate, as these reference rates would include only minor changes to the fixing methodology, i.e. taking account of transaction data in submissions. In respect of TIBOR+, transition may be implemented seamlessly at a hard cut-over, depending on the degree to which it diverges from the existing reference rate.

6.3.3.2. *Successor rate*

USD

At the six-month tenor, transition from LIBOR to a new transactions-based fixing based on LIBOR+ could represent a change in rate that is material enough to be treated as a successor rate, or possibly as an alternative rate, depending on future testing and additional analysis. The greater the disjunction between LIBOR and a successor rate such as LIBOR+, the greater the legal risks associated with a hard cut-over.

GBP

The GBP report states that more significant methodological changes—in particular, changes to the time “as of” which the rate is fixed—will have the consequence that LIBOR+ is better viewed as a successor rate to LIBOR. The greater the disjunction between LIBOR and any successor rate, the greater the legal risks associated with a hard cut-over.

CHF

Transition to LIBOR+ would lead to substantial modifications to the fixing methodology of CHF LIBOR and was therefore identified as a transition to a successor rate.

6.3.3.3. *Alternative reference rate*

USD

Both of the proposed OIS rates (the term rate and the compounded overnight rate) and the Treasury Bill rates were categorized as alternative reference rates in the USD report. They are significantly different from LIBOR in both concept and level, given the absence of a significant term spread for bank credit risk. The report also noted that there is some chance that LIBOR+ would represent an alternative rate to USD LIBOR at the six-month tenor.

GBP

Transition to SONIA or the Bank of England rate was categorized as a transition to an alternative reference rate presenting a significant transitional challenge for the reasons set out [above](#).

YEN

Further changes might be envisaged for a TIBOR+ reference rate. The more significant the changes, the less likely TIBOR+ would be characterized as a continuation of the same rate. In this case, in order to avoid the uncertainty associated with a hard cut-over which would likely arise under Japanese law, treatment of TIBOR+ as “alternative or new” reference rate is advisable, though conservative.

Transition to TDB and OIS was identified as a transition to an alternative or new reference rate.

EUR

The EUR report suggested that where fundamental changes to the methodology were contemplated, EURIBOR+ would be better characterized as an alternative reference rate.

CHF

OIS transactions present markedly different credit risk and liquidity characteristics to traditional lending transactions. The OIS transition alternative was, therefore, categorized as an alternative reference rate as it significantly deviates from CHF LIBOR.

SAR would also represent a significant divergence from CHF LIBOR and was also categorized as an alternative reference rate.

6.3.4. Legal Mitigants

USD

The U.S. legal risk mitigants to challenges to any change in LIBOR methodology are similar to those likely to be encountered in the U.K. given that both have common-law legal systems, but different practical considerations may affect the degree to which these mitigants can be relied on in the U.S.. The legal risk mitigants include: (i) legal decisions, regulatory guidance and market guidance; (ii) “successor language”; (iii) the doctrine of implied terms; (iv) parallel tracking; and (v) legislation. Items (i), (ii), and (iii) could assist in reducing the risk of legal challenges (such as contract frustration) to a new fixing of LIBOR such as LIBOR+, or where transition to a successor rate is proposed. (A legal decision could exacerbate or reduce risk, depending on the outcome.) Guidance might be published on market standard terms by groups such as Loan Syndication and Trading Association, Securities Industry Financial Markets Association, and International Swaps and Derivatives Association. A successor rate clause—referring, for example, to “LIBOR or any such other successor”—could mitigate legal risk in a transition to a successor rate. Some contracts may already have such language embedded in their respective terms.

The USD report sets out two key legal risks in US jurisdictions:

- (a) A challenge to LIBOR+ as a valid fixing of USD LIBOR, with the most likely argument being the frustration of the purpose of the contract. The USD report suggests that if there is any significant risk of such a challenge, it would most likely be for legacy contracts which refer to six-month LIBOR. As the report outlines, the risk arises not from the intended target of USD LIBOR+, as an estimate of the interbank deposit rate, but rather from whether the numerical result of the fixing may be judged materially different from the target and refers to the USD Fixing Methods report which provides some relevant information on this.
- (b) The risk that a certain tenor of LIBOR+ cannot be presented as a valid fixing of the corresponding LIBOR reference rate, whether or not this arises from a legal challenge. If the legacy fixing of that tenor of LIBOR is discontinued (for example by a withdrawal of banks from the submission process or via a regulatory decision), there is a similar risk of legal frustration arising from discontinuation. Again, some products already incorporate fall-back clauses in their contracts to address this type of situation, but market participants may not be able to rely on those fall-backs for a prolonged period of time.

The USD report states that these legal risks can be reduced if market participants make alternative arrangements for their contracts, such as termination or renegotiation. Transition could be managed through access to alternative benchmarks such as OIS, Treasury Bill rates, or LIBOR+ (in the event that LIBOR+ is said to represent an alternative reference rate). An alternative reference rate may be available alongside the old benchmark (LIBOR) for a period of years. Market participants may be given regulatory incentives and informational guidance to change their contracts with the assistance of market protocols, before a hard cut-over (if any) is finally required. With a sufficient period of transition time, most legacy contracts will have matured, eliminating the need to change contracts. At any given tenor, the USD report suggests that LIBOR+ should be made available in parallel with LIBOR only if it is clearly presented to the market as an alternative rate, rather than as a new fixing of LIBOR or a successor rate.

Legislation might also prove useful in supporting contractual continuity, as discussed above under the GBP paragraph.

GBP

The GBP report analysed the benefits of the following legal risk mitigants in facilitating benchmark transition: (i) legal opinions and market guidance; (ii) "successor language"; (iii) the doctrine of implied terms; (iv) parallel tracking; and (v) legislation. The findings of the report are summarised immediately below. In particular, the first three items outlined above could assist where transition to a successor rate is proposed. The final two might be better suited where transition to an alternative reference rate is intended.

Legal opinions written by eminent lawyers (typically, Queen's Counsel) are likely to be highly persuasive on points of contractual interpretation and could assist continuity by confirming that courts are likely to imply a term (see [below](#)) into contracts on market standard terms incorporating reference to, say, a revised fixing methodology. Opinions of this kind may be commissioned on the instructions of trade or professional associations and then made available to their members. Alternatively, guidance on market standard terms may be drafted directly by trade associations such as the Loan Market Association and published on their website.

The question of whether trade associations should be encouraged to produce “successor language” or clauses for incorporation in new contracts was also considered. The GBP report concluded that a successor rate clause—referring, for example, to “LIBOR or any such other successor”—could prove to be an effective tool in mitigating legal risk in a transition to a successor rate.

Mitigants which might reinforce contractual continuity include those which are triggered “by operation of the law” and, in this regard, the doctrine of implied terms and its potential for minimizing the risk of contractual discontinuity was assessed. The doctrine can help to ensure contractual continuity even when developments occur to which the parties have never turned their minds; it prevents contracts being frustrated merely because the parties have not expressly allocated between themselves the commercial risks associated with those developments.

As regards transition to an alternative reference rate, transition can be managed by running the new benchmark alongside the old benchmark (LIBOR) for a period of years and gradually incentivizing market participants to move their contracts across, with the assistance of market protocols, before a hard cut-over (if any) is required. Additionally, legislation might purport to provide for contractual continuity. It could do so in the following ways:

1. precluding any argument by contracting parties that their contracts are frustrated as a result of the transition;
2. establishing a presumption that a contractual reference to LIBOR can be taken to imply a contractual reference to a successor rate; and/or
3. identifying a successor rate, expecting that the doctrine of implied terms will then operate to incorporate that rate into existing contracts.

A further possibility was also examined:

4. forcibly preclude any argument that contracts are discharged under *force majeure* clauses—or that fall-back provisions apply—following the withdrawal of LIBOR, notwithstanding any contractual provisions to the contrary.

It was noted that there are practical difficulties inherent in coordinating a legislative response in multiple jurisdictions and that these should be taken into consideration. Given the prevalence of English and New York governing law clauses in global financial instruments, State (i.e. New York), national (i.e. U.K.) and European legislative responses should be harmonised at a minimum.

YEN

The YEN report focused its analysis on the benefits of parallel tracking, although a seamless transition at a hard cut-over may be possible for a transition to TIBOR+, under certain circumstances. A long period of running the parallel track was considered to be essential to ensuring that contracting parties have enough time to amend their contracts, where necessary. In addition, this legal risk mitigant would provide for a smoother transition where operational issues (e.g. IT and accounting) arise. Importantly, running a parallel track for a long period of time would result in the maturity of the majority of legacy

contracts before any withdrawal of the existing benchmark in question, thereby significantly eliminating the risk of contractual discontinuity.

EUR

The applicability of certain doctrines in Germany, Italy, France and Spain was outlined but, on balance, the report concluded that these were unlikely to be effective in assisting contractual continuity. For instance, Italian and German law have codified “frustration”: under these rules, a contracting party can either terminate their contract or ask for an amendment if the (economic) circumstances on which the contract was based have materially changed. Similarly, under Spanish law, the doctrine of the *cláusula rebus sic stantibus* allows a contracting party burdened by onerous terms as a result of “a change in circumstances” to bring an end to the contract, or to ask the court to amend it. Under French law, no doctrines of this kind are likely to apply; contracts can only be terminated by operation of *force majeure*.

Reliance on these doctrines was deemed undesirable. The EUR report concluded that the better view would be to introduce supranational legislation through the European Commission. Legislation might, for instance, purport to provide for contractual continuity in the following way:

Where a contract refers to the EURIBOR as the method to determine a periodic payment in relation to a defined payment period (e.g. 3 months EURIBOR), the replacement of such EURIBOR by the equivalent EURIBOR+ shall not give rise to a right of any party to prematurely terminate the contract or to require the cancellation or the amendment of such contract. However, the right of the parties to cancel, novate or amend the contract by mutual consent shall remain unaffected.

CHF

A gradual implementation of LIBOR+ was recommended, with the support of legal opinions and recommendations facilitating the amendment of contracts through protocols (similar to the introduction of “successor rate language”, described earlier under the GBP paragraph). Where transition to an alternative reference rate is proposed, the CHF report stated that parallel tracking for a certain period of time would be desirable. Legislation was not considered to be suitable at this stage.

6.3.5. Conclusion

The “IBOR+” (and UIMR in respect of the YEN report) alternatives postulated by the Transitions and Fixing Methodologies teams represent, in many cases, a relatively low level of legal risk for financial contracts and some reports suggested that an “IBOR+” alternative could be subject to a seamless transition. The greater the divergence in methodological changes, the more likely this alternative reference rate would be identified as a successor or alternative reference rate to the existing benchmark in question (the CHF alternative was identified as a successor rate, for instance).

The successor rate alternative can be regarded as being in the middle of the legal risk spectrum. Transition to a successor rate could, in some circumstances, be achieved through a hard cut-over and in this regard the legal risk mitigants described [above](#) (i.e. legal

opinions and market guidance, successor rate language and the doctrine of implied terms) would be most useful. Some reports did, however, recommend a gradual transition rather than a hard cut-over for this kind of transition.

Where even further changes and a much greater divergence from the existing benchmark are envisaged, transition to such an alternative reference rate would represent the highest levels of legal risk. All other reference rate alternatives considered across the currency streams (including EURIBOR+, which was classified as an alternative reference rate rather than the continuation of the same rate) were identified as alternative reference rates. The reports suggested that for this kind of transition, it would be difficult to picture a seamless transition for legacy contracts at a hard cut-over. The legal mitigants recommended ranged from running a parallel track to implementing supranational legislation. Practical difficulties in implementing legislation were, in some cases, also presented. Overall, it is clear from the Phase 2 reports that where benchmark transition is considered, a particular legal risk mitigant which could offer the brightest hope of creating a smooth transition in one jurisdiction might not be suited to another jurisdiction.

7. Outreach to Market Participants

7.1. Background and Objectives

The objective of the Outreach Workstream is to gather feedback from market practitioners, with a particular focus on understanding market participants' views on potential replacement benchmarks and transition issues. This Outreach Workstream is important in order to obtain direct feedback from a diverse set of market participants across a number of regions who use rate benchmarks, and could therefore be impacted by any reform measures recommended by the FSB. Banks, asset managers, exchanges, corporations, and trade associations located in Asia, Europe, and the US were contacted.

This outreach primarily captured the views of asset managers, banks and other financial institutions. Note that there was a separate working group focused on obtaining feedback from non-financial corporates, which resulted in a broad effort to obtain views from these entities and the trade associations that represent them. This feedback is not reflected in this summary. Please review "Impact of Benchmark Reform on Corporates" for detail on outreach related to non-financial corporates.

7.2. Approach taken for Research

The research was primarily undertaken by surveys and supplemented with phone calls, as needed. The research was broken down into sub-workstreams, each with a regional coordinator who was responsible for developing a survey and soliciting responses. The following is a list of sub-workstreams:

- CHF
- EUR
- GBP
- JPY
- USD
- Non-home country

The Outreach workstream did use any previously published material.

To our knowledge, the information detailed in this report is not confidential.

7.3. Summary of Key Findings

7.3.1. Use of Interest Rate Benchmarks

The research conducted by this workstream demonstrated the diversity of entities that use rate benchmarks. This diversity is not limited to the standard categories of financial institutions (banks, asset managers, etc.); but within those categories, there are a multitude of products that are impacted by these benchmarks in different ways. Please see Table 10 for a detailed list of the products that reference interest rate benchmarks.

Table 10: Products that Reference Interest Rate Benchmarks

| | | |
|---------------------|---|---|
| Derivatives | <ul style="list-style-type: none"> • Swaps • Swaptions • Options | <ul style="list-style-type: none"> • FX forwards • Swap futures • Eurodollar futures |
| Loans | <ul style="list-style-type: none"> • Commercial loans • Syndicated loans • Floating rate bank loans • Term loan market • Leverage facilities • Intercompany loans | <ul style="list-style-type: none"> • Agricultural loans • Student loans • Credit card loans • Home equity loans • FHLB advances |
| Structured Products | <ul style="list-style-type: none"> • Asset backed securities (ABS) • Mortgage backed securities (MBS) • Commercial mortgage backed securities (CMBS) | <ul style="list-style-type: none"> • Collateralized loan obligations (CLOs) • Collateralized mortgage obligations (CMOs) • Hybrids |
| Short-term | <ul style="list-style-type: none"> • Foreign office deposits • Time deposits • Checking accounts • Money market deposit accounts • Demand deposit products • CDs | <ul style="list-style-type: none"> • Commercial paper • Medium-term notes (MTNs) • Securities lending • Repo • Reverse repo |
| Bonds / Other | <ul style="list-style-type: none"> • Corporate bonds • Auction rate securities • Agency notes • Exim bonds • Non-US government bonds • Affordable housing bonds • Trust preferred securities • Covered bonds • Solvency II liabilities reference rate definition • Subordinate debt | <ul style="list-style-type: none"> • Senior notes • Capital leases • Trade finance • FA-backed notes • Direct fund agreements • Commercial leases • Interest calculations on I/C accounts of group companies • Pricing and accounting of money market, debt and derivatives • Benchmarks for asset management mandates |

7.3.2. Alternatives

A key theme throughout the sub-workstream reports was that there is reluctance among market participants across regions to move to an entirely new benchmark, with the general view that the costs to market participants to transition to an entirely new benchmark would outweigh the potential benefits. Instead, market participants were supportive of the preservation of LIBOR and similar benchmarks (i.e. Euribor, TIBOR), but with the addition of strengthened oversight and governance. Respondents indicated that this would achieve the objectives of reform without imposing unnecessary transition costs on market participants who utilize financial products that reference these benchmarks. In sum, the more the solution resembles LIBOR, the easier it will be to transition with limited market disruption and minimize transition costs for market participants.

With respect to other alternatives, the consensus among the sub-workstream reports was that market participants do not see any “quick fix” or a single alternative benchmark that exists today that could fully replace LIBOR (or similar benchmarks). However, there are a number of existing benchmarks and data sources that show promise and could potentially gain greater market acceptance over time. Some examples include the Overnight Index Swap (OIS), Sterling Overnight Index Average (SONIA), Euro Overnight Index Average (EONIA), central bank rates, repo indexes, among others. Detailed discussions of the benefits and limitations of each potential alternative as well as applicability to particular instruments (i.e. derivatives, loans, etc.) and regional markets are included in each sub-workstream report.

7.3.3. Properties of an Ideal Benchmark

For the most part, market participants in the different regions surveyed agreed on the key properties that any alternative or reformed benchmarks would have. The key characteristics of an ideal benchmark cited in the majority of sub-workstream reports include:

- Transparent calculation methodology
- Based on transactions or tradable/realistic quotes
- Deep, liquid market at all tenors
- Stringent oversight and governance
- Stable / low volatility

With respect to volatility, a number of the workstream reports indicated that respondents were concerned that a volatile benchmark could increase borrowing costs. The EUR Outreach report noted that respondents suggested that “smoothing techniques” could be used to limit volatility, especially on longer tenors.

Some reports also indicated that central banks might be helpful in lending credibility to the benchmark through oversight, but that the government otherwise did not have to be involved with the rate setting process. Instead, it was suggested that an independent administrator could be responsible for managing the data collection and rate setting process.

7.3.4. Transition Considerations

The survey respondents stressed the importance of an orderly transition that does not disrupt existing markets. There were a number of key concerns among market participants that were apparent throughout the different sub-workstream reports. Those universal concerns that need to be taken into consideration for an orderly transition are detailed below.

- *Renegotiating existing contractual agreements:* The majority of sub-workstreams found that market participants are concerned about the need to re-write existing contractual agreements (including OTC confirmations, ISDA agreements, loan agreements, fund prospectuses, etc.). This exercise will be costly and require a significant amount of time to implement. Some of the respondents suggested that the negative impacts could be mitigated by requiring only new contracts to use the new benchmark, without requiring a change in existing contracts.
- *Impact on legacy positions including hedges:* Investors could be exposed to basis risk as a result of a transition and existing hedging strategies may need to be altered to be effective using the new benchmark. Additionally, a change to pricing methodology as a result of a transition to a new benchmark could cause price swings among existing positions that could change the reported value of such positions, at least temporarily.
- *Reduced liquidity during transition:* A number of respondents were concerned that transitioning to a new benchmark could result in reduced liquidity during the transition phase, particularly if the new benchmark did not have a deep and liquid market from the outset of the transition.
- *Operational costs:* Many respondents indicated that a transition would result in operational costs, particularly IT costs to alter systems to be compatible with the new benchmark and back office costs.

Some jurisdictions will also require regulatory approval or changes to existing rules in order to accommodate a transition. A transition will therefore need to be long enough to ensure that all of these issues can be resolved without market disruption.

Finally, there are a number of potential legal and tax consequences in the various regional jurisdictions associated with a transition that will need to be investigated further.

8. Impact of Benchmark Reform on Corporates

This section is a synopsis of the full report of the MPG Corporate Work Group, which can be found in the Appendix F.

8.1. Background and Objectives

The objective of the 'Impact on Corporates' work-stream is to ensure that the views and concerns of non-financial corporate end-users ("Corporates")¹⁵ of the relevant interest rate benchmarks¹⁶ are adequately addressed in the MPG's report.¹⁷ The full report of the corporate work group illustrates that uses of IBOR by corporates are wider than those relating to financial contracts alone. Certain issues are likely to require further identification, consideration, communication and resolution in advance of a potential reform of IBOR reference rates.

Particularly, this section of the MPG report aims to highlight:

- The various uses of interest rate benchmarks by corporates;
- Corporates' preferences regarding the characteristics of potential alternative interest rate benchmarks;
- The potential impact of any changes to IBOR reference rates on corporate users (and actions that could mitigate an adverse impact);
- Areas of uncertainty that may merit further assessment and engagement with corporates before a final proposal is approved.

The legal continuity of contracts is obviously a priority for the corporate sector, as well as for the financial sector. Corporates tend to have a range of commercial references to IBOR in addition to those relating to banking products. Tracking these wider references can be difficult for some corporates (perhaps as a symptom of having less specialized IT systems than financial institutions' purpose-built loan and deposit tracking systems). Corporates may have difficulty in creating an inventory of relevant contracts, particularly as contract life-span can go backward and forward many years. Tax and hedge accounting structures including inter-affiliate (i.e. intra-group) financing arrangements, are sensitive to changes, especially where contracts have an international dimension.

¹⁵ The term "corporate" also includes, where applicable, defined benefit pension funds sponsored by a corporate.

¹⁶ The report covers the interest rate benchmarks in five major currencies, USD, EUR, GBP, CHF and JPY and the focus is on LIBOR, EURIBOR and TIBOR rates (collectively referred to as "IBOR").

¹⁷ The views expressed in this report are an aggregation of input received from various industry associations and market experts as well as directly from corporates via an online survey. The opinions expressed should not be inferred as representing the views of any particular contributor or member of the corporate work group.

It is important to note that, as at January 2014, many corporates are not yet convinced that wholesale change of IBOR is required, beyond strengthened governance, provided that a sufficient number of banks shall continue to contribute to IBOR.

Corporates are uncertain about the nature and potential impact of the MPG's likely recommendations. Therefore corporates fear that changing IBOR could have considerable cost implications (such as the renegotiation or termination of their existing agreements) and unintended consequences (e.g. tax and accounting issues). Some corporates expressed concern that, in the event of any change, corporates may have a weak negotiating position in relation to banks. Further engagement with corporates is recommended, once the OSSG's proposals have been clearly defined. This could be achieved constructively through representative organizations such as the International Group of Treasury Associations (IGTA).

8.2. Approach taken for Research

The findings in the report of the corporate work group are based on the results of an outreach survey, supplemented by informal discussions with market experts, such as auditors and members of industry associations³.

During Phase I of the MPG's work (September-December 2013) preliminary discussions were held with industry associations and certain multinationals having large treasury functions, including those represented on the corporate work group itself. These discussions helped to shape the corporate outreach survey that was conducted in Phase II, during the last two weeks of January 2014.¹⁸ The survey was distributed internationally to several hundred corporates via relevant associations, principally affiliates of IGTA & Business Europe.

The detailed survey questionnaire comprised questions on the following five topics:

- Respondent classification
- Market Footprint
- Reference rate reform scenarios
- Transition scenarios
- Other Considerations

A copy of the survey is attached as Appendix 1 to the Corporate Work Group's full report.

¹⁸ Due to the wider MPG timetable, the survey had to be scheduled for the last two weeks of January 2014, coinciding with year-end accounting for many corporates.

There were 82 confirmed responses to the survey. Detailed analysis of the respondents and their responses is included in the corporate work group's full report. All data has been aggregated¹⁹, with nothing attributable to any individual company.

The work group identified potential drawbacks in respect of the survey approach and timing: particular effort had been given to ensuring wide geographical representation but, nevertheless, responses were skewed heavily towards the UK, USA and EU, with few Swiss companies and no Japanese companies (i.e. whose main operating currency was JPY). Smaller companies were considered to be difficult to reach and less likely to respond.

In keeping with the Terms of Reference of the MPG, the survey could not reveal confidential details of the recommendations being considered by the MPG. Therefore corporates could not consider the topic comprehensively. Under these circumstances it is likely that many corporates might have focused on the uncertainty and potential "down-side" that they would associate with a reform of IBOR reference rates.

Given these drawbacks, the response rate of 82 confirmed submissions is considered good, particularly since many of these responses were received from multinational corporates.

8.3. Summary of Key Findings

8.3.1. Use of Interest Rate Benchmarks

The Corporate Sector uses IBOR reference rates not only for financial instruments created by the Financial Sector but also for a wide range of commercial purposes. These exposures may exist over a long time-frame (both historically and prospectively) and may affect all sizes of corporate enterprises. Typically corporates do not have a comprehensive inventory of their wider [commercial] uses of IBOR.

Interest Rate Benchmarks at corporates are used mainly for pricing loans, in financial instruments, valuations, discounting and benchmarking purposes and in commercial and trade finance contracts. The highly important inter-affiliate loan facilities of corporates mainly incorporate USD- and GBP-Libor as well as Euribor. The tenors range from Overnight to 12-months ("12M") with the bulk up to 6-months ("6M").

Tax and hedge accounting structures, as well as inter-affiliate financing arrangements, are sensitive to any transition (especially where contracts are international).

A summary of some uses of IBOR reference rates by corporates is provided in Table 11 below:

¹⁹ Due to competition law concerns, the raw data was aggregated and anonymised by the survey administrator, The Confederation of British Industry (CBI), before being provided to the MPG corporate work group.

Table 11: Uses of IBOR by Corporate Survey Respondents (non-comprehensive)

| | |
|---|--|
| Uses of IBOR | <ul style="list-style-type: none"> • Pricing of inter-affiliate/intra-group loans • Hedging of discount rates and/or inflation in respect of defined benefit pension liabilities or other post-employment liabilities. • Swapping a debt obligation in one currency to another currency using a cross-currency swap that involves an IBOR • Discount rates for valuation purposes • Performance benchmarks for money market funds and/or other asset managers • Standard interest rates for pricing long-term commercial contracts • Late payment clauses in commercial contracts • Long-term project finance contracts / joint ventures • Trade Financing Solutions (e.g. factoring or supply chain financing by highly-rated corporates that provide financing for their suppliers with less direct access to credit) • Hedging the variable interest rate on a floating rate debt obligation by "swapping" to a fixed rate using an interest rate derivative (could also be "swapping" a fixed-rate to a floating rate using an interest rate derivative) |
| Loans/Credit Facilities | <ul style="list-style-type: none"> • Asset securitization pricing • Pricing on secured and unsecured debt issuance which may be directly linked to IBOR • Primary syndicated loan agreement that is IBOR based • Pricing of corporate borrowing drawdown and credit lines/facilities • Revolving Credit Facility pricing that is based on IBOR • Interest apportionment between members of a cross-border, cross-currency cash pool |
| Accounting Purposes | <ul style="list-style-type: none"> • Accounting- IBOR may be used in fair value calculations for discounting provisions, impairments and financial leases. It may also affect [indirectly] capitalization of interest for project accounting |
| Regulatory Cost of Capital | <ul style="list-style-type: none"> • As part of the discount rate for property valuation calculations - used in bank lenders' loan security covenant testing and valuation • Indirectly used in setting regulatory cost of capital using a CAPM model with cost of debt components |
| Commercial Contract Clauses | <ul style="list-style-type: none"> • Asset transaction Sale & Purchase agreements will occasionally make use of LIBOR benchmarks in the definition of price adjustment mechanisms where the settlement date differs from the effective date of the deal. The buyer would typically agree to pay LIBOR plus a spread during this period. • Price escalation clauses in long-term supply/purchase contracts. |
| Pricing/Valuation of Financial Instruments | <ul style="list-style-type: none"> • Used in pricing some trade products, such as contracts for difference (CFDs) • Rate is used in some types of option pricing • Pricing of floaters |

8.3.2. Alternatives

As mentioned, some corporates expressed support for stronger governance around IBOR but the case for a more fundamental change was not clearly understood or supported by

corporates in general, owing to their concerns about the potential for such a change to affect them adversely. For example, switching to an alternative reference rate may invoke a loan repayment clause with attendant tax consequences. It is important that alternative reference rates should continue to include longer tenors (>6M), particularly for corporates' usage in commercial contracts and inter-affiliate financing.

Many corporates do not have standard fallback clauses in their contracts or are not sure about their existence. All commercial contracts would have to be identified and assessed in detail to identify non-standard fall-back clauses.

It is evident from the various results that corporates currently have a preference for IBOR-styled rates, with bank credit and liquidity premia included, over OIS or T-Bills. However, the majority indicated that they would have little appetite for change to an alternative (e.g. IBOR+) if the new rate would be systemically >5bps higher (or lower) in future. It is likely under such a scenario that larger corporates, with legacy portfolios linked to current IBOR, would prefer to move those contracts towards a risk-free rate that better reflected their cost of borrowing (in preference to IBOR+). Only 20% of all respondents would definitely transfer to an alternative benchmark that was significantly more volatile than current IBOR.

Any alternative or replacement benchmark must be durable (i.e. being robust, long-lasting and available during times of financial crisis).

8.3.3. Properties of an Ideal Benchmark

The main requirements of corporates with regard to the characteristics of an ideal benchmark are transparency, availability (daily, while remaining durable in turbulent markets), supervision, a large number of contributors and the continuity of contracts. The relative negligence of "Exclusively transaction based" in Phase II contrasts somewhat with outreach results obtained from a smaller sample of respondents in Phase I.

Many corporate respondents currently require a reference rate with bank credit and liquidity premia approximating the funding costs of the banks in their credit agreement. However, an ideal future benchmark should not be significantly more volatile or systemically higher (or lower) than current IBOR. The continued availability of 6M and, to a lesser extent, 12M tenors are very important in an ideal benchmark.

8.3.4. Transition Considerations

There is a risk that recommendations for a potential transition may focus primarily on products used by the Financial Sector. Corporates may need a longer preparation period than the Financial Sector in which to analyse their historical exposures and to renegotiate current exposures as required; this exercise is likely to entail considerable effort and cost. If reference rates were to change, corporates fear that this could invalidate certain legal contracts, hedge accounting structures or transfer pricing agreements. In turn this could lead to unwanted consequences such as early loan repayments, unexpected financial accounting effects and the asymmetrical crystallization of taxable gains and losses.

Many corporates have argued in favour of a parallel transition, in view of their existing exposures to IBOR, but a synchronised and aligned "hard cut-over" transition potentially could reduce the scope for subsequent legal and fiscal disputes. A seamless transition may be preferred to market-led because it would help to justify the cost/benefit impact of a

transition (although corporates would prefer a market-led approach if the hard cut-over approach would have an adverse impact on their historical contracts). If there would be a hard cut-over to new reference rates, a notice period of between 2 and 5 years would seem to be appropriate in order to cover the needs of the majority of corporates. However, in the parallel run scenario, a notice period of ≥ 5 years was indicated by survey respondents, noting that the "run off" period for some existing contracts could be >30 years. A parallel transition period could be reduced if there were a longer lead in period. However, a parallel transition may be problematic because typically one cannot input two benchmark rates into treasury IT systems and a choice of parallel rates may give rise to legal, tax or accounting implications (described in more detail in the full report). Similarly a transition from a long tenor to a short tenor may constitute refinancing and trigger fiscal/accounting issues.

In practice, the necessary length of a transition period would depend upon the Official Sector's ability to:

- a. ensure legal continuity of contract through a "seamless" transition; and
- b. put in place an international framework to ensure prior alignment of legal, fiscal and accounting treatments in respect of any transition. Global coordination across currencies is crucial for multi-nationals; Prior engagement (by OSSG) with international accounting authorities (e.g. IASB, FASB) and national fiscal authorities will be necessary to ensure aligned legislation and treatment.

8.3.5. Additional Findings

The final section of the survey was intended to provide a platform for corporates to provide narrative commentary on considerations that were not covered elsewhere in the survey. The corporates raised further issues and recommendations that have been abridged and collated in the full report. Key themes from the narrative comments related principally to (i) increased costs and (ii) risk & uncertainty.

Cost considerations included the potential Profit & Loss or Balance Sheet impacts arising from Accounting or Tax impacts (e.g. asymmetrical fiscal treatment of inter-affiliate financing arrangements upon transition). Some corporates expressed a fear that they would be in a poor position to re-negotiate terms with their banks, so the end result for these corporates may be an increased cost of borrowing (particularly for smaller corporate end-users).

Risks and uncertainties included market uncertainty and the likelihood of increased volatility leading to negative financial impact. Change management was considered likely to be difficult and risky. Therefore a change to IBOR would require detailed impact assessment, both at corporate level and in terms of international regulatory alignment.

Market Participants Group on Reforming Interest Rate Benchmarks

Cross-Currency Appendix

March 2014

Appendix A. Terms of Reference

The following Terms of Reference were published by the FSB at:
http://www.financialstabilityboard.org/publications/r_130829f.pdf

August 7, 2013

Market Participants Group on Reforming Interest Rate Benchmarks Terms of Reference

Background and Objectives

At their June 2013 Plenary, the members of the Financial Stability Board agreed to establish a high-level Official Sector Steering Group (OSSG) comprised of representatives from regulatory agencies and central banks, which will be responsible for coordinating reviews of existing interest rate benchmarks and for establishing and guiding the work of a Market Participants Group (MPG), which will examine the feasibility and viability of adopting additional reference interest rates. The MPG will issue a report of its findings and recommendations to the OSSG, which will assist the MPG as necessary and will review and discuss the report with the MPG.

Role of Market Participants Group

The MPG is asked to submit a report that:

- i. Proposes options for robust reference interest rates that could serve as potential alternatives to existing Libor, Euribor, and Tibor benchmark rates. The proposed rates should be consistent with the IOSCO principles adopted by the OSSG. Proposals would include assessing the feasibility and viability of additional benchmarks that are based upon (i.e., anchored in) an active market having observable bona fide, arms-length transactions, and potential plans for adoption of these additional rates.²⁰ This work should include:
 - A thorough examination of the methodologies that could be employed in establishing each potential additional benchmark and the incentives and ability to manipulate the proposed rates.
 - Suggested administrative and governance structures for the proposed rates.

²⁰ This does not preclude benchmark administrators from using executable bids or offers as a means to construct benchmarks where anchored in an observable market consisting of bona fide, arms-length transactions. See Principle 7, IOSCO Principles for Financial Benchmarks. <http://iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf>

- An analysis of the potential interest among market participants and end-users in adopting the proposed rates.
- 2) Proposes strategies (testing, protocols, and timing) for any transition to new reference rates and for dealing with legacy contracts in the national or regional currency. This should include identifying problems that could arise in moving to new benchmark rates, and how these can be addressed. Among the issues that this work should address are:
- How reference rates are currently treated in the terms and conditions of the contracts that use them. This should include household or corporate loan and insurance contracts that directly impact the nonfinancial sector in addition to derivatives contracts used by the financial sector.
 - Potential testing or parallel-runs to pilot new benchmarks.
 - Factors to consider in setting timetables for any transition, including the feasibility of setting a uniform date for banks and other market participants to begin using a new benchmark for new contracts.
 - The implications of different transition timetables being adopted across jurisdictions and for different rates, and how they should be addressed.
 - Strategies to deal with legacy contracts, including whether the long tail of legacy contracts could be reduced, e.g. by trade compression or replacement.
 - Other potential transition issues, including the legal, accounting, and tax issues that would arise over the transition to a new benchmark (e.g. continuity of contracts and contract frustration) and what roles can and should the official sector play in providing legal certainty and facilitating transition.

The MPG should, in consultation with the OSSG, engage in outreach to a wide set of stakeholder groups, including end-users (e.g. institutional investors, government-linked institutions consumer associations, corporate treasurers and, where appropriate, non-professional end-users) of the relevant interest rate benchmarks, institutions involved in the production benchmarks (e.g. benchmark administrators and firms involved as calculation agents), and exchanges that trade instruments referencing these benchmarks. The MPG report to the OSSG should demonstrate how stakeholder groups, whether represented or not on the MPG, have been consulted and how their concerns have been addressed.

The MPG may establish sub-groups to examine issues specific to particular benchmark rates, currencies, or financial instruments/markets, and the MPG may, in consultation with the OSSG, co-opt other market participants to serve on these groups where relevant and necessary.

The MPG is to consult periodically with the OSSG, and is to provide the OSSG with the opportunity to comment on any decisions at an early stage.

Governance

- The chair and membership will be appointed by the OSSG
- Members of the MPG will act in a personal capacity.

- Unless directed otherwise by the OSSG, the MPG's internal deliberations and its communications with the OSSG will be treated as confidential.
- For voting and decision making, the presence of 10 MPG members and the Chair will constitute a quorum. Decisions and recommendations should be reached by consensus if possible or by a 2/3 super majority of those present otherwise.
- The MPG will maintain a schedule of conflicts of interests of its members; where appropriate, members will excuse themselves from discussions where actual or potential conflicts exist.
- The MPG shall meet as necessary, with a first meeting scheduled no later than September 10, 2013.
- The FSB shall publish these terms of reference and the membership of the MPG

Deadlines

| | |
|------------------------------------|--|
| Sept. 27, 2013 on any progress. | MPG provides a proposed work plan to OSSG and updates the OSSG |
| Dec. 31, 2013 | MPG provides initial report and draft recommendations to the OSSG. |
| Mar. 17, 2014 | MPG provides final report and recommendations to the OSSG. |

Appendix B. Formation and Composition of MPG

The Market Participants Group was formed by the Official Sector Steering Group of the Financial Stability Board, as announced by the FSB on October 2, 2013. Consistent with the OSSG's Terms of Reference, the MPG recruited external working group members who have played a key role in the project. The entire MPG project team is shown in the table below. Those shown with an asterisk are the OSSG-appointed members.

The MPG gratefully received support from Irina Leonova and Nigel Jenkinson of the Financial Stability Board. Excellent workflow coordination was provided by Oliver Wyman. We are also extremely grateful for project support from the firms of the project members, and especially for assistance from many members of the staffs of MPG members.

| | |
|-------------------------------|--------------------------------------|
| Darrell Duffie, Chair* | Stanford University |
| Stephen O'Connor, Vice-Chair* | ISDA |
| Rawan Abdelrazek | Promontory Financial Group |
| Vickie Alvo | JPMorgan Chase & Co. |
| Yasunobu Arima* | The Bank of Tokyo-Mitsubishi UFJ |
| Eesan Balakumar | Promontory Financial Group |
| Terry Belton | JPMorgan Chase & Co. |
| Christian Buschmann | Commerzbank |
| Libby Cantrill | Pimco |
| Justin Chan* | HSBC |
| Laurent Clamagirand* | AXA Group |
| Pierre Collin-Dufresne | EPFL |
| John Cummins* | Royal Bank of Scotland |
| Thomas Deas* | FMC Corporation |
| William De Leon | Pimco |
| Hubert de Vauplane | Kramer Levin Naftalis & Frankel LLP. |
| Lee Edwards* | Nestle |
| Sherine El-Sayed | Financial Markets Law Committee |
| Rolf Enderli* | Credit Suisse |
| Lenny Feder* | Standard Chartered Bank |
| John Feeney* | National Australia Bank |
| David Geen | ISDA (Secretary, MPG) |
| Diane Genova | JPMorgan Chase & Co. |
| Fabiano Gobbo | KPMG |
| Jeffrey Golden | P.R.I.M.E. Finance Foundation |
| Mohammed Grimeh | Standard Chartered Bank |
| Serge Gwynne | Oliver Wyman |
| Jonathan Hall* | Goldman Sachs |
| Andreas Hauschild* | Commerzbank AG |
| Hanno Hirvinen* | Pohjola Bank |
| Martyn Hoccom | Royal Bank of Scotland |
| William Hughes | Citi |
| Yoshito Kasamatsu | Mizuho Bank |
| Atsushi Komatsu* | Mizuho Bank |
| Ernst Lienhard | SwissRe |
| Andrew Longden* | Shell |
| Joanne Medero | BlackRock |

| | |
|-------------------|---|
| Aidan Mittra | RBC |
| Anthony Murphy | Promontory Financial Group |
| Edward Ocampo* | Morgan Stanley |
| Sandie O'Connor* | JPMorgan Chase & Co. |
| Will Oswald | Standard Chartered Bank |
| Joanna Perkins | Financial Markets Law Committee ²¹ |
| Knut Pohlen* | Swiss Re |
| Richard Prager* | BlackRock |
| Alex Roever | JPMorgan Chase & Co. |
| Haley Rosenlund | RBC |
| Benjamin Sacks | Oliver Wyman |
| Harry Samuel* | RBC |
| Pier Mario Satta* | UniCredit |
| Harald Schlosser* | Volkswagen Group |
| Howard Shek | Independent |
| Takumi Someya | Mizuho Bank |
| Frederick Sturm | CME Group |
| Kimberly Summe | Partner Fund Management, L.P. |
| Yasuyuki Takeda* | Sumitomo Mitsui Banking Corp. |
| Joshua Thimons | Pimco |
| Caroline Vassallo | RBC |
| Adrian Walkling | Standard Chartered Bank |
| James Winterton | Shell |
| Tomoji Yokoyama | Sumitomo Mitsui Banking Corp. |

²¹ Also affiliated with ICE Benchmark Administration Ltd.

Appendix C. Legal Analysis

C.1. Product Profile: Market Standard Definitions

The commonest financial contracts linked to LIBOR, EURIBOR and TIBOR include: (i) syndicated loans; (ii) floating rate notes; (iii) interest rate swaps; (iv) exchange-traded derivatives and (v) forward rate agreements.

C.1.1. Derivatives

Exchange-traded derivatives

GBP

In calculating the final settlement price on an expiring contract, under an exchange-traded derivative contract governed by English law, the exchange is typically obliged to refer to “a rate... which shall be calculated by reference to interest rates... in the London interbank market at 11 am London time on the Last Trading Day”. That rate is then subsequently defined in the contract as either “BBA LIBOR”.

Contractual references to “BBA LIBOR” or “the British Bankers Interest Settlement Rate”, which are still common in market standard terms for loans and may also appear in some long-term derivatives (see below), have raised the question whether the contracts in question can accommodate a change in administrator, (i.e., without the change presenting issues as to the contracts’ construction and/or enforceability).²² The question is a pressing—although far from insoluble—one for the markets concerned because it was agreed on 9 July 2013 that the administration of LIBOR would be handed over to NYSE Euronext Rate Administration Limited (a new subsidiary of NYSE Euronext), which is expected to take responsibility for the benchmark early in 2014.²³ One solution to this potential problem which has been mooted is that the BBA might continue to designate and/or endorse the NYSE-administered benchmark in some way.²⁴

OTC derivatives

GBP

OTC derivatives comprise a significant proportion of instruments linked to LIBOR in the Sterling and global markets and may be valued at approximately \$230 trillion on a notional underlying basis.

²² [Benchmark Transition Report - December 2012](http://www.fmlc.org/Pages/papers.aspx) published by the Financial Markets Law Committee (available at www.fmlc.org/Pages/papers.aspx), at paragraph 5.5.

²³ Subject to authorisation from the Financial Conduct Authority and following a period of transition.

²⁴ *Ibid.*

A wide variety of these derivatives incorporate the 2006 ISDA Definitions. The most common index chosen in the Sterling interest rate swaps market under those definitions is "GBP-LIBOR-BBA", which:

means the Reset Date will be the rate for deposits in Sterling for a period of the Designated Maturity which appears on the Reuters Screen LIBOR01 Page as of 11: 00 a.m., London time, on that Reset Date.

In addition to the titular reference to LIBOR, this definition refers to "the rate for deposits" and publication "on the Reuters Screen LIBOR01 Page", which are, therefore, additional features of the contractual definition. It is noteworthy that publication must occur "as of 11:00 a.m., London time" which has provoked the suggestion that any later re-fixing of the rate will not be incorporated in derivatives payments calculations.²⁵

YEN

The 2006 ISDA Definitions provide that with respect to a "Swap Transaction" if a "Successor Price Source" and a "Successor Price Source Effective Date" have been agreed on between the parties, then the "Floating Rate Option" can be amended pursuant to the agreement.

The 2006 ISDA Definitions provide for "JPY-LIBOR-Reference Banks" as a fall-back for JPY-LIBOR,²⁶ whereas they provide for "JPY-TIBOR-TIBM-Reference Banks" as a fall-back for JPY-TIBOR.²⁷

EUR

Belgian Law

"EUR-EURIBOR-Reuters" means that the rate for a reset date will be the rate for deposits in Euros for a period of the designated maturity which appears on the REUTERS screen EURIBOR01 Page as of 11:00 a.m., Brussels time, on the day that is two TARGET settlement days preceding that reset date. If such rate does not appear on the Reuters Screen EURIBOR01-page, the rate for that Reset Date will be determined as if the parties had specified".

This definition is also included in the European Master Agreements (EMA), which are governed by the Belgian law but also includes a successor page clause:

²⁵ *Ibid*, paragraph 36.

²⁶ Regarding JPY-LIBOR, the 2006 ISDA Definitions provide for "JPY-LIBOR-FRASET," "JPY-LIBOR-BBA," and "JPY-LIBOR-BBA-Bloomberg" (Section 7.1.(l)(iii)-(v)), for all of which "JPY-LIBOR-Reference Banks" is provided as a fallback.

²⁷ Regarding JPY-TIBOR, the 2006 ISDA Definitions provide for "JPY-TIBOR-TIBM (10 Banks)," "JPY-TIBOR-TIBM (5 Banks)," "JPY-TIBOR-TIBM (All Banks)," "JPY-TIBOR-TIBM (All Banks)-Bloomberg," and "JPY-TIBOR-ZTIBOR" (Section 7.1.(l)(viii)-(xii)), for all of which "JPY-TIBOR-Reference Banks" is provided as a fallback.

"If such rate does not appear on the Reuters screen EURIBOR01-page, the rate for that Reset Date will be determined as if the parties had specified "EUR-EURIBOR-Reference Banks" as the applicable floating rate option.

German Law

German Master Agreement for Financial Derivatives Transactions (*Deutscher Rahmenvertrag für Finanztermingeschäfte - DRV*):

If, on a Calculation Date, it is not possible to determine the reference basis agreed in respect of the relevant Transaction, the parties shall determine such reference basis by using a basis of calculation which is as close as possible, to the one agreed with respect to the relevant Transaction. If the reference basis is an interbank interest rate which cannot be determined by mutual agreement within 20 days, the reference basis shall be the arithmetic mean of the interest rates which two banks of international reputation, selected by the Bank offer time deposit in the contractual currency with equivalent maturities to prime banks in the interbank market for about the same amounts as the notional amount at about 11.00 a.m. (local time of the relevant interbank market) on the Calculation Date.

C.1.2. Loans

Syndicated loans

Across the most jurisdictions (considered in the Legal Analysis reports) syndicated loan agreements incorporate Loan Market Association ("LMA") market standard terms. Under these terms, "LIBOR" is defined as "the applicable Screen Rate... as of the Specified Time" which, in turn, is defined as follows:

"Screen Rate" means:

In relation to LIBOR, the British Bankers Association Interest Settlement Rate for the relevant currency and period displayed on the appropriate page of the Reuters screen.²⁸

²⁸ The LMA published new provisions:

"Screen Rate" means

- a) in relation to LIBOR, the London interbank offered rate administered by the British Bankers Association (or any other person which takes over the administration of that rate) for the relevant currency and period displayed on the pages LIBOR01 and LIBOR02 of the Reuters page screen or any replacement Reuters page which displays that rate); and

CHF

Lombard loans also make up a significant proportion of commercial loan contracts under Swiss law. The following provision is representative of a typical “LIBOR” definition incorporated into such contracts:

Fixed Advances

The interest rate is given by LIBOR*+%, if and where a LIBOR is available for the requested currency and term. Where a LIBOR is not available for the requested currency and duration, the interest rate is determined by the bank with regard to the conditions prevailing in the money markets and the capital markets (taking into account currency and duration of the loan).

*The London Interbank Offered Rate (“**LIBOR**”) is herein defined as the rate for deposits in the requested currency for the a period corresponding to the duration of the Fixed Advance set by the British Bankers Association at 11:00 a.m., London time, as it appears on Bloomberg screen BBAM 1.

Bilateral commercial loans and commercial mortgages

Many bilateral commercial loans and commercial mortgages will be drafted to replicate key LMA market standard terms. In respect of Swiss law, Lombard loans linked to LIBOR are also issued in respect of bilateral commercial loans and to a lesser extent, private clients.

C.1.3. Debt securities

Floating rate notes

GBP

Floating Rate Notes (“FRNs”)—including Commercial or Residential Mortgage Backed Floating Rate Notes and floating rate debt instruments issued pursuant to other kinds of receivables securitization—occupy a significant share of the markets in LIBOR-linked instruments. The Prospectuses for these products are often modeled on ISDA market standard terms.

on the appropriate page of such other information service which publishes that rate from time to time in place of Reuters. If such page or service ceases to be available, the Agent may specify another page or service displaying the relevant rate after consultation with the Company.

For example, terms for FRNs commonly refer to a rate for deposits which appears on a particular screen "as of" a particular time in language reminiscent of the terms for OTC derivatives discussed above. Here is an example:

the Agent Bank will determine the rate for deposits in Sterling for a period equal to the relevant Interest Period which appears on the display page designated LIBOR01 on Reuters (or such other page as may replace that page on that service, or such other service as may be nominated as the information vendor, for the purpose of displaying comparable rates) as of 11:00 a.m. (London time), on the second TARGET Settlement Day before the first day of the relevant Interest Period.

German Law

The EURIBOR-definition can be tailor-made.

If the calculation agent cannot determine the reference interest rate because the screen page is not published, or if the calculation Agent cannot make such determination for any other reason, then the Reference Interest Rate for the respective Interest Period shall be the arithmetic mean (rounded, if necessary, to the nearest one thousandth of a percentage point, 0.0005 being rounded upwards) determined by the Calculation Agent of the interest rates which five reference banks selected by the calculation agent in conjunction with the Issuer (the "Reference Banks"), quote to prime banks on the relevant Interest determination date for deposits in the issue currency for such Interest period. Should two or more of the Reference Banks provide the relevant quotation, the arithmetic mean shall be calculated as described above on the basis of the quotations supplied. If less than two reference banks provide a quotation, then the reference interest rate for the respective Interest Period shall be determined by the calculation agent in its reasonable discretion in accordance with § 317 of the German Civil Code (*Bürgerliches Gesetzbuch - BGB*). Here, no template terms and conditions in the form of the ISDA or LMA template documentation are available and is therefore somehow "tailor-made": The wording is in line with market practice for floating rate notes governed by German law.

Because the German bond agreements give no information how the benchmark should be calculated it might be that the new benchmark setting process is covered by the existing provisions. According to the above quoted provision, it is necessary that a certain number is quoted at certain point of time and that this number is published on a certain webpage / screen: What will be published there will be, by legal definition, the EURIBOR benchmark.

Swiss Law

LIBOR Cap warrants are marketed in particular as knock-in call options on LIBOR to home buyers with LIBOR-referenced floater mortgages. Below are the relevant references to CHF LIBOR in these contracts:

Warrant 1

The terms define the Underlying as:

The Underlying means the 3 Month CHF LIBOR (London Interbank Offered Rate). The rate represents the daily fixed reference rate in the

interbank market which is fixed on every business day at 11:00 hrs London time.

Regarding the Price of the Underlying, the terms set forth:

The Price of the Underlying means the price of the Underlying as published on the Relevant Screen Page or a substitute page thereof [...].

Repurchase Agreements

EUR

French Law

The fall-back typically stipulates that if the relevant EURIBOR rate cannot be observed, the Calculation Agent will approach four major banks to obtain quotes for a replacement rate.

German Law

REPOs are governed by the German master agreements for repurchase transactions (*Rahmenvertrag für Wertpapierpensionsgeschäfte*) and the master agreements for securities lending transactions (*Rahmenvertrag für Wertpapierdarlehen*) and their respective confirmations. Both master agreements were set up by the German banking association (*Bundesverband deutschen Banken- BdB*) and do not include any EURIBOR-definitions.

C.2. “Fall-Back” Provisions

Most market contracts on standard terms deal with instances where LIBOR is unavailable. These contingency clauses (known as “fall-back” provisions) purport to provide a safety net where LIBOR has temporarily disappeared (*i.e.* does not appear on the Reuters LIBOR01 Page) by providing another means by which a reference rate can be obtained.

A notable exception is exchange-traded derivatives which do not appear to include standard fall-back provisions to cover the withdrawal of one of the benchmarks considered by the legal reports. However, such contracts typically vest a wide discretion in the exchange unilaterally to decide that the Settlement Price is to be determined by means other than by reference to the relevant benchmark.

C.3. Force Majeure/MAC Clauses

USD

It is possible that a court might consider the inclusion of the force majeure provision in Section 5(b) of the 2002 ISDA Master Agreement and various other fallback provisions in ISDA documentation to be a contractual reflection of the parties’ foresight in risk mitigation, thereby undermining a frustration of purpose claim. The force majeure termination event in the ISDA Master Agreement states that such an event could trigger the termination of the contract if the affected party is unable to overcome the event “after using all reasonable efforts”.

GBP

Some contracts may incorporate other force majeure or material adverse change clauses—i.e. in addition to, or as an alternative to, the standard fall-back provisions—which could be triggered by a change to the methodology of the existing LIBOR benchmark or the elimination of LIBOR. Such clauses are not standard but where they exist, they will *prima facie* prevent the frustration of the contract.

EUR

French Law

The French Banking Federation underlines the need for clarification of the temporary measures which as is currently do not dissipate all interrogations as for existing contracts, in particular for contracts whose modification of the index would involve / could be considered as force majeure.

C.4. Transition Hypotheses

C.4.1. Transition to another unsecured benchmark

Under this hypothesis, the old LIBOR, EURIBOR or TIBOR benchmark is replaced by another benchmark reflecting the cost of unsecured borrowing in the interbank market.²⁹ The new benchmark might have markedly different features which were considered to bring it into greater alignment with the IOSCO Principles. Such features might include a fixing methodology anchored firmly in transactions, different provisions for the calculation of submissions data and a policy on intraday re-fixing, for example.

C.4.2. Transition to a secured benchmark

Alternatively, a proposal may be made to replace LIBOR, EURIBOR or TIBOR with a benchmark reflecting secured lending rates in the interbank market. The introduction of a new benchmark of this kind and an attempt to transfer legacy contracts to such a benchmark would represent a more significant change than that discussed in the section above. It would be harder to argue that legacy contracts impliedly contemplate such a transition in the event that one of these benchmarks is discontinued.

C.4.3. Transition to a new fixing methodology

One possibility is that the existing LIBOR, EURIBOR or TIBOR benchmark is simply reformed by the introduction of a new fixing methodology to bring the benchmark ("LIBOR/EURIBOR/TIBOR+") into what is perceived to be greater alignment with the IOSCO

²⁹ Currently, the rate at which each bank makes its submission to the administrator of the LIBOR benchmark reflects the bank's judgement as to its cost of unsecured funds in the London interbank market. The definition of "funds" is: unsecured interbank cash or cash raised through primary issuance of interbank Certificates of Deposits.

Principles. The most likely proposal of this kind is a proposal to “anchor” the benchmark in transactions.

C.4.4. Transitions involving other revisions to the benchmark

Other revisions to a benchmark may include a change to the Administrator and the introduction of a re-fixing policy.

Appendix D. Benchmark Fixing Backups

Requirement for a backup methodology for benchmark fixes

Benchmarks rely on successful publication every day to maintain their status as dependable fixings. A successful benchmark will combine the characteristics of a robust mechanism for routine rate fixes and a clear fallback process to ensure a fair result under most circumstances.

Consideration should be given to a fixing process which is relevant to the characteristics and currency of individual benchmarks. This appendix covers a number of principles that can be used to design several levels of backup in the case of disruption of the routine fixing process.

Market Disruption

The design of the fixing process typically assumes normal market conditions. But periodically markets can become volatile and/or illiquid. This section looks at a variety of backups that can be used to maintain the reliability and confidence in the benchmark.

- Normal market conditions
 - The normal fixing processes operate as usual
- “Volatile” market conditions
 - Create a process for declaring volatile conditions

This can be done using a small committee run by the benchmark administrator. The purpose is to gain consensus among market participants that normal processes will not be able to operate and which backup is required.
 - Design of the first level of backup

Often this level involves another attempt at the normal fixing process but at a delayed time. This allows the administrator time to remedy the situation and produce a successful fixing of the benchmark.
 - Design a second level of backup

Should the normal and delayed fixing prove to be impossible then it is advisable to have another clearly defined process for fixings.

For example, this can involve interpolating for missing tenors (provided the “pillars” are available) or using alternate, closely correlated markets. In the latter case for OIS, the FFER futures could be used to provide an effective fixing. In other currencies forward FX may be a better choice for interest rates.

The important feature of any secondary backup is to make the process clear, transparent and dependent on a closely aligned but independent market. This will likely need to be carefully adapted for each benchmark.
 - Preparation of a third level

Should all attempts at a fixing based on market prices and/or trades fail then it is likely the benchmark will have to rely on submissions to effect a successful outcome. In this case the administrator will be required to maintain a list of submitters and the principles by which they will be supervised.

Since the circumstances of reaching this third level will likely correspond with difficult market conditions, the commitment of the submitters and the procedures for submitting will have to be carefully planned and well communicated.

There is a possibility that the administrator may rely on a submission process for some time if the "normal" conditions cannot be quickly restored. It would be advisable to plan accordingly for this situation.

Operational Issues

Many benchmarks rely on infrastructure to enable the fixing to be calculated. Such infrastructure can fail and this possibility has to be covered.

- Temporary infrastructure failure
 - Resort to a manual collection and calculation of the benchmark if possible.
 - Consider a delay to the publication if the problem can be rectified quickly and the data is stored for later use.
- Major infrastructure failure
 - This is a version of market disruption and can be covered under the previous section.

Summary

In many cases, the design of benchmarks and their associated fixing processes assumes normal market conditions. But there will be occasions that do not allow a benchmark fixing to be carried out in a way that supports the objectives of that benchmark.

The backup processes need to be very clear both in the application and the conditions under which they will need to be deployed.

The detail will necessarily have idiosyncratic aspects peculiar to each benchmark. But the common requirement is for a dependable and transparent process to ensure the reliability and use of any benchmark under all conditions.

Appendix E. Fixing Methodology for OIS Reference Rates

E.1. Overview And Objectives

This paper reviews existing, and proposes new, methodologies for Overnight Index Swap (OIS) rate fixings for maturities ranging between 1 and 12 months. OIS markets in EUR, USD and GBP are generally liquid in maturities up to 24 months with a significant number of market makers prepared to make two-way prices at tight bid-offer spreads. Hence, it should be feasible to develop robust rate fixings for these markets in relatively short order. See Chart 1 and Chart 2 below for OIS volumes by currency and tenor.

The CHF and Yen OIS markets are far less liquid and the underlying Overnight Interest Rate (OIR) in CHF, TOIS, is currently fixed using an approach based on submissions from panel banks. Several contributor banks have withdrawn from this panel over the past 12 months. Consequently, it may take longer to establish robust OIS fixings for CHF and Yen markets.

Overall trading volumes in OIS have increased significantly since the 2007/2008 financial crisis. OIS have gained popularity as a money market trading instrument as OIS more directly reflect expectations of changes in policy rates than "IBOR" based alternatives. Since the crisis, IBORs have included a bank credit spread component, which has sometimes been significant and volatile. The degree of risk implied by this spread has not always been consistent with that implied by bank credit pricing in the FX forward markets. It has also not been well grounded in liquid underlying cash markets (due to the increasing illiquidity of the interbank unsecured term lending markets).

Use of OIS has also become more widespread with the development of central clearing for OTC derivatives. Cleared IRS now account for almost 60% of outstanding derivative notional value vs. just 16% in 2007. This trend is set to continue with global regulatory reforms designed to increase the scope of central clearing, notably including Dodd Frank in the U.S. and EMIR in Europe. Even though IBORs remain the reference rate for most swaps, the market has adopted OIS (which do not include a term credit premium) as the appropriate discount rate for the valuation of cleared and collateralized bilateral swaps. This has generated IBOR/OIS basis risk across the curve. Consequently, many market participants would welcome the adoption of OIS as a market standard for longer tenor IRS.

It should be noted that there are active OIS/IBOR basis swap markets in EUR, USD and GBP so it is currently possible for market participants to transition their portfolios from referencing 3 and 6 month IBORs to referencing OIRs (EONIA, FFER, and SONIA) and many have taken steps in this direction. OIRs currently provide satisfactory reference rates for the swap market without the need for additional 1, 3, and 6 month term reference rates based on OIS. However, certain swap and cash market end users who are accustomed to using IBORs may find the lack of term rate fixing alternatives problematic. Therefore, we believe that robust OIS term rate fixings could help engender market confidence and increase end user acceptance OIS markets.

E.2. Summary Of Key Findings And Recommendations

- Central Counterparties (CCPs) for cleared swaps that have adopted OIS discounting, including LCH SwapClear and the CME, "fix" OIS curves four times daily to calculate

variation margin. CCPs are closely regulated and their discount curves are well accepted by both market participants and regulators. However, based on preliminary discussions, we believe it is unlikely that CCPs would welcome the use of their fixing rates as public benchmarks. Rather, they suggest that these fixings should only be used for CCP risk management and the calculation of margin and settlement amounts.

- OIS benchmarks for 1, 3 and 6 months are currently only available for the EUR market. The EBF publishes EONIA Swap Index fixings for maturities of 1 week to 24 months. However, 11 banks have withdrawn from submitting to the index over the last year. Partly as a result of these withdrawals, the EBF issued a consultation questionnaire on 25 September 2013 seeking views from the market on the impact of possible discontinuation of publication of the rates. We do not believe the existing bank submissions based methodology, such as that used for EONIA Swap Index fixings, is robust or sustainable in the long term.
- We believe that the most appropriate OIS rate fixing methodology for EUR, USD and GBP markets is an MTF/SEF based approach which sources rates directly from regulated electronic trading venues which operate central limit order books (CLOBs) and where market makers stream live, actionable bids and offers. IRS referencing IBORs are actively traded on MTFs/SEFs with CLOBs. OIS trading is now also being offered on some of these platforms. In February 2014 Trad-X launched EONIA IRS with 3 to 24 months maturities, with plans for committed live streaming from 11 market makers. We expect other platforms to follow. We also anticipate the launch of USD and GBP OIS trading in 2014. Provided these platforms attract sufficient liquidity, they should provide a viable source for OIS term reference rates.
- We further recommend that adaptable rate fixing methodologies are developed so that pricing sources can be changed as markets evolve and liquidity moves to alternative venues. In the US, FFER 1-month futures contracts listed on the CME provide an attractive alternative pricing source. However, there can be a material fitting error associated with futures implied OIS rates. Consequently, we are only recommending this approach as a fall back when SEF based fixings are not available. A hierarchy of alternative pricing sources should also be developed for EUR and GBP fixings. These could include indicative prices sourced from multiple inter-dealer brokers (IDBs) and MTFs operating RFQ platforms.
- MTF/SEF based fixings should only be initiated when there is sufficient liquidity on these platforms to support robust fixings. Table 12 provides an example of the potential criteria for determining when there is sufficient liquidity for an MTF based 3-month EONIA swap fixing. We recommend that benchmark administrators develop similar criteria for each relevant currency market and tenor.
- We do not anticipate that MTF/SEF based OIS fixings will be available before the second half of 2014 at the earliest. In the interim, we recommend that OIR administrators/calculation agents begin publication of 1, 3, and 6 month compounded OIR. These would simply be a "backward looking" calculation of compounded OIRs for the relevant term and would correspond to the settlement rate for the floating rate leg of OIS in these maturities. We believe that publication of these rates could facilitate transition from 1, 3 and 6 month IBORs to OIR reference rates, at least for certain market participants.

- The EUR workstream of the MPG has also recommended a transactions based fixing using data sourced directly from contributing banks. This approach would use a VWAP of daily transactions (and not a point-in-time snapshot), so is a fundamentally different index. Consequently, we should consider this an alternative to, and not a replacement for, other existing and proposed EONIA swap indices.
- We recommend that ISDA undertake work with existing and prospective benchmark administrators and calculation agents to ensure that robust OIS fixings are developed in a timely manner. We note that the EBF is planning to launch an initiative with this objective for EONIA swap fixings.
- It must be recognized that the reliability of OIS fixings, however sourced, are only as robust as the fixings for the underlying OIR. Since the financial crisis, changes in monetary policy and banks' credit and liquidity management practices have significantly altered the volume and structure of overnight lending markets. We recommend that administrators and/or calculation agents for OIRs continue to work closely with relevant central banks to ensure that fixing methodologies capture a broad and representative sample of transactions in the overnight money markets.

E.3. Review Of Alternative OIS Fixing Methodologies

Below we review a variety of alternative price sources and methodologies that could be used to fix OIS rates.

E.3.1. MTF/SEF order books

ISDA has recently announced that they plan to use an MTF-based approach for ISDAFIX rates for term EUR swaps vs. EURIBOR in maturities of between 2 and 30 years. ISDA aims to effect the transition to this new methodology for EUR IRS by the end of Q2 2014 and expects to extend this approach to USD and GBP IRS in the second half of 2014. This approach sources market rates directly from electronic trading venues, regulated as MTFs, which operate CLOBs and where market makers stream live, actionable bids and offers.

ISDA and Oliver Wyman are currently working with three MTFs which provide robust liquidity and have deep order books for IRS in maturities of 2 to 30 years. One of these platforms, Trad-X, extended its offering to short-end IRS (3 to 24 months) vs. EONIA in February 2014, with plans for incentivized live streaming from 11 market makers. Table 13 summarizes Trad-X's product and tenor roll out schedule. We expect other platforms to follow shortly thereafter. We also anticipate the launch of USD and GBP OIS trading in 2014. SEF rules under Dodd Frank will likely mandate trading of OIS on these, or similar, platforms and MIFID rules should eventually mandate similar practices in the EU. Provided these platforms attract sufficient liquidity, we expect that they should provide a viable source for OIS term reference rates.

MTF or SEF based fixing approaches offer multiple benefits. They are based on live, fully executable prices from CLOBs, offer increased transparency and ease of scrutiny, and are underpinned by the systems and controls of regulated trading venues. They are also aligned with regulatory driven requirements to transact more standardized products on regulated venues. They leverage existing bank streaming of prices to e-trading venues and associated controls, and they eliminate the need for separate submissions to benchmark calculation agents along with the regulatory and operational burden this entails. Another

advantage of the MTF based approach is that it is very easy to query an order book at any given time during the trading day. This makes it possible to calculate multiple fixings across the trading day.

We recommend that an MTF or SEF based rate be calculated by creating an aggregated order book drawing on prices from multiple trading venues. A mid price would be calculated based on volume weighted average best bids and offers, starting from the top of the order stack and working down to a specified contract size. The contract size would be a typical wholesale market ticket volume which would be set, and periodically reviewed, by the administrator. Figure 4 provides an example of how a swap rate could be set using an aggregated order book.

Best practice governance, controls and surveillance would need to be implemented by the administrator and calculation agent to ensure robust fixings. These could include various sub-methodologies to deal with flash orders and other practices that could undermine the reliability of rate fixings. For example, multiple order book snapshots could be taken over a short time window, or a randomizing algorithm could be used to adjust the precise timing of snapshots. In addition, we believe that an index calculated as an average of multiple fixings across the day (for example, two morning and two afternoon fixings) could be more robust. The administrator could also be charged with monitoring for market manipulation, in addition to the checks currently required of trading venue operators.

We believe that a well-designed and governed MTF fixing could satisfy IOSCO Principle 7. Rates from active and transparent MTFs would be “anchored” in observable transactions. Furthermore, Principle 7 states that a benchmark determination could be based “...predominantly or exclusively on executable bids and offers.”

E.3.2. Futures market order books

Deriving rates from futures market order books is only currently viable for a USD OIS fixing. FFER futures trade on the CBOT with reasonable volumes and depth of order book so, at least in principle, it should be feasible to derive a solid fixing. A significant advantage of this approach is that market rates are readily available today. Hence, there is no need to wait for the development of trading venues with CLOBs for US OIS.

The principal difficulty with this approach is the need to interpolate between futures settlement dates to fix constant maturity 1, 3 and 6 month OIS rates. Standard interpolation methodologies do not work well because of the potential for intra-month step changes in the FFER. Depending on the methodology employed, this fitting error is usually under 1 basis point, but can get much larger during periods of financial stress. This will create problems of acceptance amongst swap market participants. Consequently, we are only recommending this approach as a fallback when reliable SEF based OIS fixings are not available. The interpolation formula would be calibrated so as to minimize the average discrepancy with the OIS fixing for the corresponding tenor over a prior set of days (to be specified) when both rates are available.

E.3.3. Executed trades from Swap Data Repositories (SDRs)

We have also considered the possibility of using transactions data from US based SDRs or EU based Trade Repositories in order to develop OIS fixings. This approach could offer

certain advantages. Provided there are sufficient trading volumes the use of a VWAP across an entire trading day would make the fixing difficult to manipulate. In addition, the fixing would only utilize publicly available data for actual completed transactions. It could also be possible in future to aggregate data from multiple trade repositories in order to develop a more robust fixing.

Based on current and proposed reporting requirements, these comprehensive trade repositories are unlikely to have publicly available information in a timeframe that would be suitable for OIS rate fixings. However, there is a separate "Real Time Reporting Rule" in the US (CFTC, Part 43) that requires publication of primary economic terms as soon as operationally feasible and with a 30 minute time delay for block trades.

Clarus Financial, a software and services provider to the global derivatives market, has recently announced a new series of swap market benchmarks they have named SDRFix. These indices are designed to be compliant with IOSCO principles and are based on actual transactions reported to a Swap Data Repository, DTCC, under the Real Time Reporting Rule. Clarus currently calculates and publishes fixings for USD, EUR, and GBP IRS for maturities of between 2 and 30 years based on a VWAP for all trades reported between 4am and 11am NY time. Clarus do not currently publish fixings for USD OIS vs. FFER.

We have spoken to Clarus and reviewed available DTCC transactions data to assess the possibility of developing an SDR based USD OIS fixing. Unfortunately, OIS transactions volumes are currently too low to provide robust fixings. In 2013, DTCC captured only around 55 to 110 trades per month across the entire term structure. In the 1, 3 and 6 month tenors, there were multiple trading days for which no transactions were available.

The EUR workstream of the MPG has recommended sourcing daily OIS transactions data directly from banks (similar to what is being studied for EURIBOR+). We anticipate that we would find more trade data in the EUR market than in the USD market, so this is a promising approach. It must be noted, however, that a VWAP of transactions data across a trading day would be a fundamentally different index than the EONIA Swap Index currently published by the EBF, as the latter is an 11 am point-in-time fixing. Similarly, the transactions approach will not provide rate fixings consistent with those sourced from MTF snapshots. The transactions approach should be considered as an alternative to, and not a replacement for, other existing and proposed EONIA swap fixings.

With a transactions based approach, significant market events during the observation period could mean that rates from very different market environments are averaged. In such a scenario the transactions based index would not correspond to a market rate at the time of publication. This could inhibit its acceptance among certain market participants. Market makers would find the rate difficult to hedge and CCPs would not find it useful for the purposes of calculating intra-day margin requirements.

E.3.4. Daily rate fixing auction

Market makers could be asked to provide executable bids and offers at a specified time during the trading day for a given order size. Orders would be executed if bids and offers cross.

This approach is more artificial and far less robust than the alternative of deriving prices from active, regulated trading venues. Banks might also be unwilling to participate unless

compelled to do so since the operational and regulatory burden of this approach is similar to that of a submission-based approach. In addition, this approach may not be faithful to the IOSCO principles if bid offer spreads are wide and few prices cross in the daily auction process. In that scenario, it could be difficult to demonstrate that prices were “anchored” in actual completed transactions.

E.3.5. Indicative prices from IDBs and MTFs operating RFQ models

We do not recommend using indicative prices as a primary source for swap rate fixings as they are not executable and may be difficult to audit and verify. However, these prices are almost always available, even in periods of financial distress, so they could be very useful as a back-up when primary sources are not deemed to be sufficiently robust.

E.3.6. Submissions from panel banks

This approach is only necessary in illiquid markets where market makers are unwilling to provide actionable bids and offers. In liquid OIS markets, most of the above alternatives are both feasible and preferable. Moreover, as demonstrated by the recent withdrawals from the EONIA Swap Index, banks may be unwilling to submit rates unless compelled to do so.

E.4. Review of Underlying OIR Fixings

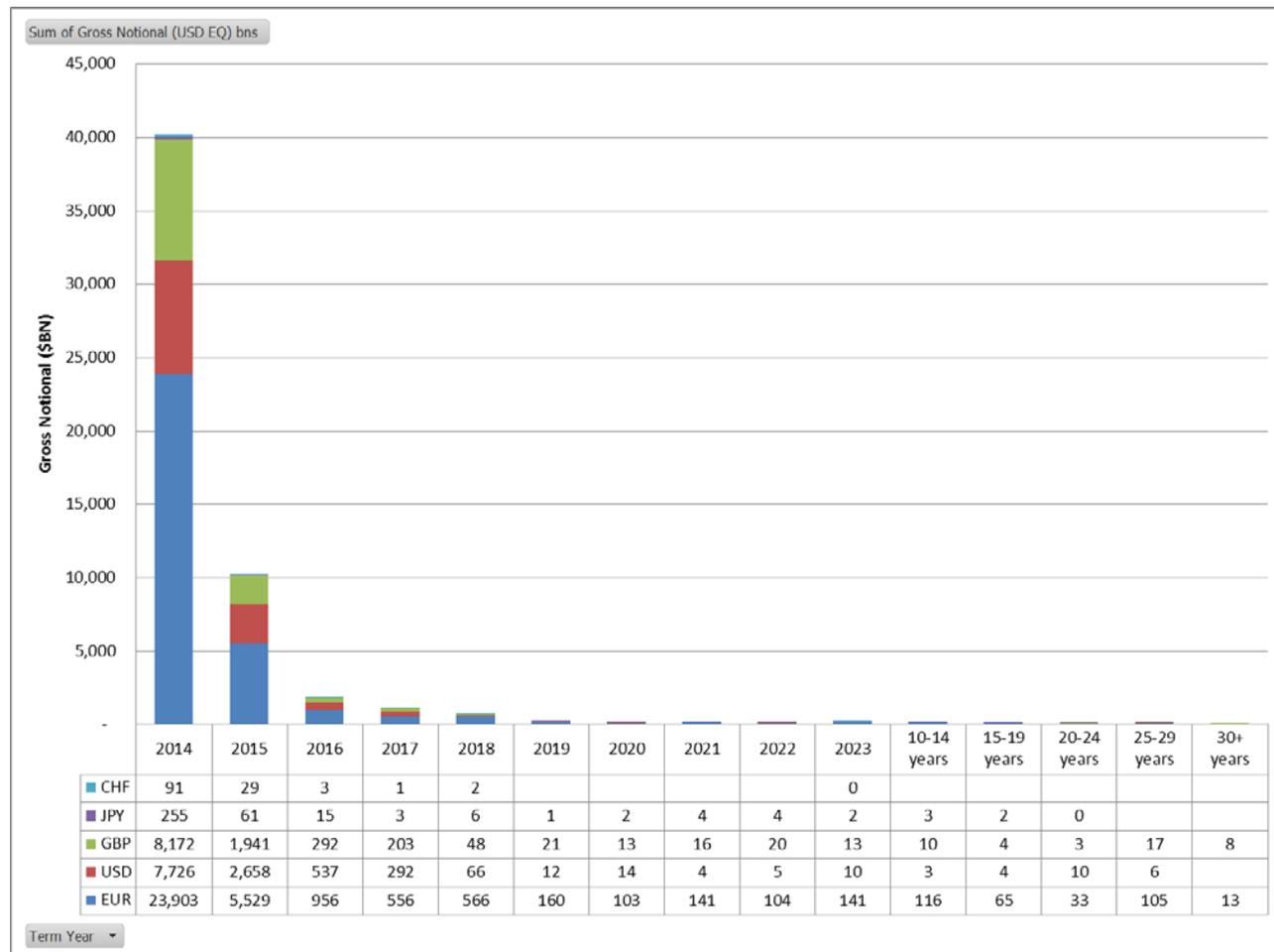
It must be recognized that the reliability of OIS fixings, however sourced, are only as robust as that of the underlying OIR. Since the financial crises, changes in monetary policy (driven by the significant increase in the supply of central bank reserves) and changes in banks’ credit and liquidity management practices (driven by changes in prudential liquidity and capital regulations) have significantly altered the volume and structure of overnight lending markets (Chart 3 provides historical unsecured overnight lending volumes.) These factors, amongst others, have led to a decrease in the volume of overnight transactions used in the calculation of OIR. They have also influenced the composition of market participants represented in the overnight index which, in some cases, has led to an insufficiently representative sampling of market activity.

In the US Fed Funds market, these factors have been particularly pronounced since the Fed took the decision to pay interest on excess reserves in 2008. This has resulted in thin and unusual institutional conditions in the Fed Funds market with adverse implications for the robustness of the FFER fixing. We would point to two potential mitigants of this problem: (a) the possibility of the redefinition of the FFER based on a wider set of wholesale unsecured bank borrowings, should the Fed decide to pursue that option based on its new “2420” transactions data repository, or (b) a replacement of the underlying overnight reference rate. The Fed’s new reverse repo facility rate (RRP), interest on excess reserves (IOER) or the overnight general collateral repo rate (ONGCR) could be considered as alternatives. We would note that option (b) is disruptive to existing contracts and markets.

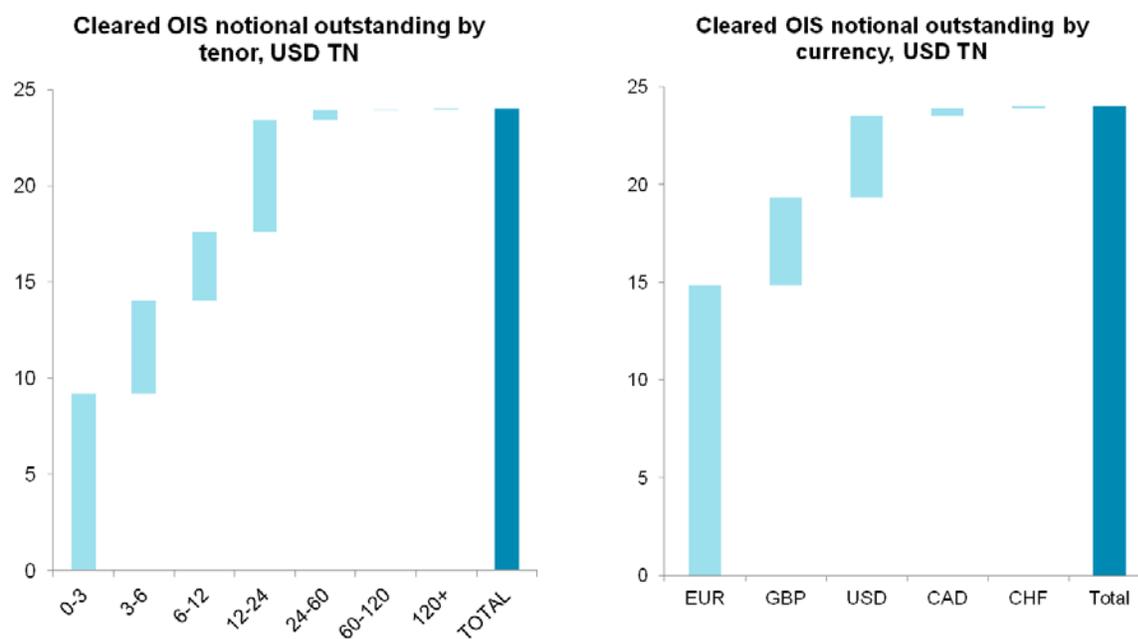
In EUR and GBP markets, these factors are less pronounced and we believe that OIR fixings remain robust. However, we recommend that the EBF and the WMBA, as administrators for OIR fixings, continue to work closely with their respective central bank counterparts in order to ensure that OIR fixings capture a broad and representative sample of transactions in the overnight money markets.

E.5. Supporting Analysis

Chart 1: OIS gross notional outstanding by year of maturity and currency (\$BN)



Source: DTCC

Chart 2: Active Market in OIS to 24 months in EUR, GBP & USD

Source: CFTC September 20th weekly snapshot

Table 12: Potential assessment criteria for MTF-based Eonia swap reference rate

| | |
|---|---|
| 1. Significant liquidity traded in that product on MTFs | E.g. at least €1bn of average daily matched orders in Eonia Swaps over a 3 month trial period |
| 2. At least 2 MTFs offering that currency with relevant liquidity at a given contract size | E.g. at least €2bn in firm orders for 3 month Eonia swaps at the time of fixing |
| 3. Minimum number of active trading participants on a platform | E.g. 25 participants |
| 4. Minimum number of market makers providing committed streaming | E.g. 6 for any one platform; 12 in total. |
| 5. Shadow testing period for MTF-based rates | E.g. at least 3 months |
| 6. Agreements from a minimum number of MTFs to provide rates to the rate setting process | E.g. at least 2 MTFs |
| 7. CLOB in place, with executable prices and no last look mechanism | |

Table 13: Schedule for euro short-end launch on the Trad-X MTF platform**PHASE 1 - 3rd February 2014**

| Tenor | Duration | Minimum Size |
|--------------|-----------------|---------------------|
| Eonia | 3m | 500m |
| Eonia | 6m | 250m |
| Eonia | 1y | 100m |
| Eonia/Bor | 2y | 100m |
| Eonia | ECB1 | 1,000m |
| Eonia | ECB2 | 1,000m |
| Eonia | ECB3 | 1,000m |
| Eonia | ECB4 | 1,000m |

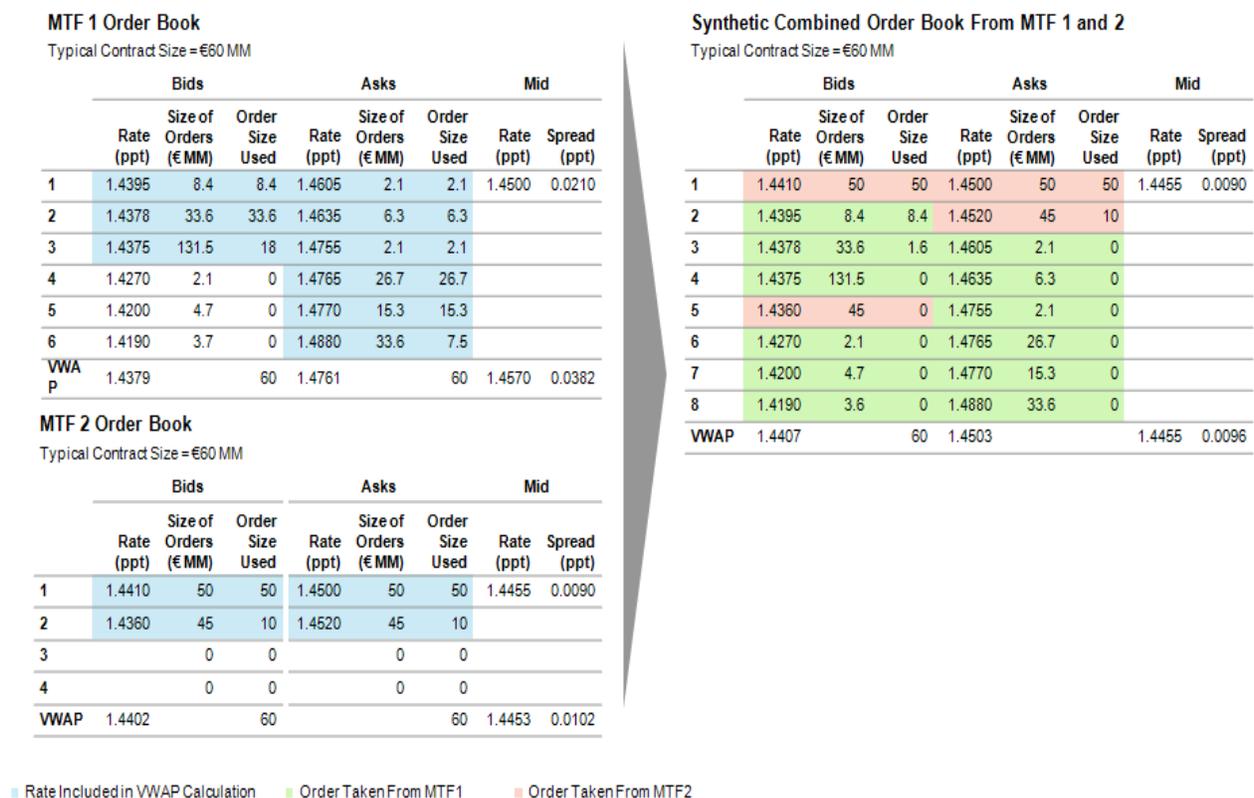
PHASE 2 - TBD

| Tenor | Duration | Minimum Size |
|--------------|-----------------|---------------------|
| AM/1s | 3m | 500m |
| AM/1s | 6m | 250m |
| AM/1s | 1y | 200m |
| FRA/Eonia | IMM 1 | 500m |
| FRA/Eonia | IMM 2 | 500m |
| FRA/Eonia | IMM 3 | 500m |
| FRA/Eonia | IMM 4 | 500m |

Go live: Nov 2013, with dealers commitment to stream live prices in phased approach in January and February

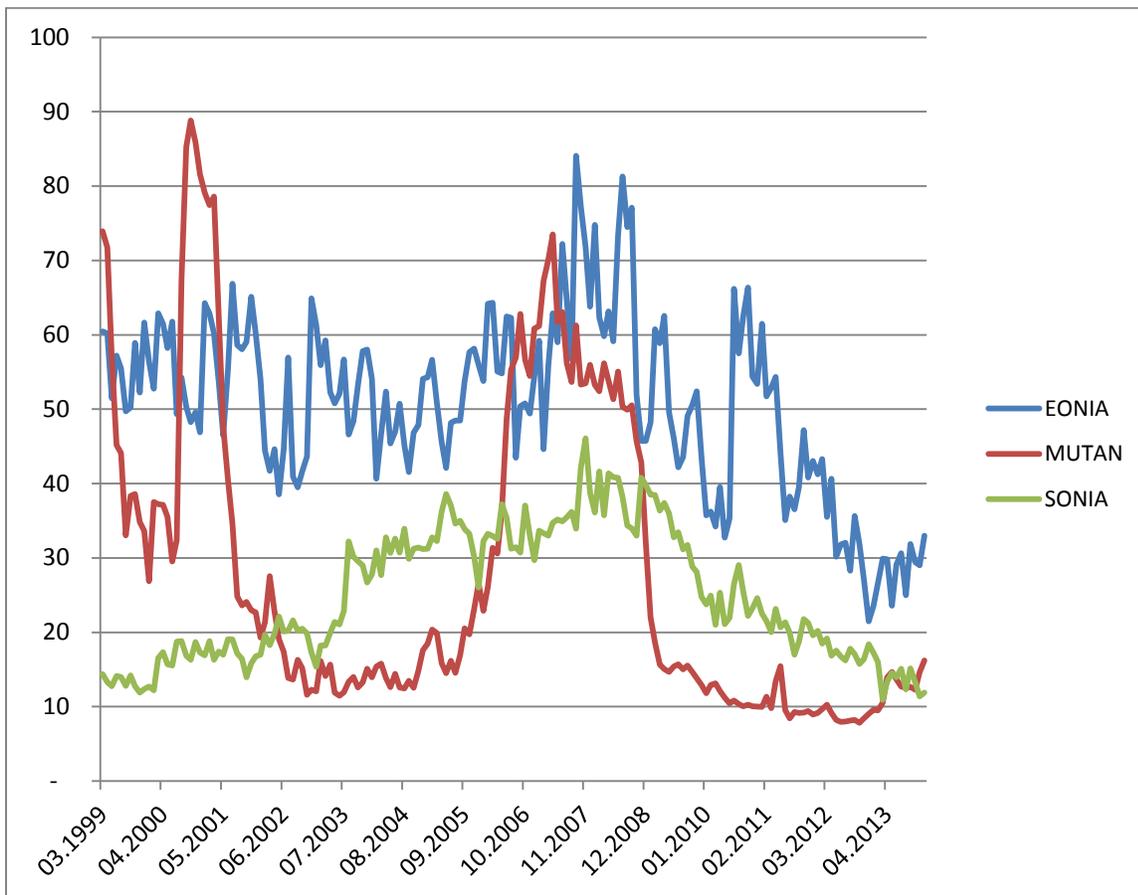
Source: Tradition

Figure 4: Creating a synthetic order book from MTF/SEF data



- In above example, market makers stream live, actionable bids and offers to MTFs 1 and 2. The two order books are then combined to create a synthetic combined order book.
- Using the synthetic combined order book, a volume weighted average best bid and offer is calculated for a contract size of €60mm.
- Mid of bid and ask used as the benchmark fixing.

Chart 3: Unsecured Overnight Interbank Lending Volumes (USD BN)



Source: ECB, BOJ and WFMA

MUTAN* BOJ sourced monthly average of daily lending volumes from 2007 to 2013. Estimates used for remaining period: BOJ end-of-month data from 2005 to 2007 and inter-dealer broker data from 1999 to 2005.

FEDFUNDS - Current brokered market is \$20-25bn daily vs. \$160-180bn before interest on excess reserves was introduced in October 2008.

E.6. MTF/SEF-Based Fixing Approach

[See below]

Appendix F. Impact of Benchmark Reform on Corporates

F.1. Summary

The OSSG, in responding to the MPG's Phase 1 report, requested additional detail in Phase II on a number of issues that are important to Non-Financial Corporates ("Corporates"):

The uses of interest rate benchmarks

- The Corporate Sector uses IBOR reference rates for a wider range of purposes than the Financial Sector. Exposures typically exist over longer time-frames and may affect all sizes of corporate.
- In addition to pricing & discounting, benchmarking and usage in financial instruments, corporates also use IBOR in (for example) commercial and trade finance contracts and in hedge accounting structures. There is extensive use of IBOR for inter-affiliate financing.
- Most corporates use 6-Months rates and, to a lesser extent, also 12-Months rates.
- Typically corporates do not have a comprehensive inventory of their wider [commercial] uses of IBOR. With sufficient lead time, larger corporates are mostly confident of being able to identify all their significant applications of IBOR but smaller corporates may find it difficult to create such an inventory of relevant/historical contracts.

Market Participants appetite for change

- Corporates are not yet convinced that wholesale change of IBOR is required, beyond strengthened governance, provided that a sufficient number of banks shall continue to contribute to IBOR.
- The main requirements of corporates with regard to reference rates are transparency, availability (daily, while remaining durable in turbulent markets), supervision, a large number of contributors and the continuity of contracts. "Transaction based" is not a top criterion. This contrasts somewhat with the outreach results from Phase I.
- Many corporate respondents currently require a reference rate with bank credit and liquidity premia included but the majority indicated that they would have little appetite for change if the new rate would be systemically >5bps higher (or lower) in future. It is likely (under such a scenario) that larger corporates, with legacy portfolios linked to current IBOR, would prefer to move those contracts towards a risk-free rate that better reflects their cost of borrowing.
- Corporates are presently uncertain about the nature and potential impact of the MPG's likely recommendations. Therefore corporates fear that changing IBOR could have considerable cost implications (renegotiation of agreements, including inter-affiliate loans) and unintended consequences (e.g. tax/accounting).
- Further engagement with corporates is recommended, once OSSG's proposals are clearly defined. This could be achieved constructively through representative organizations such as the International Group of Treasury Associations.

The importance of synchronisation of transition across markets

- Corporates are likely to need a longer preparation period than the Financial Sector in which to analyse their historical exposures and to renegotiate current exposures as required.
- Although many corporates have argued in favour of a parallel transition, in view of their current exposures to IBOR, a synchronised and aligned “hard cutover” transition potentially could reduce the scope for subsequent disputes.
- The necessary length of a transition period will depend upon the Official Sector’s ability to:
 - Put in place an international framework to ensure alignment of legal, fiscal and accounting treatments in respect of any transition.
 - Ensure legal continuity of contract through a “seamless” transition.

Workstream Members

- Andrew Longden** (Shell)
- James Winterton (Shell)
- Tom Deas* (FMC)
- Harald Schlosser* (VW)
- Lee Edwards* (Nestle)
- Claudio Menghi (Nestle)
- Serge Gwynne (Oliver Wyman)
- Benjamin Sacks (Oliver Wyman)
- Anthony Robinson (CBI)

F.2. Background and Objectives

Background

- Following initial outreach in Phase I, principally to organizations affiliated to the International Group of Treasury Associations, a survey was distributed to corporates during Phase II.
- Continuity of contracts (both legal and commercial) is extremely important for corporates.
- Corporates have different contracts and wider references to IBOR than in financial sector (e.g. trade finance, commercial suppliers, defined-benefit pension funds).
- However, corporates' usage of reference rates is less tracked and less standardized than within the financial sector. It may be difficult to create an inventory of relevant / historical contracts, particularly as contract life span can go back (and forward) many years.
- Tax and hedge accounting structures including intra-group financing arrangements, are sensitive to Transition (especially where contracts are international/multinational).
- Less sophisticated/flexible treasury IT & contract management systems.
- In the event of change, corporates may have a weak negotiating position in relation to banks.

Objectives

- The Corporate work group's key objective was to contribute constructively to the MPG study by examining the usage and potential impact of suggested changes to IBOR reference rates upon the corporate sector, as distinct from the financial sector.
- Desired outputs were also to represent the "real economy" and to highlight areas of uncertainty that may merit further assessment and engagement with corporates before a final proposal is approved.

The objective of this work stream is to ensure that the views and concerns of non-financial corporate end-users ("corporates") of the relevant interest rate benchmarks are being addressed adequately. The report covers the interest rate benchmarks in five major currencies, USD, EUR, GBP, CHF and JPY and the focus is on LIBOR, EURIBOR and TIBOR rates – collectively referred to as "IBOR" in this report.

The term "corporate" is applied to non-financial companies (including, where applicable, defined benefit pension funds sponsored by a corporate). The views expressed in this report are an aggregation of input received from industry associations as well as directly from corporates via an online survey. The opinions expressed should not be inferred as representing the views of any particular contributor or member of the corporate work group.

The corporate work group would like to illustrate that the transition issues for corporates potentially are different and wider than those relating to financial contracts alone. This is likely to require further identification, consideration, communication and resolution of certain issues. As at January 2014, many corporates do not see the case for change to IBOR benchmarks and they are uncertain about, and therefore concerned by, the potential impact of such change.

Phase I - corporate outreach approach

During Phase I (September-December 2013) there was limited direct outreach to corporates. The corporate work group was of the view that corporates were more likely to engage with a single survey in Phase II, having a clearer view of proposed scenarios (rather than responding to a series of hypothetical questions). It was observed also that, despite the importance of the subject matter, corporates were (and are) facing many competing consultations as well as regulatory developments such as the EMIR implementation, so there was some risk of "survey fatigue" and "regulatory fatigue".

Therefore preliminary discussions were held principally with relevant industry associations (affiliated to the International Group of Treasury Associations) as well as certain multinationals having large treasury functions, including those represented on the corporate work group. These discussions helped to shape the corporate outreach survey that was conducted during the last two weeks of January 2014.

Meanwhile the focus of the parallel MPG Outreach work group has been upon financial institutions, with a tailored survey conducted separately during Phase I, as reported in the preceding Outreach chapter 7.

Also in parallel during Phase I, some limited direct outreach to corporates was conducted by the MPG Currency work streams, notably by the MPG EUR work group. During the months of September and October 2013, the EUR work group sent a questionnaire to a large variety of institutions: banks, asset managers, insurance companies and corporate companies. This questionnaire was sent either directly and/or through trade bodies. As noted in the Phase I EUR Currency chapter 6, six corporate treasurers responded to the EUR questionnaire. Those six respondents reported using a variety of benchmarks.³⁰

This Phase I work was helpful in shaping the corporate work group's outreach in Phase II. The corporate work group noted the EUR work group's Phase I observations, in respect of its outreach, that: *A number of respondents also expressed concern regarding the lack of anonymity of their responses...and ultimately declined to participate.*

Therefore the corporate work group survey was conducted on an anonymous basis, with the survey being hosted by the Confederation of British Industry (an organisation well respected for conducting similar surveys amongst UK corporates). The CBI undertook to ensure that the data-set was anonymous before sharing it with the other members of the corporate work group, thereby ensuring compliance with anti-trust legal requirements in case of competitor responses. Considerable effort was expended to ensure that the survey would reach a wider [potential] audience of several hundred corporates, across a range of

³⁰ Attention is drawn to EUR Currency Report sections 6.3 and 6.4

geographies/currencies, and would elicit an adequate response for the purposes of this report.

Responses to the EUR work group questionnaire in Phase I had been received principally from Financial Institutions, as well as from six corporate treasurers of European entities.

Preliminary findings from the small sample in Phase I ***that were reinforced*** by the larger sample in Phase II included:

- **Transition** - concerns relating to the altering of existing contracts and the potential impact on legacy positions.
- **Volatility** - All corporates want to avoid high volatility in benchmarks. In addition, there would need to be a deep and liquid market for any new benchmark at all of the relevant tenors.
- **Legal** - There are too many contracts that use the LIBOR as the reference interest rate to make revolutionary changes. If the methodology is changed so significantly that the reference rate used can no longer be covered by the definition in the existing contracts, the contractual parties may no longer feel bound to them.
- **Accounting** - various accounting aspects would be impacted by this change. There was a strong desire to avoid Hedge-Accounting problems that may lead to Profit & Loss swings.

However, some observations from Phase I produced ***differing reactions*** in the Phase II corporate survey:

- **Tax** - more significant Tax concerns were raised in Phase II
- **IT systems** - more significant IT concerns were raised in Phase II, particularly where treasury systems may be unable to hold parallel yield curves.
- **Transition** - A "hard cut-over" transition received greater support in Phase II than it had in Phase I, where it was seen as difficult to achieve.
- **Benchmarks** - Phase II participants attached less importance to a transaction based benchmark.

F.3. Approach Taken for Research (Phase II)

- A survey was distributed internationally to several hundred corporates via relevant associations (e.g. IGTA / Business Europe). There were 82 confirmed responses
- The survey findings have been supplemented by informal discussions with, for example, auditors and members of industry associations.
- All data has been aggregated, with nothing attributable to any individual company.
- Potential drawbacks were identified in respect of the survey approach and timing:
 - Particular effort was given to ensuring wide geographical representation but, nevertheless, responses are skewed heavily towards UK, USA and EU, with few Swiss companies and no Japanese companies (i.e. whose main operating currency was JPY).
 - Smaller companies were considered to be more difficult to reach and less likely to respond than larger companies.
 - Due to the wider MPG timetable, the survey had to be scheduled for the last two weeks of January 2014, coinciding with year-end accounting for many corporates.
 - In keeping with Terms of Reference of MPG, the survey could not reveal confidential details of the MPG's current thinking. Therefore corporates could not consider the topic comprehensively.
- Under these circumstances it is likely that many corporates would have focused on the uncertainty and potential "down side" of a potential change to IBOR reference rates.
- Given these drawbacks, the response rate of 82 confirmed submissions is considered good, particularly since many of these responses were received from multinational corporates.
- Survey structure
 - SECTION A: Respondent classification
 - SECTION B: Market Footprint
 - SECTION C: Reference rate reform scenarios
 - SECTION D: Transition scenarios
 - SECTION E: Other Considerations
- A blank copy of the survey is attached in section F.5.1

Corporate Outreach Survey

A link to an online survey was communicated in January 2014 to affiliates of the International Group of Treasury Associations and other relevant trade associations (e.g. Business Europe, CBI) for their onward distribution to several hundred corporate treasurers located internationally – a regional breakdown of responses is shown in Chart 10. The raw data collected was then aggregated, with nothing attributable to any individual or company and with an assurance that the collected data would not be used for other purposes. The Confederation of British Industry (CBI), with Oliver Wyman, acted as the administrators of the survey and provided the anonymous data-set to the MPG Corporate work group.

The UK, EU and USA corporate associations are well represented in the survey results (with a response rate skewed towards respondents based in the UK). However, there were relatively few responses from Switzerland and Asia Pacific (none from Japan), although over a quarter of responses appear to come from large multinationals, with a business footprint that covers a wide global representation of national legal/fiscal jurisdictions. Chart 11 and Table 14 indicate that some consideration has been given to a wide range of jurisdictions.

Interpreting the Survey Responses and Chart Methodology

There were 82 completed responses (*see charts below*). The discrete number of corporates represented by the survey is likely to be less than 82 because a few respondents might be different subsidiaries of the same holding company (for example, a commercial subsidiary and a treasury centre); these subsidiaries may have differing perspectives and the survey was intended to capture the multi-faceted usage of IBOR. The majority of survey questions were optional. Therefore the number of respondents (“n”) will differ question by question. Few optional questions achieved responses from all 82 respondents; therefore “n” will be less than or equal to 82. Some questions required a single answer whereas others provided multiple options (“check all that apply”) or required ranking of prompted answers.

For this reason, and to aid comparison of the responses to different questions, the majority of charts in this report are depicted in percentage format, with the number of respondents to each question being stated alongside. In the case of questions where more than one response could be received per respondent, a statistical distinction needs to be made between the number of respondents to that particular question (“n”) and the greater number of responses (“nF”) to that particular question.

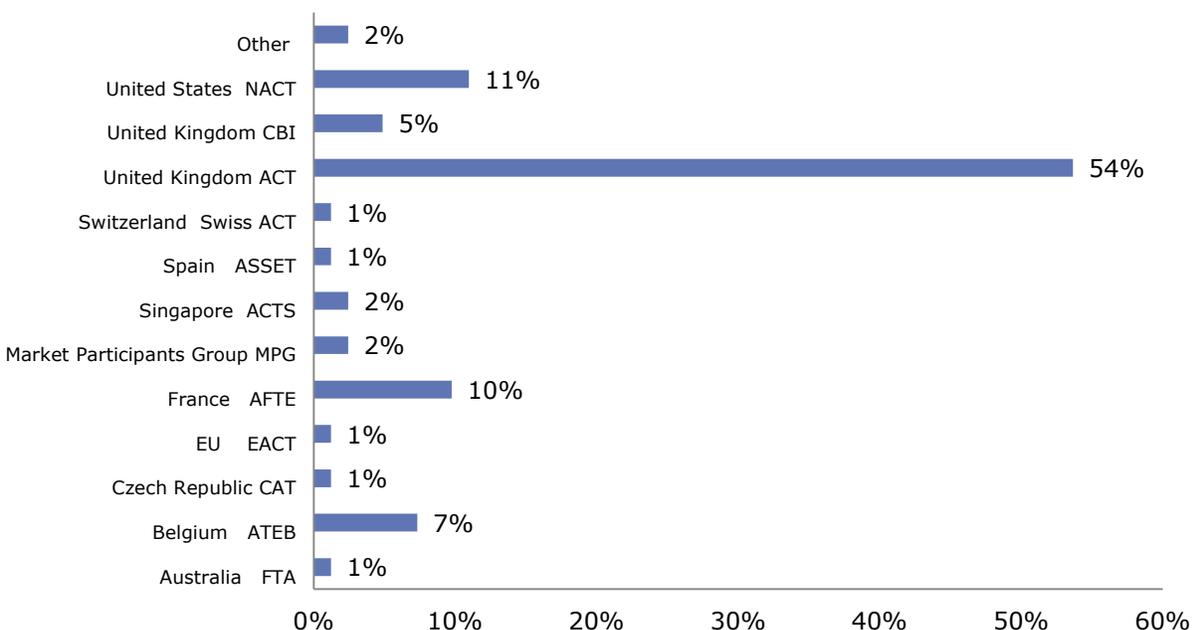
It is important not to infer that a small percentage response is unimportant, since it may represent a consideration potentially affecting a very large number of companies (or an issue that has not yet been widely identified).

A distinction should be made between prompted and unprompted questions. For example, the survey suggested various uses of IBOR. Respondents could also add narrative to give other (unprompted) uses of IBOR. Therefore the prompted uses will have received a much higher frequency of response than the unprompted uses, although the unprompted uses may be an important consideration for a number of companies. In general, narrative comments tended to raise concerns. [See F.5.4 and F.5.5]

Analysis of Respondents to Corporate Outreach Survey

Although an apparent bias towards respondents based in the UK may be inferred from Chart 4 below, approximately half of these respondents are in fact multinational corporates, responding with a global perspective.

Chart 4: Survey Responses Received by Distributing Association



A total of 82 corporates (non-financial) end-users of IBOR responded to the Phase II survey, of which 80% responded from Parent/Holding Companies and Corporate Treasury centres [Chart 5]. There was a skew towards larger companies, including multinationals, with 93% of corporate respondents having annual turnovers greater than US\$ 1 billion [Chart 6]. The corollary is that the concerns of smaller companies might not have been adequately represented, with most of the smaller respondents coming from the UK. Nevertheless, the corporate work group considers that smaller companies' usages of IBOR, and their related concerns, are likely to be a sub-set of the larger corporates reflected in the survey results. Compared with larger corporates, it may be assumed that smaller corporates have fewer resources to manage a change process (and less bargaining power with their banks). Nevertheless, the smaller companies require less than average time to transition (lead-in period and time for run-off), presumably because their exposures are less complex. Smaller corporates are less likely to use 12 months rates and would be more willing to transition to 3 months if necessary.

There is an obvious danger in extrapolating conclusions from 82 respondents (or fewer on any particular question) and it is recommended that the OSSG may wish to utilize the International Group of Treasury Associations (and/or other relevant trade associations or representative corporates) for further consultation and engagement once definitive proposals have been agreed in respect of IBOR reform. In particular, it would be desirable to ensure a wider geographical representation, notably from the Far East / Asia Pacific

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region. Subsequent correspondence with one entity in that region, to investigate the reason for a low response rate, received a reply abridged as follows:

"Overall, there is a feeling that the problems with LIBOR setting, while real, have been blown out of all proportion, and very few people feel there is any need to significantly change the system. This may well turn into yet another area where we will be facing new regulations which will add cost, reduce market efficiency and generally make it increasingly difficult to accomplish what we need to do to manage risk for our companies. Unfortunately, it is not even clear that these new regulations will actually reduce market risk, or the risk of inappropriate activities by traders."

Chart 5: Respondents' Background

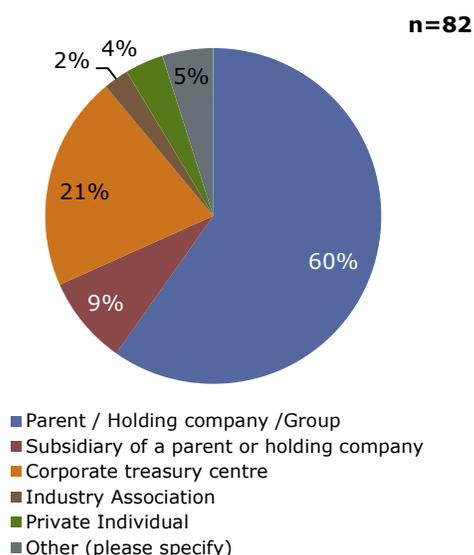
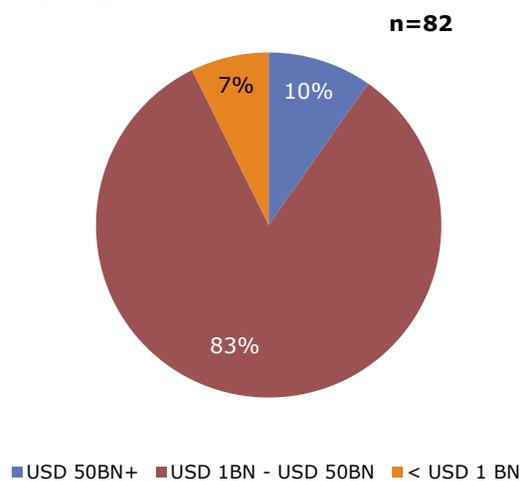


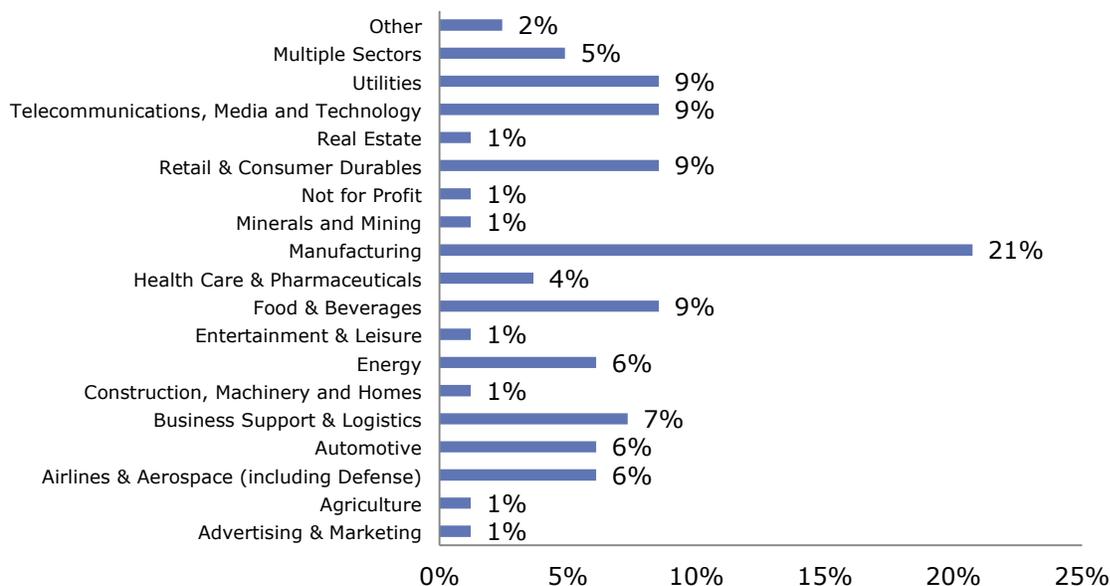
Chart 6: Turnover of Respondents' Company



The various corporate sectors and industries were widely represented with the highest frequency of responses coming from manufacturing businesses. "Other sector" responses included a corporate pension fund asset manager and a non-profit housing association.

Chart 7: Industry Sector Representation

n=82



Survey responses have come from a good selection of users of USD, GBP and EUR across geographies and company sizes (the largest companies tend to use all three and be present in all geographies). The survey also highlights significant usage of CAD, AUD, NOK and CNY (including offshore traded CNY). However, primary users of JPY and CHF appear to be under-represented.

Chart 8: Key Transaction Currencies

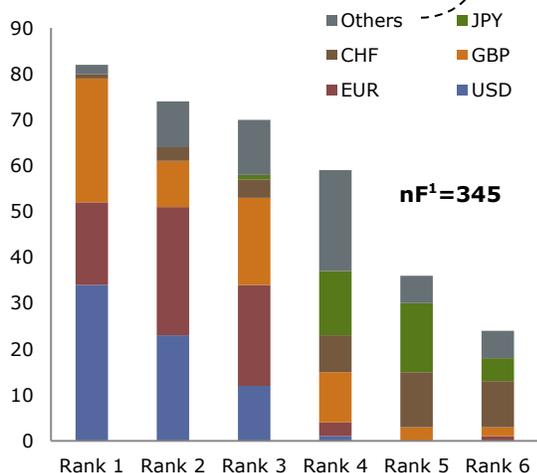
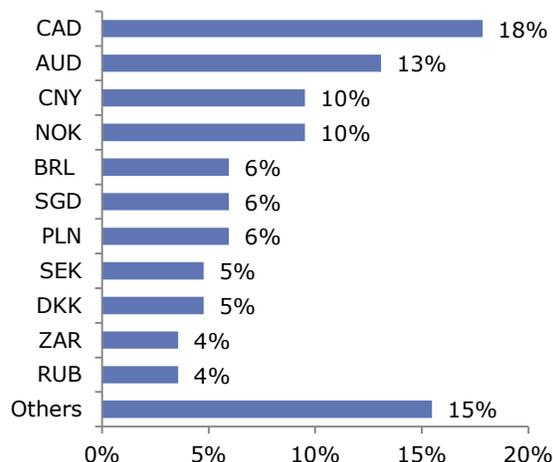


Chart 9: Breakdown of "Others" Currencies

n=82

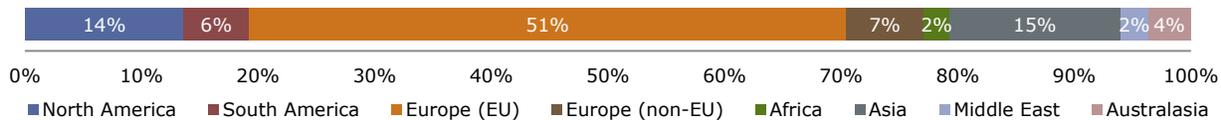


¹ "n" represents the number of respondents. "nF" represents the frequency in which the option has been chosen.

The breakdown of respondents' exposures by geographical region was as follows:

Chart 10: Regions in which Corporates may have a significant exposure to changes in IBOR reference rates (per survey responses)

nF¹ = 463



¹ "n" represents the number of respondents. "nF" represents the frequency in which the option has been chosen.

In terms of geographical exposures, respondents highlighted the United Kingdom, United States, France and Germany as the main countries (*in this context 'countries' refers to legal or fiscal jurisdictions*) where a change in IBOR reference rates may have a material impact for their company. Asia Pacific respondents, whilst under-represented, appeared to be more resistant to a change of IBOR.

F.4. Detailed Summary of Materials

Key Messages on Market Footprint

- Interest Rate Benchmarks at corporates are used mainly for pricing loans, in financial instruments, valuation, discounting and benchmarking purposes and in commercial and trade finance contracts.
- The highly important loan facilities of corporates mainly incorporate USD- and GBP-Libor as well as Euribor. The tenors range from Overnight to 12 months with the bulk up to 6 months.
- Continuity of Legal contracts is extremely important. Contract life span can go backward (and forward) many years and usage of reference rates is wider and less tracked and less standardized than within the financial sector. (e.g. trade finance, commercial suppliers).
- Most of the large corporates are confident of being able to identify all their significant exposures to IBOR, given sufficient lead time to create an inventory of historical open contracts and to renegotiate terms as required.
- Tax and hedge accounting structures, as well as intra-group financing arrangements, are sensitive to any transition (especially where contracts are international).
- Corporates typically have less sophisticated/flexible treasury IT & contract management systems than in the financial sector.
- Smaller companies may lack resources to handle a transition and may have a weak negotiating position in relation to their banks (e.g. if a change of IBOR would require refinancing or an amendment to credit facilities).

F.4.1. Use of Interest Rate Benchmarks

Most respondents were able to identify examples of how IBOR is used and referenced within their organizations, in response to the prompted answers in the survey (see **Chart 12**). 84% of respondents expressed confidence in being able [given time] to identify the significant applications within their company that reference IBOR rates. This result is perhaps surprisingly positive given the high level of uncertainty expressed by respondents in response to other questions (including free format narrative responses). This answer should be considered in the context of the long transition lead times required as well as noting [Chart 12] conversely that up to 16% of respondents were uncertain about their significant exposures to IBOR.

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Chart 12: I am confident that my company can identify all significant applications that reference IBOR rates."

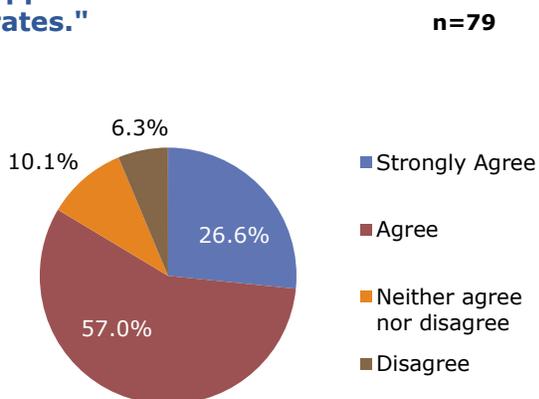
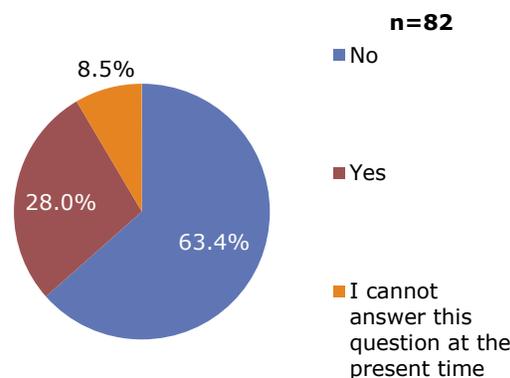
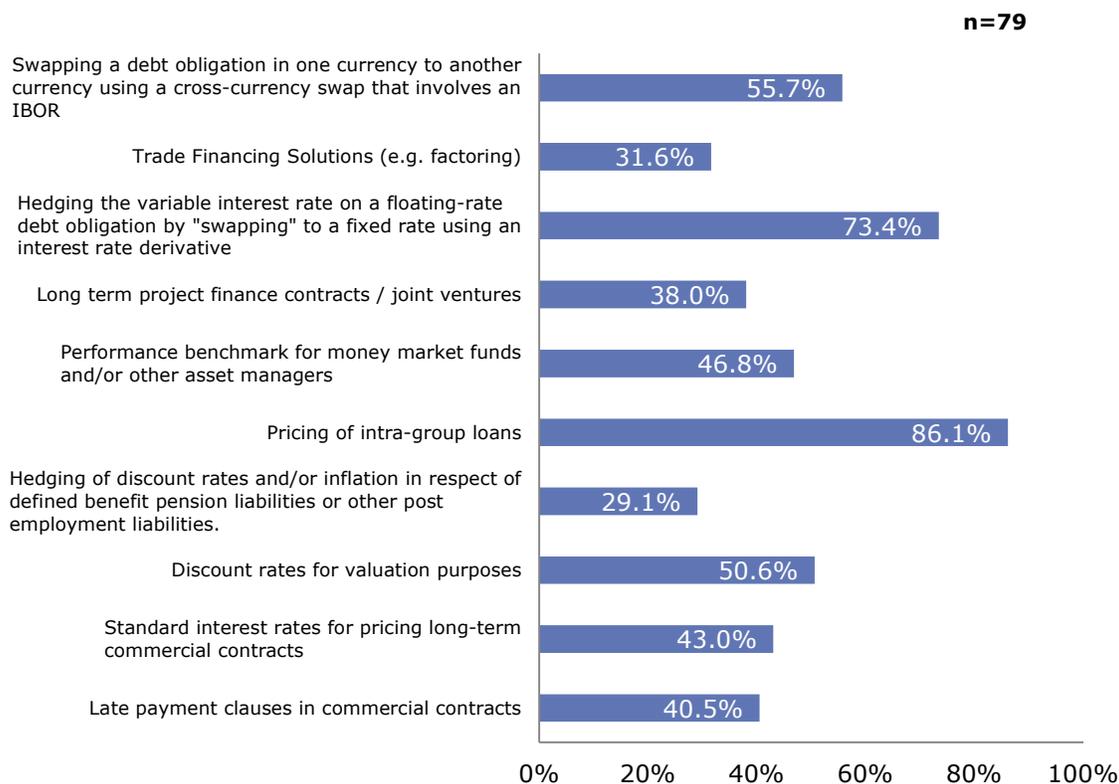


Chart 13: Are there any other usages of IBOR not considered in the survey?



The survey data represents that most corporates use IBOR or related instruments referring to IBOR for the pricing of inter-affiliate funding arrangements and for hedging corporate debt obligations. The majority of respondents have a major credit or loan facility that references IBOR [Chart 15]. In addition to the prompted uses depicted in Chart 14 below, there were also other significant applications or exposures to IBOR raised in narrative responses detailed in Table 15.

Chart 14:



Impact of Benchmark Reform on Corporates

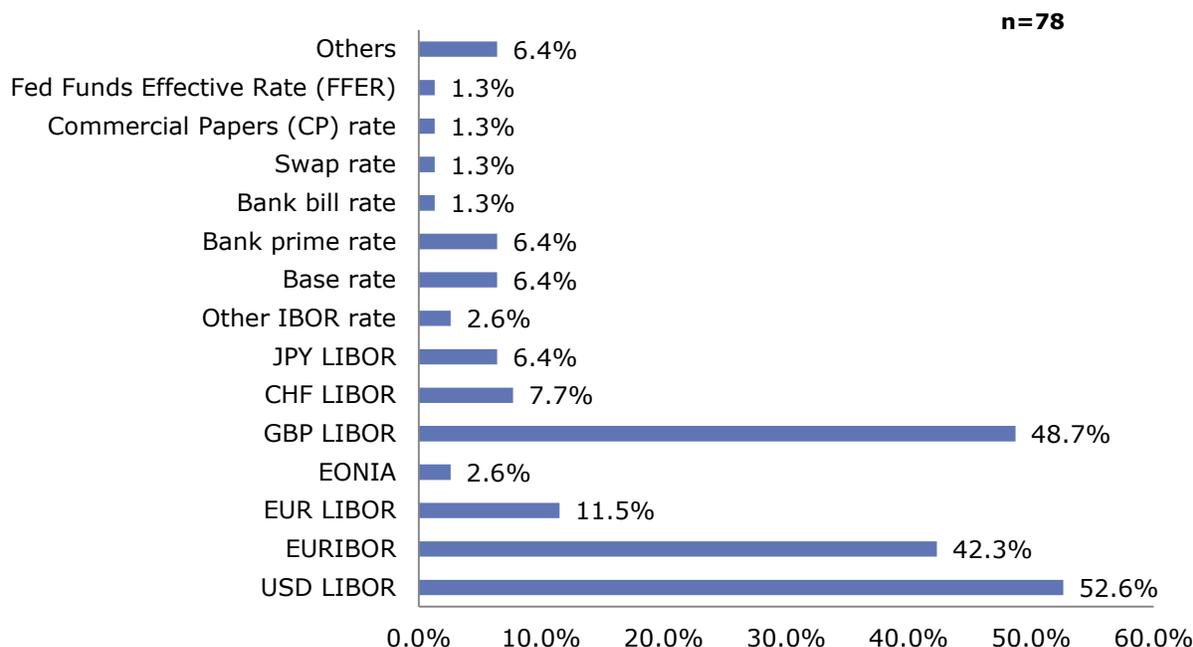
Additional [unprompted] uses of IBOR were given by respondents as follows: [see also F.5.3]

Table 15

| Other applicable usages of IBOR | Examples |
|------------------------------------|---|
| Loans/Credit Facilities | <ul style="list-style-type: none"> • Asset Securitization pricing • Pricing bank credit facilities • Drawdown on bank credit facilities |
| Accounting Purposes | <ul style="list-style-type: none"> • Fair value calculations for discounting provisions, impairments, financial leases and the valuation of commercial property |
| Regulatory Cost of Capital | <ul style="list-style-type: none"> • Indirectly setting regulatory cost of capital due to cost of debt component in CAPM models for commercial property valuation calculations. • Required for loan covenant testing by lending bank |
| Commercial Contract Clauses | <ul style="list-style-type: none"> • Clauses in Sale & Purchase agreements which is used in a price adjustment mechanism for time period between deal date and settlement date. • Buyers will pay reference rate + spread for this period |
| Pricing | <ul style="list-style-type: none"> • Inter-Affiliate / Intra-Group loans |

An analysis of the responding corporate principal credit agreement (loan facility) positions revealed that nearly 85% percent of corporates had committed credit agreements >US\$100 million [Chart 16], for which USD LIBOR and GBP LIBOR are the most common reference rates used [Chart 15], followed closely by Euribor.

Chart 15: Reference Rates for Respondent’s Main Committed Credit Facility



*Others includes TIBOR, STIBOR, MYR IBOR and Australian Bank Bill Swap (BBSW) Benchmark Rate

These credit facilities are mainly denoted in USD (32%) and GBP (30%). Nearly 15% of the corporates reported that they have multi-currency facilities. [Chart 17]

Chart 16: Size of Committed Credit Facility

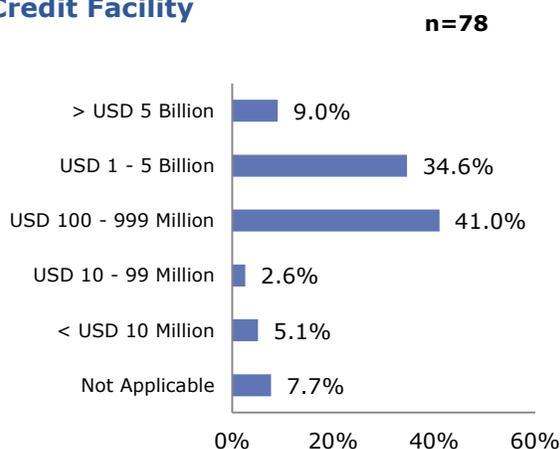
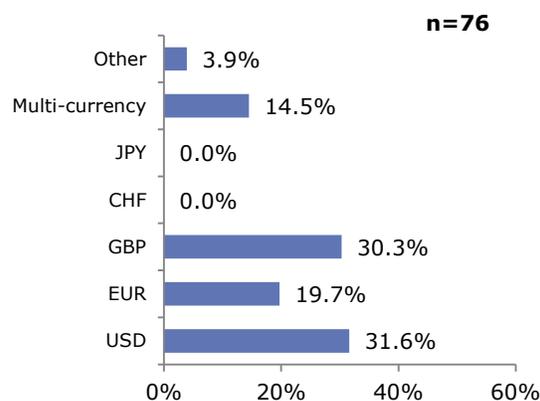


Chart 17: Largest or Functional Currency of Committed Credit Facility



Respondents were divided almost equally between those having fewer or more than 10 banks participating in their credit facility agreements [Chart 18]. 62% did not formally require a minimum credit rating for these banks [Chart 19].

Chart 18: No. of Participating Banks

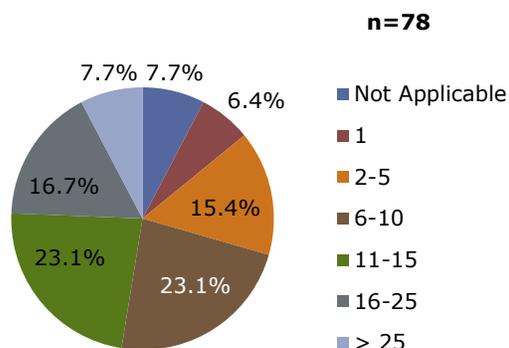
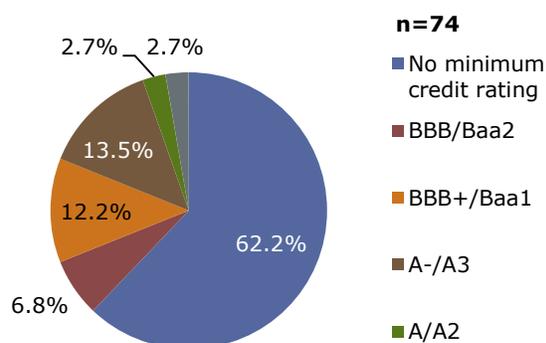


Chart 19: Minimum Credit Ratings of Participating Banks



Given the MPG’s likely recommendations in respect of 6 months (6M) and 12 months (12M) reference rates, which lack a substantial number of observable transactions to be IOSCO compliant, it is important to note [Chart 21] that these reference rate tenors, particularly 6M, appear to have a high usage amongst corporates for their committed credit facility. It is also understood that 6M rates have a high usage for transfer pricing of inter-affiliate (intra-Group) financing arrangements, which would not be visible to banks or the official sector.

This is considered further in Chart 25.

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Chart 20: Available Duration of Committed Credit Facility

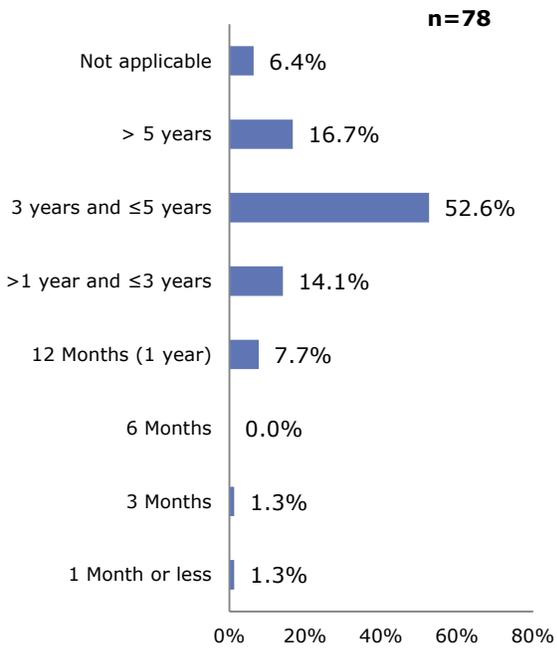


Chart 21: Reference Rate Tenor of Committed Credit Facility



F.4.2. Alternatives

Key Messages on Reference Rate Reform Scenarios

- Context: corporates expressed support for stronger governance around IBOR but at present [January 2014] the case for more a fundamental change is not clear to (or supported by) corporates in general, owing to their concerns about the potential impact.
- e.g. A change of reference rate may invoke a loan repayment clause.
- Many corporates do not have fallback clauses in their contracts or are not sure about their existence. Commercial contracts would have to be assessed to identify non-standard fallback clauses.
- Only a minority would be willing to switch to reference rates that are more volatile or systemically >5bps higher/lower than existing rates.
- It is evident from the various results that corporates [currently] have a preference for IBOR-styled rates, with bank credit and liquidity premia included, over OIS or T-Bills. Only around half of the corporates consider OIS or T-Bills as valid alternatives to IBOR-styled rates. However, the majority indicated that they would have little appetite for change to an alternative (e.g. IBOR+) if the new rate would be systemically >5bps higher (or lower) in future.
- Also it is important to retain reference rates with longer tenors (>6M), particularly for corporates' usage in commercial contracts and inter-affiliate financing.
- Any replacement index must be durable (robust, long-lasting and remain available during financial crisis).

Corporates were asked whether they have a fall back clause in their contracts in the event that IBOR ceased to exist. As highlighted by the Legal work group, a historical fall-back clause potentially could cause more problems than the absence of a fall-back clause where the intention is a hard cut-over and the fallback clause referred to an index other than IBOR.

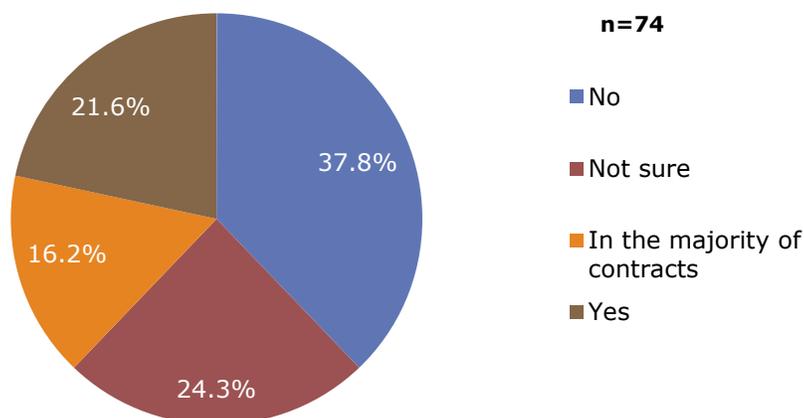
For example, there may be some residual uncertainty as to whether the successful Transition of LIBOR administration from BBA to ICE (1 February 2014) potentially could generate legal issues at a later date, where certain historical commercial contracts still refer to "Libor as administered by the BBA" and where such contracts specifically provided for an alternative fall back rate, such as a specific bank's base rate, "in the event that Libor ceases to be administered by the BBA".

40% of corporate survey respondents indicated that they have fall-back clauses in the majority of their contracts. These fallback clauses typically follow one of three forms:

- Average rate of a pre-agreed list of reference banks
- Bank's own cost of funds
- Open for negotiations between contract parties

The unprompted responses have also cited that falling back to the bank’s cost of funds rate is “not appealing” and “deeply unsatisfactory” due to the arbitrary nature these rates are derived. *Some unprompted examples of fallback references are shown in section F.5.4.*

Chart 22: Does your company have a standard fallback reference rate within its contracts for a case where an IBOR rate becomes unavailable?



The corporates then considered a hypothetical scenario of mandatory transition from IBOR to a benchmark rate based on transactions (IBOR+) that was systemically >5 basis points higher or lower than current IBOR. Respondents who replied [Chart 23] that they were ‘undecided’ whether to transition, or that they would probably or definitely transition to a rate other than the new IBOR+, were then asked whether their response would differ if bank spreads would be adjusted to compensate for the systematic difference [Chart 24 below]:

Chart 23: If IBOR+ had a significantly different value to IBOR (e.g. systematically +/->5bp²), would your company elect to transition to IBOR+ or to an alternative rate?

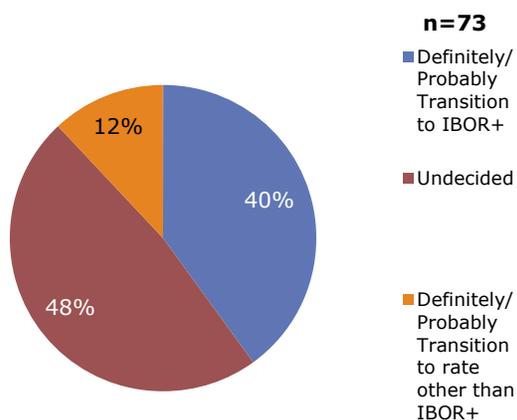
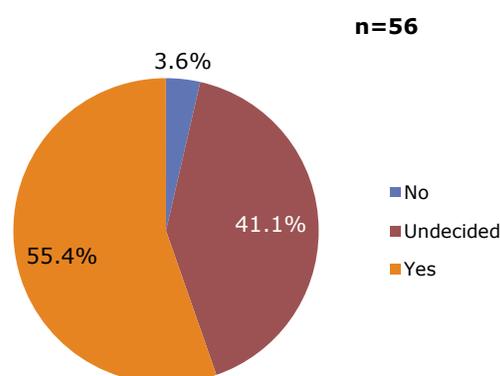


Chart 24: In a scenario where IBOR+ was systematically +/- >5bp but bank spreads would be adjusted to compensate for this difference, such that there was no significant change to your actual cost of borrowing, would you probably or definitely transition to IBOR+?



² bp = basis points which is measured at 1/100th of a percent (1bp=0.01%)

In a situation where new IBOR+ systematically varied from current IBOR by more than 5 basis points, 88% of corporates were undecided or preferred to transition to rate other than IBOR+. The unprompted narrative responses [see F.5.5] indicate that one of the concerns of such a transition is the impact to the cost of borrowing. Many corporates have financing arrangements that take into account the future values of IBOR and a change to IBOR could impact their liabilities massively. Also, there are worries that a transition may result in banks leveraging on the opportunity to increase credit spreads or even to terminate some existing arrangements.

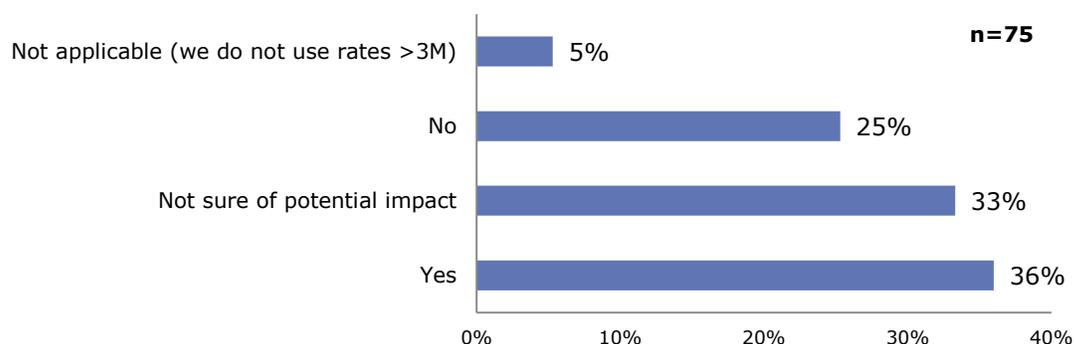
Unprompted responses (provided by nearly half of respondents) revealed a strong sentiment of uncertainty. Many corporates have stated that a detailed impact assessment of the new rate and the available alternatives is required before they can come to a decision. Some corporates have also indicated that they would prefer to look at the general market practice once the new rate is in effect.

The corporates then considered if there was comparable bank spread adjustment resulting in no impact to the cost of borrowing, 55% of corporates who were previously undecided or opposed to transitioning to IBOR+ became more inclined to adopt IBOR+ over an alternative rate.

Other narrative comments on transition considerations are contained in section F.5.5.

Respondents indicated considerable reliance on 6 months (6M) and 12 months (12M) tenors:

Impact of Benchmark Reform on Corporates

Chart 25: If it is not possible to fix robust 6-month and 12-month IBOR+ rates, then would this adversely affect your company?

It is evident that more than two-thirds of the respondents might be affected if 6M and 12M tenors were not available as reference rates. For example, one respondent said that the lack of 6M tenors would have an adverse impact on their inter-affiliate loans resets. This would result in a need to re-write these loans and ensure legal and fiscal requirements are adhered to in the process in over 25 countries. In other unprompted responses, corporates made specific requests for an interpolation of rates between 3M to 1 Year and at least to the 6M point.

Prompted preferences for alternative reference rates (in place of 6M & 12M tenors) were as follows:

Table 16: If it is not possible to fix robust 6 months and 12 months IBOR+ rates, then what would be your preferred alternative rate in this case?

[Prompted]

| n=71 | First Choice | Second Choice | Third Choice |
|-------------------|--------------|---------------|--------------|
| 1w to 3m IBOR+ | 52% | 10% | 28% |
| 6m or 12m OIS | 24% | 46% | 20% |
| 6m or 12m T-Bills | 17% | 32% | 31% |

Apart from these preferences, corporates have also stated some other alternatives that they will rely on;

- 6M-12M IRS
- Closest match to Swap Markets
- Required Rate by Supervisory Body

The respondents ranked the 1w to 3M IBOR+ ahead of 6M or 12M OIS with 6M or 12M T-Bills being the least preferred alternative. There were also other suggestions on alternatives such as 6M-12M IRS or a reference rate which is the closest match to the swap markets.

Impact of Benchmark Reform on Corporates

In the event that a new reference rate compliant to IOSCO standards could not be mandated, corporates indicated that they would prefer OIS over T-Bills but they suggested some other [unprompted] alternatives that they would consider such as: Market Benchmarks; IOSCO non-compliant IBOR; or a central bank base rate.

Table 17: If no IOSCO compliant IBOR+ can be fixed, what other reference rate would you choose to transition to?

[prompted]

| n=68 | First Choice | Second Choice | Third Choice |
|-------------|---------------------|----------------------|---------------------|
| OIS | 56% | 32% | 3% |
| T-Bills | 37% | 50% | 1% |
| Others | 6% | 1% | 12% |

F.4.3. Properties of an Ideal Benchmark

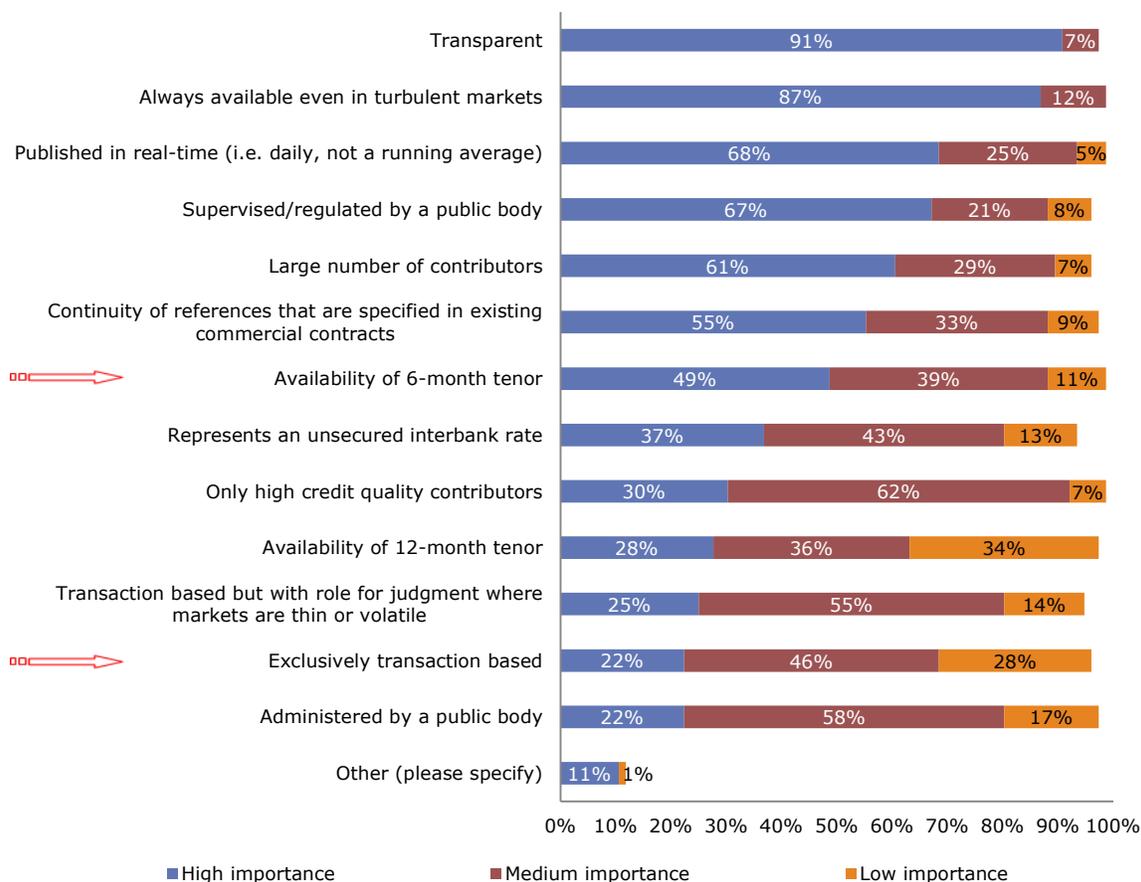
Key Messages on Benchmark Properties

- Corporates consider the following points as most important for reference rates:
 - Transparency
 - Availability (daily and also in turbulent markets)
 - Supervision
 - Large number of contributors.
- The relative negligence of “Exclusively transaction based” in Phase II contrasts somewhat with outreach results obtained from a smaller sample of respondents in Phase I.
- Many corporate respondents currently require a reference rate with bank credit and liquidity premia included but the majority indicated that they would have little appetite for change if the new rate would be systemically >5bps higher (or lower) in future. It is likely (under such a scenario) that larger corporates, with legacy portfolios linked to current IBOR, would prefer to move those contracts towards a risk-free rate that better reflects their cost of borrowing.
- The availability of 6M and, to a lesser extent, 12M tenors is very important.

Most corporates believe that it is important that there should be continuity of references that are specified in existing contracts. Corporates want a robust rate which is available on a daily basis, even in turbulent markets. Ideally the rate should be contributed by a large number of creditors but good governance and transparency is perceived as a much higher priority than being exclusively transaction based [Chart 26]. This corresponds with narrative feedback indicating that corporates presently appear to have little appetite for change from existing IBOR benchmarks. Corporates ranked the continued availability of 6 month tenor as being more important than being exclusively transaction based [see also Chart 29 & Chart 30 below].

Chart 26: Key Characteristics of an Ideal Benchmark

n=76



Respondents also raised four other characteristics they believed to be of “High Importance”

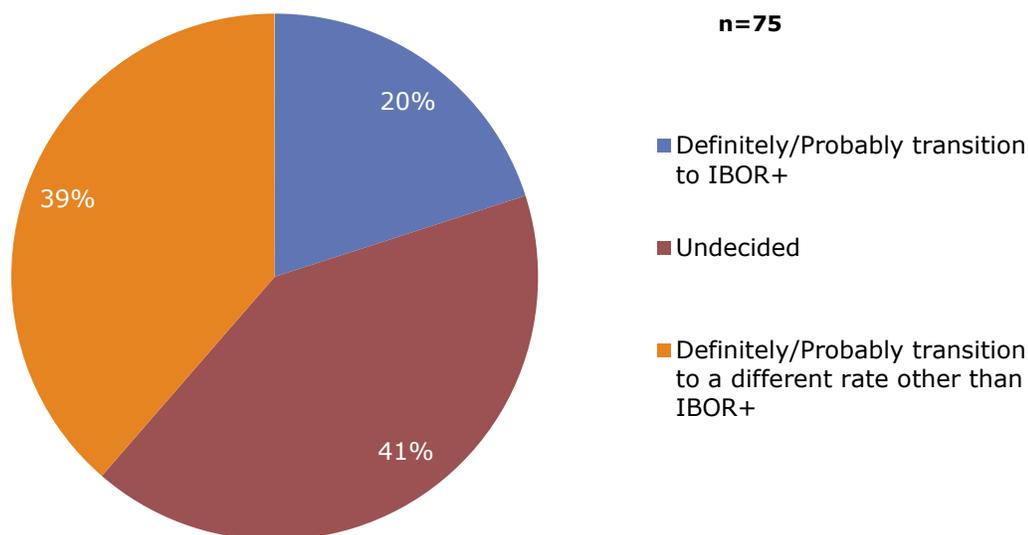
- For some corporates it is most important that IBOR rates reflect the funding costs of a group of high-credit-quality banks such as those that make up the corporates’ bank group;
- A range of tenors and currencies the same as (or similar to) those currently available under the [then] current BBA LIBOR are needed to provide flexibility;
- In order for the LIBOR fixings to be representative, it is important for there to be underlying liquidity;
- Clear and well defined criteria for use of "judgment rates/adjustments" in thin markets - supervisors must be aware when these judgment rates are used and what is the basis/analysis used in estimating the rate. No need to make this public at the time but it should be made public after a suitable period of time, say 1 to 5 years.

Volatility

It is evident that if IBOR+ was significantly more volatile than IBOR [Chart 27] or systemically >5bp higher or lower [Chart 23 & Chart 24] then IBOR+ would not appear attractive to corporates. 80% of corporates were either undecided or would be inclined to shift towards an alternative rate other than IBOR+.

The spread of responses indicates that there might not be one good alternative rate to move towards in such a scenario. The question always involves a cost-benefit analysis as to which rate would best meet corporate objectives but, in practice, some corporates expressed concern that they would be in a weak negotiating position with regard to their banks in choosing an alternative rate.

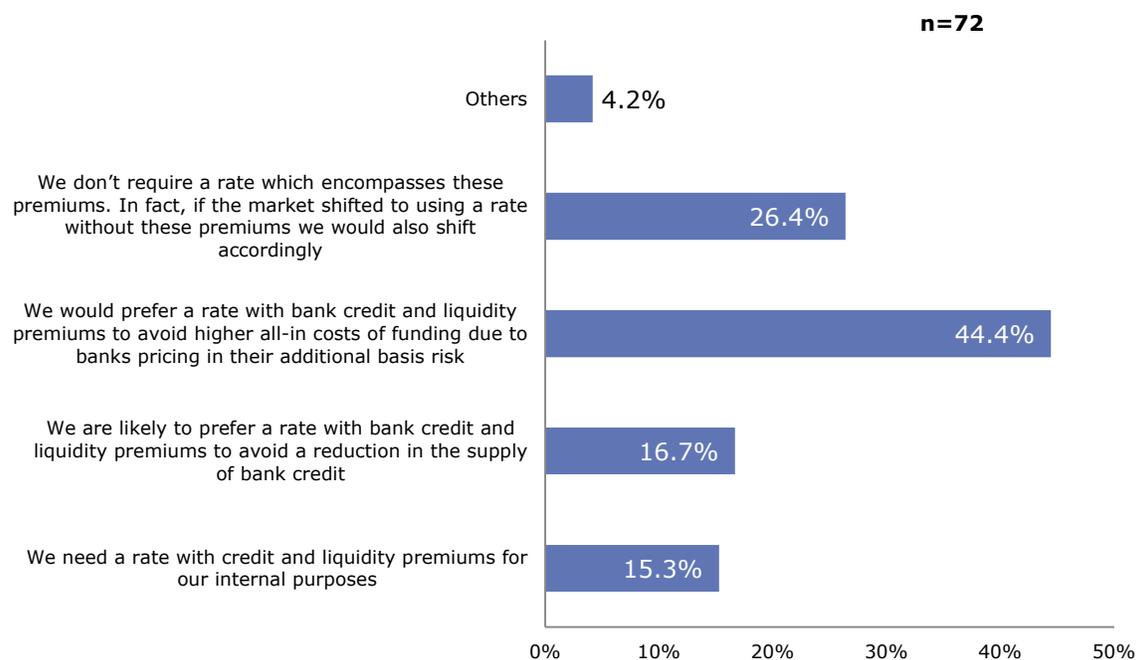
Chart 27: If IBOR+ was significantly more volatile than IBOR, would your company transition to IBOR+ or to an alternative reference rate?



Some corporates might be tied to existing financing terms and conditions and would have either to rely on the rate referenced in the agreement or to seek to renegotiate their credit agreements. A minority expressed the view that if the rate is the best representation of the market, then the associated volatility is acceptable.

Many of the unprompted responses cited uncertainty [See F.5.5]; they proposed that, before a decision could be made, a full assessment of the degree of volatility and the available alternatives in the market must first be conducted. Given the low percentage (20%) of positive responses, it can be concluded that corporates prefer a stable benchmark. Some corporates would not embrace a more volatile rate as it would create similar volatility in their financial results and might also result in significant “rate-set risk” for hedge accounting purposes.

Chart 28: Looking at your company's current usage of IBOR, to what extent do you explicitly require a rate that encompasses bank term credit and liquidity premiums?



Corporates considered their current usage of IBOR and reviewed their need for a reference rate that encompasses bank term credit and liquidity premium [Chart 28]. There was a preference (44%) towards an all-inclusive rate to avoid higher all-in costs of funding due to banks pricing in their additional basis risk. From the unprompted responses, we could also see that corporates would use such inclusive rates to price inter-affiliate / intra-group loans to satisfy "arm's-length" tax principles.

26% of corporates explicitly do not require a rate that encompasses such premiums. From the unprompted comments, it is evident these corporates are more keen to link their internal transactions to a widely recognized and trusted market benchmark. Hence, in the prompted option, if the market shifted to using a rate without these premiums, probably they would follow suit. Similarly [Chart 26] some 30% of respondents had ranked "only high credit quality contributors" as being a benchmark characteristic that was of high importance.

For many corporate treasurers, the basis for loan pricing has been an index meant to capture the banks' cost of funding plus a credit spread appropriate to the risk of the borrower over the commitment period of the loan. The way USD LIBOR, for example, has been determined with a small group of major clearing banks has served as an approximation acceptable to corporate treasurers of their own bank groups' funding costs. An analysis of the proposed move to a much wider group of banks shows spreads widening, especially in times of higher volatility, caused by the relatively higher funding costs of less well capitalized banks and those with higher country risk. However, most corporates put together their bank groups by choosing well capitalized banks having the most stable funding costs [even if the corporate does not have a formal minimum credit level for their banks – Chart 19]. One solution to this would be for corporate borrowers to abandon a new IBOR+ in their loan agreements and use an index of their agent banks' funding costs as was

an option in the 1980s. In theory this could be achieved by constructing subsets of the new IBOR+ based on submitting banks’ credit ratings or capital ratios. This would be analogous to discounting pension liabilities based on Moody’s AA Corporate Bond Rates since this approximates the credit quality of pension investments. However, the consensus was this would not provide sufficient transaction volume especially for less used maturities. The [Transitions meeting] group acknowledged the problem, but decided that the MPG’s terms of reference calling for robust transaction-based rate-setting did not allow for alternatives.

Tenor

As previously referenced in section F.4.1 [Chart 21] and section F.4.3 [Chart 26], availability of 6 Months and 12 Months tenors is clearly important to a majority of corporate respondents (weighted towards 6M). 61% of these respondents indicated that they would be likely to move towards 3M tenor in the event that 6M or 12M tenors were no longer available.

Chart 29: Key Characteristics of an Ideal Benchmark (extract from Chart 26)

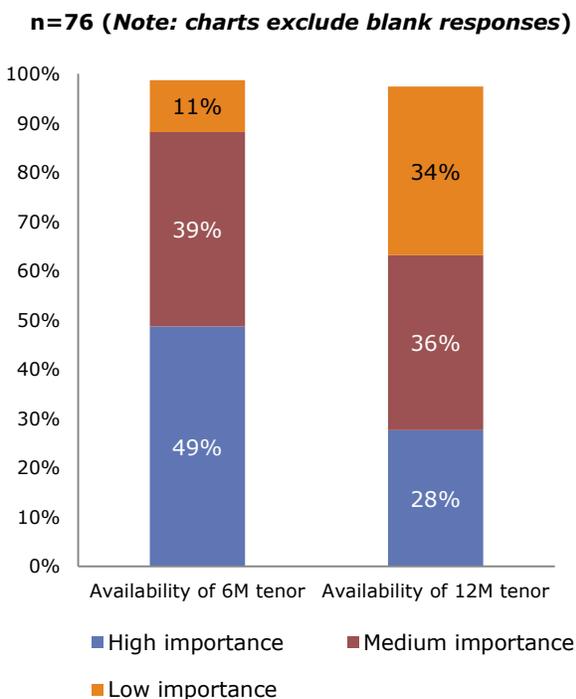
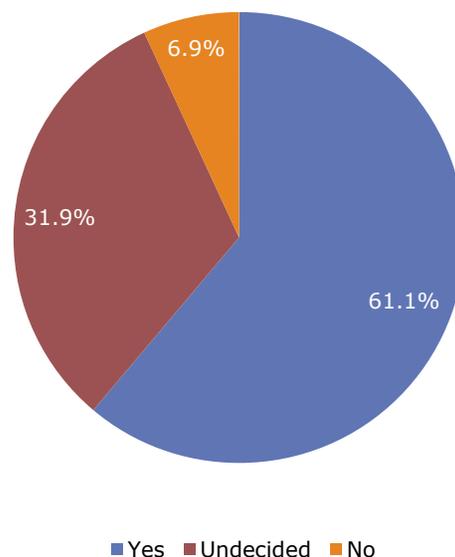


Chart 30: If 6M or 12M rates were not available, then would you transition to 3M rates?

n=72



F.4.4. Transition Considerations

Key Messages on Transition Scenarios

- If reference rates change, corporates fear that:
 - Legal contracts may be invalidated, leading to unwanted consequences (e.g. early loan repayment) and considerable re-negotiation efforts and costs.
 - Hedge accounting structures may be invalidated, leading to unwanted P&L effects.
 - Taxable gains/losses may be triggered.
- Corporates are not convinced that any change is necessary and have little appetite to renegotiate contracts. A seamless transition may be preferred to market-led because it helps to justify the cost/benefit of transition.
[Section F.5.2 expresses an alternative view]
- There is a risk that transition recommendations may focus primarily on products used by Financial Institutions. Corporates are likely to need a longer preparation period than the Financial Sector in which to identify, analyse and renegotiate their historical commercial exposures.
- If there would be a hard cut-over to new reference rates, a notice period of between 2 and 5 years would seem to be appropriate in order to cover the needs of the majority of corporates.
- However, in the parallel run scenario, a notice period of ≥ 5 years was indicated, noting that the “run off” period for some existing contracts could be ≥ 30 years.
- Parallel transition period can be reduced if there is a longer lead in period. However, a parallel transition may be problematic because typically you cannot input two benchmark rates into treasury IT systems and a choice of parallel rates may give rise to legal, tax or accounting implications.
- Similarly a transition from a long tenor to a short tenor may constitute refinancing and trigger fiscal/accounting issues.
- Global coordination across currencies is crucial for multi-nationals; Prior engagement (by OSSG) with international accounting authorities (e.g. IASB, FASB) and national fiscal authorities will be necessary to ensure aligned legislation and treatment.

A possible transition to new reference rates would be a huge task for every company. However, the kind of challenge may vary across different businesses. While the handling of benchmark rates is a core business function of financial institutions, their usage within non-financial companies might be less tracked and less standardized in individual cases. In anticipation of a transition, corporates would need sufficient time to create an inventory of relevant contracts (including historical commercial contracts) and their particularities. For

instance the arrangements made for reference rates in contracts relating to trade finance or with commercial suppliers may differ from e.g. the definitions in ISDA master agreements.

In addition tax and hedge accounting structures will need to be reviewed with external auditors on a case by case basis. Finally Treasury IT systems may be less sophisticated at non-financial companies, at least at smaller ones, and unable to handle parallel rates and yield curves.

The corporate work group recognises that not all contracts used by Financial Institutions are standardised (e.g. retail loans, small business customers and structured finance products). However, there is a risk that Transition recommendations may focus primarily on products used by Financial Institutions (which can be amended by ISDA / standard contract amendments) whereas transition issues for corporates are different and wider than those relating to financial instruments alone. Therefore corporates are likely to need a longer preparation period than the Financial Sector in which to analyse and renegotiate their historical exposures. [Chart 31 & Chart 32]

In practice, the necessary length of a transition period will depend upon the Official Sector's ability to:

- a) Put in place an international framework to ensure alignment of legal, fiscal and accounting treatments in respect of any transition.
- b) Ensure legal continuity of contract through a "seamless" transition.

Tax Considerations for Corporates

The corporate work group has not examined areas of potential tax/fiscal impact in detail but it is clear that corporates (and other entities) would have to conduct an extensive analysis of their potential tax exposures ahead of any transition. Transfer pricing of inter-affiliate financing agreements, particularly for multinationals, is a particular area of concern for corporates but some other considerations are also noted below:

Engagement with National Fiscal Authorities

Considerable effort by the Official Sector, including engagement with and between national fiscal authorities, will be required to ensure a smooth transition for all IBOR reference rates, with aligned legal, fiscal and accounting treatments and interpretations. This may require statements by, for example, the Interpretations Committee of the IASB [see *Accounting Considerations below*] and/or primary legislation in some countries.

Tax Legislation

National Fiscal authorities should be encouraged to check whether there may be embedded references to IBOR within their regulations and statutes (e.g. as the basis of the interest rate payable in the event of a late tax payment or penalty). As yet, the corporate work group is not aware of any tax legislation that specifically references IBOR rates (embedded within fiscal statutes). However, national fiscal authorities should be asked to provide specific confirmation of this point

Crystallisation of Loss/Gain

More commonly, transfer pricing requirements refer to an appropriate benchmark or reference rate; typically IBOR rates will be the benchmark for inter-affiliate loan agreement documents. Therefore any change away from IBOR potentially may constitute a change to the terms and conditions of the inter-affiliate loan. This may include an enforced change of tenor from, say, 12 month to 3 month.

Loss of Tax Relief

In some countries there is a significant risk that such a change of terms & conditions would constitute refinancing and consequently the corporates may lose tax relief for the interest costs incurred by the borrower. Therefore it is recommended that the OSSG should actively seek agreement with fiscal authorities against such treatment. (*see USA example below*).

Asymmetrical Treatment Risk

If IBOR were to cease to exist as an alternative, there would likely be a wholesale shift across to the alternative benchmark for transfer pricing purposes. If IBOR and the alternative benchmark are not closely aligned, this would have a consequent tax effect through multinationals' intra-group / inter-affiliate arrangements. Depending on the size and direction of the effect, it is possible some fiscal authorities may consider spreading any adjustments over a period of time through some form of transition arrangement. Given the large number of countries (i.e. fiscal jurisdictions) affected, this would need to be handled consistently to avoid asymmetrical treatments for tax purposes.

Parallel-Run Benchmarks Risk

If IBOR continues to exist in parallel to a new benchmark(s), then the element of choice for the benchmark would exist for tax payers in the event that a fiscal authority does not predetermine which benchmark is acceptable. There may be some form of grandfathering arrangement, such that existing loans would continue on IBOR whilst new loans would switch to the new benchmark. Existence of two possible benchmarks would create difficulties for corporates to agree their internal transfer pricing arrangements with fiscal authorities. Again consistent application across countries would be required to avoid the risk of asymmetrical treatment.

Transition Example - USA Tax

- The US Tax treatment of financial contracts in which interest rate indexes may be changed could result in undesirable consequences.
- Federal income tax regulations require that a financial instrument be marked to market and any gain or loss be recognized for federal income tax purposes if the interest rate is changed by more than a *de minimus* amount.
- Specifically, Treasury Regulation 1000.1-3 defines the *de minimus* threshold for changes to a debt instrument's interest rate at 25 basis points or 5 percent of the yield
 - (ii) in general a change in the yield of a debt instrument is a significant modification if the yield computed under paragraph (e)(2)(iii) of this section varies from the annual yield on the unmodified instrument
 - (determined as if the date of the modification) by more than a greater of –
 - (A) ¼ of one percent (25 basis points): or
 - (B) 5 percent of the annual yield of the unmodified instruments (0.05 x annual yield)
- **Corporates would have to analyze all jurisdictions (not just the G20) in which they operate to identify and resolve similar transition issues.**

Accounting Considerations for Corporates

The corporate work group has not examined areas of potential accounting impact in detail but, in the event of a transition, corporates would need time to assess the implications with their auditors on a case by case basis. Accounting Standards Boards are likely to require time to assess whether an official interpretation of existing (or new) accounting standards would be required in the event of a transition. They may reach different interpretations without Official Sector alignment. Potentially IFRS accounting treatment may vary depending on whether a transition would occur before or after IFRS9 is introduced, for example due to the current hedge accounting 80/125 effectiveness test.

Subject to the particular circumstances, it seems likely that a change of IBOR would be prospective rather than retrospective; therefore it is not likely that auditors and accounting rules would require a recalculation or restatement of prior year comparatives in respect of a change of IBOR reference rates. However, in case of this eventuality, it would be desirable for a transition lead in time to cover at least two financial year-end periods.

Accounting (and Tax) considerations depend greatly on whether there is a step change on day one of the transition, particularly where a change from IBOR to IBOR+ would be considered to invalidate or change the terms of a contract. [see *Australian Example below*]. To the extent that the day one accounting implications would give rise to a gain or loss, the corporates would need to determine whether those impacts are subject to taxation in the jurisdictions in which they arise [see *Tax Considerations section above*].

Impact of Benchmark Reform on Corporates

Inter-affiliate transfer pricing should be on an “arms length” basis but each tax authority will have a different view of what that is and what is an acceptable spread above IBOR+. A change in tenor from 12M to 3M may constitute a change of terms and would need to be agreed with tax authorities country by country.

A hard cut-over may remove some of the uncertainty involved in assessing the accounting impact of a transition. However, the hard cut-over may itself create a fair value movement that could breach hedge accounting principles. Even if the hedged risk is deemed to be the same, where hedge accounting is based on either an underlying instrument or a derivative which references IBOR, a change to IBOR may alter the effectiveness of the hedging relationship. Where the relationship is fundamentally altered it may be necessary to de-designate/re-designate the hedge.

Corporates will need to examine their use of IBOR in fair value calculations of financial instruments referenced to IBOR as well as any use of IBOR in discounting provisions, impairments and future lease payments (potentially this could alter the lease classification for corporates reporting under certain GAAPs).

Capitalisation of interest could be indirectly affected (where the corporate’s borrowing rates reference IBOR) as it is dependent on the actual cost of borrowing.

Amortised cost accounting: changes to IBOR will impact the interest paid over the life of an instrument and hence may alter the amortised cost profile of the interest rate.

An additional consideration for corporates is whether commercial contracts are linked to IBOR and impaired by the transition, including assessment of “own use” contracts where the contract is a quasi-derivative for the corporates’ own purchase/sale requirements. In particular, corporates would need to check whether historical long-term sale/purchase contracts contain embedded price escalation clauses referencing IBOR. An adverse systemic step change in IBOR could make such a contract unprofitable. Under these circumstances, a corporate may be required to recognize the present value of the liability on its balance sheet in respect of the remaining term of the now “onerous contract”.

Transition example - Australia Accounting

The Wheatley Review of LIBOR recommended that publication of all LIBORs should be discontinued for the following currencies: Australian Dollars (AUD), Canadian Dollars, Danish Krone, New Zealand Dollars and Swedish Krona. A phased discontinuance timetable was then agreed. These transitions have not been examined in detail by the Corporate work group but may provide useful case studies for further analysis by the OSSG.

For example, it is understood that the impact of the discontinuance of the AUD LIBOR rate was considered for a corporate which had an Interest Rate Swap (IRS) designated as a cash flow hedge of underlying debt, both of which contained AUD LIBOR as the benchmark rate and where the terms and conditions of both the debt and the swap were silent on what should happen if the reference benchmark rate (in this case AUD LIBOR) ceased to be quoted. In this example, we understand that the parties agreed to reference BBSW as the new agreed benchmark rate. No other terms were changed, in particular the maturity, counterparty, notional amounts, fixed leg of the swap and payment dates remained identical. The change in the benchmark rate did not lead to a material change in the fair value of the IRS. One view was that the corporate entity should de-designate the hedging relationship as the hedged risk documented at inception of the contract has changed. An alternative view, accepted in this circumstance given the limited use of the Australian LIBOR rate being removed, was that there had not been a significant/substantive change in either contract. The key terms of the contracts remained the same, the hedging documentation still met the requirements of IAS39.88 (a)* as BBSW is now the best available measure of the specified benchmark of AUD LIBOR, and the hedge continues to be highly effective.

Please note that this conclusion was reached on the specific facts and circumstances of the example described above. It should not be assumed that the same conclusion would prevail generally.

Nevertheless, the fact that two alternative interpretations were being considered reinforces the need for IASB (and other Accounting Standards Boards) to provide guidance in advance of a transition.

* *Technical references/guidance - IAS39 para 88a*

At the inception of the hedge there is formal designation and documentation of the hedging relationship and the entity's risk management objective and strategy for undertaking the hedge. The documentation shall include identification of the hedging instrument, the hedged item or transaction, the nature of the risk being hedged and how the entity will assess the hedging instrument's effectiveness in offsetting the exposure to changes in the hedged item's fair value or cash flows attributable to the hedged risk.

Chart 31: Sufficient notice period before implementing hard cut-over to IBOR+ or other alternative rates

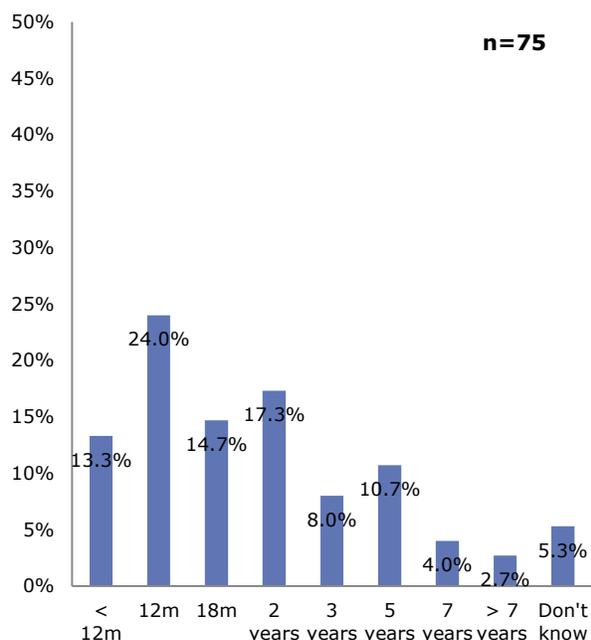
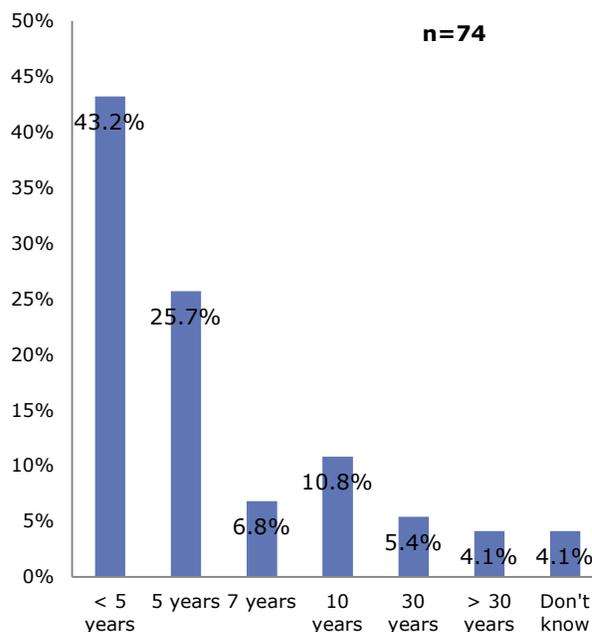


Chart 32: If new reference rates and existing IBOR rates are parallel-run, what would be sufficient time for legacy IBOR contracts to run off or be renegotiated before termination of IBOR.



It is evident that a majority of corporates believe that notice period of 5 years is sufficient for a transition regardless in the scenario of a cut-over or a parallel-run. A consideration here is whether financial year-end accounts would need to be assessed. In which case, as mentioned under accounting considerations above, it would be desirable to have a transition period of at least two years (to ensure that two financial year-ends are straddled by the change).

If there would be a hard cut-over to new reference rates, a notice period of between 2 and 5 years would seem to be appropriate in order to cover the needs of the majority of corporates.

However, in the parallel run scenario, a longer notice period (≥5 years) was indicated by a majority of respondents, noting that the “run off” period for some existing contracts could be ≥30 years.

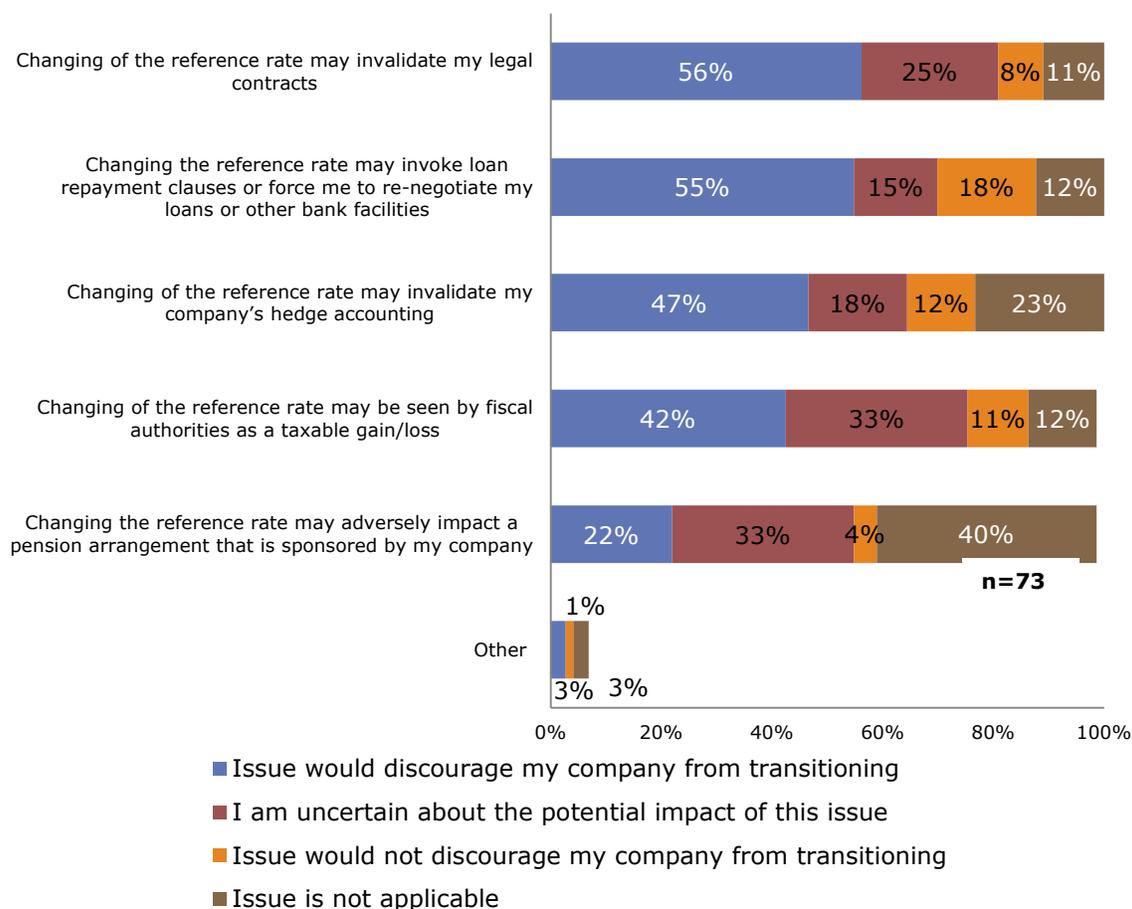
In the event that a transition is not mandatory the corporates ranked the [prompted] issues that would most discourage their possible transition:

Table 18

| Rank | Issue |
|------|---|
| 1 | • Changing of the reference rate may invalidate my legal contracts |
| 2 | • Changing the reference rate may invoke loan repayment clauses or force me to re-negotiate my loans or other bank facilities |
| 3 | • Changing of the reference rate may invalidate my company’s hedge accounting |
| 4 | • Changing of the reference rate may be seen by fiscal authorities as a taxable gain/loss |
| 5 | • Changing the reference rate may adversely impact a pension arrangement that is sponsored by my company |

However, the underlying responses also revealed some uncertainty about the potential impact of these prompted issues:

Chart 33:



The corporates have suggested in Table 19 below some actions that could mitigate the impact of the issues that were listed in Table 18 above:

Table 19

| Issues | Examples of Mitigating Actions [abridged] |
|---|---|
| A. Changing of the reference rate may be seen by fiscal authorities as a taxable gain/loss | <ul style="list-style-type: none"> • Parallel running and sufficient lead time for making the transition. • 2+ years notice for time to redo contracts • Buy-in from respective countries' regulators and tax authorities and converged guidance from tax authorities across the world. • Consistent treatment by fiscal authorities with regards to the change in reference rates will help to avoid asymmetrical treatment for tax purposes. • Getting Accounting, Tax and regulatory to accept changes to a new benchmark first • Agreement of accounting treatment by IASB • Tax authorities would need in advance of the change to agree that this change cannot cause a taxable event • Tax authorities explicitly state no tax impact from this change • Regulator should compensate participants for losses • Consult with corporate and national tax advisers/auditors to agree approach ahead of cut-over • Tax authorities could create a hold harmless exemption / conversion period • Negotiation with lenders |

| Issues | Examples of Mitigating Actions [abridged] |
|---|---|
| B. Changing of the reference rate may invalidate my company's hedge accounting | <ul style="list-style-type: none"> • Parallel availability of old and new rates for analysis • Detailed analysis of hedge accounting ramification to provide clarity on impacts • Corporates would appeal to the U.S. SEC and FASB to allow the change without invalidating hedge accounting. • International accounting boards would need in advance to agree that this change would not affect hedge accounting • Ruling by FASB/IFRS allowing transitioning with no invalidation of hedge accounting (may require relaxing some of the existing criteria) • Regulator should ensure that legal consequences are mitigated • Hedge accounting rules could be made more flexible to accommodate • Accounting authorities allow a transition period or phase out or something that grandfathers existing swaps • Transition would need to be simultaneous in all places such that hedging remained effective with IBOR+ being hedged in place of IBOR • Issue new framework ahead of SMEs adopting new UK GAAP with hedge accounting requirements • Closing pension schemes • Make transitioning optional |
| C. Changing of the reference rate may invalidate my legal contracts | <ul style="list-style-type: none"> • For ISDAs, an ISDA supplement should be available • Regulator should ensure shocks to coverage ratios do not have negative consequences • Provide sufficient notice to corporates to renegotiate contracts as required as this could have big commercial impact for some companies • Provide clarity on how terms in a commercial contract can be waived / over-ruled as a result of this change. |

| Issues | Examples of Mitigating Actions [abridged] |
|---|---|
| D. Changing the reference rate may invoke loan repayment clauses or force me to re-negotiate my loans or other bank facilities | <ul style="list-style-type: none"> • Banking regulators would need in advance of the change to agree standard substitute wording that can sit in a side letter. • I would hope that the LMA would have a standard amendment that we could bring in without too much need for negotiation. • Renegotiation of loan facilities possible with sufficient notice period. Cost of doing so is unwelcome. • Action by regulators prohibiting banks from attempting to exit loan contracts based on transitioning • Banks and lenders need to be involved with borrowers in crafting a standard transition that neither harms nor benefits either party • Long enough transition periods |
| E. Changing the reference rate may adversely impact a pension arrangement that is sponsored by my company | <ul style="list-style-type: none"> • Pension regulators would need to agree standard treatment in advance of the change to existing arrangements. |

Corporates also made various suggestions to the method of transitioning. Key messages included sufficient transition periods, reduced market disruptions and having binding legal regulations and coordinated government implementations:

Table 20: Comments on Transition Method [abridged]

| | |
|---|--|
| Extended Transition Period | <ul style="list-style-type: none"> • An extended transition period is essential • Corporates would need a longer lead time than banks • Corporates require a long lead-in to ably identify where issues may occur ahead of time. |
| Reduce Market Disruption | <ul style="list-style-type: none"> • Must be accompanied by both comprehensive market education and data reflecting the pace of transition. • During the transition a strengthened existing process must be maintained in parallel. • Rules issued with a clear effective date and sufficient lead time before transition. Rules should not be changed between issue date and effective date • Keep any changes simple and transparent. Do not over engineer it. • Proposed rates should have a broad market backing. |
| Binding Legal Regulations & Coordinated Implementation | <ul style="list-style-type: none"> • If a change in IBOR is not globally coordinated, it would result in vast amount of different jurisdictions and rules [a corporate] would have to adapt to. • There is a need for a legal initiative like when the EUR replaced the French Franc • In EU, a regulation could be issued, stating that EURIBOR (and why not LIBOR) are replaced by the new benchmarks. This regulation must be binding • A global coordinated effort would help to avoid asymmetrical treatment issues (e.g. tax) • Regulators will need to put in place a global framework that will ensure international alignment of legal, fiscal and accounting treatments in respect of any transition. |

F.4.5. Additional Findings

Key Messages on Other Considerations

The final section of the survey [Section E] was intended to provide a platform for corporates to provide narrative commentary on considerations that were not covered elsewhere in the survey. The corporates raised further issues and recommendations that have been abridged and collated as follows:

Table 21

| Theme | Examples [abridged] |
|---|--|
| Poor Position to Negotiate/Cost of Borrowings affected | <ul style="list-style-type: none"> • Inability to negotiate with counter-parties on the spread on IBOR+. • Fear that corporates may be placed in a worse position before the banks due to insufficient understanding of new rates. • It has to be made clear that the banks were not to profit from these changes. |
| Profit & Loss Impact | <ul style="list-style-type: none"> • Would require a process to legally force contract changes making the adjustment largely operational and with negligible economic impact. • Changes in reference rate will have P&L impact which has direct impact on the performance. Regulators/Accountants should make it possible to switch without possible loss. • A transition cannot occur without loss, either in MtM , P&L, corporate pension fund coverage ratios etc. These losses should be compensated |
| Market Uncertainty | <ul style="list-style-type: none"> • The recent discussions over the changes to the definition of UK RPI showed how deeply embedded some market concepts are in all kinds of contracts. The RPI changes potentially lead to some debt being repayable and other debt being re-priced. This would have created significant market uncertainty. • The uncertainty gives us a nagging doubt. • I am very worried about the law of unintended consequences • The difficulty of foreseeing all the hassle gives more doubt. |

| Theme | Examples [abridged] |
|---|---|
| Change management is difficult and risky | <ul style="list-style-type: none"> • Moving to a risk-free benchmark would require a complete overhaul of all debt and business agreement terms to preserve existing economics. The cost, time, business disruption and legal risk must be carefully considered. • Concern about increasing costs in the transition and beyond. • IT system costs will be very big • My company has negotiated its bank credit agreements so that we pay an interest rate based on the funding costs of the banks plus a credit spread appropriate for our risk. Our main credit agreement is supported by a syndicate of 22 banks chosen in part according to a minimum creditworthiness standard. If the new interest rate indexes reflect the funding costs of many banks of lesser credit quality, then we would have to transition to a different pricing formula. • We have risks if we are not empowered to move our RCFs and IRSs and CCs and bonds to the same benchmark, which is likely if they are with different providers. |
| Proposals of Solutions | <ul style="list-style-type: none"> • IBOR+ should be a REAL OFFERED rate where providers should be obliged to deal on in the interbank market. • An alternative rate derived from FX-Forwards should be considered as well. • No mixture of secured and unsecured rates • Fall back to Government T-Bills or bank's cost of fund rate • Benchmark should be a weighted average of the market transactions amongst all parties across major financial centres e.g. London, Hong Kong, Singapore etc... • There should be no arbitrage space between old and new interest rates • A full market survey should be undertaken not only for treasuries. |

F.5. Attachments

F.5.1. Corporate Outreach Survey Questionnaire

[See below]

F.5.2. Extract from the [UK] Association of Corporate Treasurers' Briefing note

January 2014

"LIBOR Administrator change to ICE Benchmarks from BBA LIBOR: Implications for non-financial companies" *[This briefing note may be freely quoted with acknowledgement]*

For treasurers, the availability of LIBOR rates provides considerable convenience as compared to the practice that preceded its establishment which in the past entailed borrowers or agents taking rate quotes from a reference panel at every drawdown and rate re-fixing date. Companies do value the availability of a rate, like LIBOR, that can continue to be available even if market liquidity is thin or conditions disturbed. The expectation of ongoing availability in a consistent manner for many years into the future is also a key feature.

It is therefore a crucial concern of non-financial companies that banks might be reluctant to contribute rates for reputational, competition law and other such concerns. If such concerns remain they must be addressed. But as the ACT has said repeatedly "The banks need to know that their customers expect them to contribute to reference rates if called upon to do so. Regulators and supervisors should insist that banks do so contribute." Informal pressure continues and some moves towards a reserve power to require contributions have been included in draft European legislation, but banks' own courage and confidence remain a weak links. The other threat to ~IBOR style rates is the financial-industry focused view of global regulators who at every turn have favoured transaction-rate-sampling type benchmarks over contributed rates involving judgements, even though recent scandals have shown how they too are vulnerable to manipulation.

LIBOR type rates, with appropriate governance and safeguards, have particular advantages for companies. LIBOR brings together components adding up to a bank's reasonable short-term funding costs, including risk-free rates and other adjustments reflective of the bank's own credit risk. The controlled judgemental elements of the rates contributed to LIBOR mean that the benchmark can be published even at times of market disruption so the rate is reliably available – the fall-back arrangements in case of unavailability being pretty unacceptable or unavailable at times of crisis.

Alternative reference rates such as the OIS (Overnight Index Swap¹¹) rate, government T-bill rates, or repo rates could all have some applicability in many uses but they each have very different characteristics to LIBOR. The fact is that LIBOR is designed to be representative of unsecured bank funding costs of leading banks in the currency concerned and therefore does contain an element reflective of credit risk of the contributing banks. This element is not present to the same degree in OIS and repo rates nor at all in government rates. These would therefore require a new complication in loan agreements to convert the reference rate into something representative of a banks cost of funds and raise issues about corresponding rate-hedging contracts. Some may argue for the use of OIS rates + CDS spread + the borrower's credit margin while others will point out the vagaries of the CSD rates.

As stated above, treasurers await with interest the report of the Financial Stability Board in 2014, but hope for continued availability of ~IBOR-type rates alongside others so that users can choose what suits them best.

F.5.3. Example Uses of IBOR by Survey Respondents

| Other applicable uses of IBOR | Examples [abridged] |
|--|--|
| Uses [prompted] of IBOR <i>(extracted from Chart 14)</i> | <ul style="list-style-type: none"> • Pricing of inter-affiliate/intra-group loans • Hedging of discount rates and/or inflation in respect of defined benefit pension liabilities or other post-employment liabilities. • Swapping a debt obligation in one currency to another currency using a cross-currency swap that involves an IBOR • Discount rates for valuation purposes • Performance benchmarks for money market funds and/or other asset managers • Standard interest rates for pricing long-term commercial contracts • Late payment clauses in commercial contracts • Long-term project finance contracts / joint ventures • Trade Financing Solutions (e.g. factoring or supply chain financing by highly-rated corporates that provide financing for their suppliers with less direct access to credit) • Hedging the variable interest rate on a floating rate debt obligation by "swapping" to a fixed rate using an interest rate derivative (could also be "swapping" a fixed-rate to a floating rate using an interest rate derivative) |
| Loans/Credit Facilities | <ul style="list-style-type: none"> • Asset securitization pricing • Pricing on secured and unsecured debt issuance which may be directly linked to IBOR • Primary syndicated loan agreement that is IBOR based • Pricing of corporate borrowing drawdown and credit lines/facilities • Revolving Credit Facility pricing that is based on IBOR • Interest apportionment between members of a cross-border, cross-currency cash pool |
| Accounting Purposes | <ul style="list-style-type: none"> • Accounting- IBOR may be used in fair value calculations for discounting provisions, impairments and financial leases. It may also affect [indirectly] capitalization of interest for project accounting |
| Regulatory Cost of Capital | <ul style="list-style-type: none"> • As part of the discount rate for property valuation calculations - used in bank lenders' loan security covenant testing and valuation • Indirectly used in setting regulatory cost of capital using a CAPM model with cost of debt components |
| Commercial Contract Clauses | <ul style="list-style-type: none"> • Asset transaction Sale & Purchase agreements will occasionally make use of LIBOR benchmarks in the definition of price adjustment mechanisms where the settlement date differs from the effective date of the deal. The buyer would typically agree to pay LIBOR plus a spread during this period. • Price escalation clauses in long-term supply/purchase contracts. |
| Pricing/Valuation of Financial Instruments | <ul style="list-style-type: none"> • Used in pricing some trade products, such as contracts for difference (CFDs) • Rate is used in some types of option pricing • Pricing of floaters |

F.5.4. Unprompted Examples of Fall-Back Rates

Supporting Data for Chart 22

| Fall Back Rates | Examples [abridged] |
|--|---|
| No Fallbacks | <ul style="list-style-type: none"> • Historical commercial (non-treasury) contracts might not have fallback clauses. • The main reference for IBOR fixings is stated in the ISDA contracts. It is stated that if on a day there are no fixings, the previous fixing should be taken, but to our knowledge there is no reference to a fallback reference rate. |
| Bilateral Agreement between Contracting Parties | <ul style="list-style-type: none"> • An appropriate rate agreed between both parties • Long-term: 30-day consultation between Agent and Borrower as to suitable replacement" |
| Fallback on Pre-agreed group of Reference Banks | <ul style="list-style-type: none"> • Minimum of two syndicate banks appointed by the facility agent to act as reference banks • Average of rates from four banks in London market (from a specified pool of named banks). • Maybe a screen based reference rate on Reuters or Bloomberg? • Funding rate of a pre agreed list of reference banks. • Quotes from reference banks • a rate that reflects interbank lending rates that has been approved by the British Bankers Association • For debt related transactions, Calculation Agent selects the London office of 4 banks located in the jurisdiction of the related currency. These banks are requested to provide the rates they offer on deposits in the currency of the transaction with an index maturity as specified in the transaction documents. If at least two rate quotes are obtained, the mean of the quotes is used. If fewer than two quotes are obtained, the Calculation Agent selects three major banks in the principal financial center of the related currency and uses the mean of quotes from such banks. If no quotes are obtained, LIBOR from the previous period is used. |
| Bank's cost of funds | <ul style="list-style-type: none"> • Bank cost of funds • Commonly "lenders' cost of funds", which is not a good solution as it is arbitrary • Bank cost of funds. This is deeply unsatisfactory. • Bank sets the rate according to its own cost of funding. Not appealing. • "Short-term: Lender's approximation of cost for it to fund its participation in the loan (such source as it may reasonably select). • Local base rates - but would not want to fall back on to these rates! They are there for emergencies. |

F.5.5. Unprompted Examples of Other Factors Affecting Transition

Supporting Data for Chart 27

| Factors Affecting Transition | Examples [abridged] |
|--|---|
| General Market Practice | <ul style="list-style-type: none"> We would probably consider using the domestic equivalent of LIBOR for some currencies (for example, for CAD rate fixing we now refer to the TDOR rate). It would also be important for us to know what general market practice was going to be before making our decision and for our external credit facilities, we would be largely bound by the approach taken by our group of banks. Depends on higher acceptance of IBOR+ compared to IBOR. Depending on discussions with lenders, ACT and other corporate treasurers. In essence I suspect it would be a UK market shift to a single new LIBOR reference rate, rather than picking one of a range of references. |
| Positive Willingness to Adopt IBOR+ | <ul style="list-style-type: none"> As long as the new reference rate is created on a more robust basis and it is the best represented rate in the market, it would suit our purposes. If this is the true cost of funding for the banks then this is the reference that we should be using. If it is 10bps higher than LIBOR then yes we will pay more in interest on our bank loans, but we should have been paying more for years, it is becoming right, not becoming wrong. It looks like the alternative IBOR+ is aligned with market conditions and reasonableness for benchmarking transactions. |
| Volatility leading to negative financial impact | <ul style="list-style-type: none"> The problem [would be] the volatility of IBOR+ The transition to IBOR+ would result in adjusted valuation and discounting curves which will have Mark to Market impact in the derivatives positions we hold. This Mark to Market could also result in unwanted Profit & Loss changes which could be undesired. Even if spreads would be adjusted as [posed in the survey question] there would be still Profit & Loss impact. Positions taken in the past could potentially move from in the money to out of the money. Depends to a degree whether IBOR+ is higher or lower than IBOR and whether you want to be opportunistic in your behaviour or choose a reference rate that you think is appropriate for your business in the long-term. Also depends on what your counterparties will agree to. If IBOR+ is more volatile than IBOR, as the [survey poses] would be expected, then this would probably deter us from moving. |
| May increase costs of borrowing | <ul style="list-style-type: none"> Our financing arrangements are fine tuned taking into account the future values of IBOR. Such a change would have a massive impact in our liabilities. Would not transition to T-Bills as banks would use a switch to this reference as an excuse to significantly increase credit spreads |
| Requires Detailed Impact Assessment | <ul style="list-style-type: none"> Before making a decision an impact study should be performed. Would need to evaluate the financial impact before making decision We would have to study the alternatives. We would be deeply mistrustful of anything based on actual transactions, or based on a public body or regulator. Actual transactions become a circular reference, and can be affected by lack of liquidity. Public bodies and regulators are, sadly, no more trustworthy than the banks. would depend on whether the margin would be adjusted to reflect the "different value". in addition, would depend on the particular strengths and weaknesses of IBOR+ |

**Factors Affecting
Transition****Examples [abridged]****Would Negotiate with
Parties**

-
- Before our company could transition to the new rate, we would have to be convinced that the difference is relatively constant and that we could negotiate the appropriate offset with our bank group.
 - It will have to be by negotiation as already have a clause that covers the eventuality of IBOR not being available.
-

Appendix G. Alternative Reference Rate Approaches

This appendix discusses the feasibility of several alternative approaches that we considered for obtaining reference rates. These are:

- A. Inferring reference rates in a given currency from reference rates in other currencies and foreign-exchange forward prices, using the covered-interest-parity formula.
- B. Obtaining a term unsecured rate of bank credit quality from a near-risk-free rate and an estimate of credit spreads obtained from credit default swap rates on a panel of referenced banks.
- C. Interpolating, from futures prices on overnight rates, the term rate implied by compounding the overnight rate (which is, in effect, the overnight index swap rate).
- D. Inferring a synthetic reference rate from put-call parity pricing relationships between option prices and bond prices.

After evaluating these approaches, the MPG chose not to recommend any of them as feasible and viable reference rates, although we do recommend the use of futures-implied USD OIS rates as a backup fixing method for USD OIS rates.

G.1. FX-Implied Reference Rates

Less developed financial markets can face liquidity constraints in deriving a market-based interest rate as a reference for domestic borrowing and lending. While FX-implied interest rates can partially solve liquidity issues, the MPG believes that credit, convertibility and domestic US\$ liquidity issues make such rates highly problematic for use as reference rates. We do not recommend that FX-implied rates be used as reference rates except in the rare cases of offshore financial centres

An accurate measure for the price of domestic liquidity is critical for any economy, forming the basis for lending from corporate loans to household mortgages. As the IBOR issues have illustrated, however, an accurate measure can be problematic to determine, with reforms shifting towards using transaction-based approaches in preference to polled contributions.

G.1.1. Issues With Domestic Interest Rate Determination

In deep, liquid money markets such as the US or Europe, the volume of daily transactions in benchmark tenors means that such an approach is relatively straightforward. However, in many emerging and less developed economies, the volume of activity is significantly lower and hence a transaction-based domestic interest rate might not be available.

For developing economies, domestic credit creation and a reliable interest rate channel are often weak. However, such developing economies will typically have a higher ratio of total trade to overall economic activity (as services are more typically non-tradeable but become more important at a later stage of economic development). Further, the importers and exporter usually are active in converting their trade activity from a foreign currency to a local one. In this situation, the foreign exchange market is often more liquid than the interest rate market and hence raises the potential of using FX-implied interest rates instead of a domestic interest rate.

G.1.2. Defining Fx-Implied Interest Rates

Interest rates for domestic markets can be derived using a no-arbitrage approach called interest rate parity. The principle behind this calculation is that a dollar invested in the US dollar interest rate market should have the same return as converting that dollar into another currency, investing at the prevailing interest rate in that foreign currency and converting back through the forward exchange rate using a rate determined at inception. Formally, this can be expressed as:

$$1 + r_{\$}.t = \frac{e(1 + r_f.t)}{e^*}$$

Where $r_{\$}$ is the US\$ interest rate for period t , r_f is the foreign interest rate for period t , e is the spot exchange rate between US\$ and the foreign currency, and e^* is the forward outright exchange period at time t . The FX-implied interest rate is then determined by solving for r_f .

G.1.3. Why FX-Implied Rates Fail The No Arbitrage Condition

The expression used above is a commonly used formulation in foreign exchange markets. However, in very important ways, this does not satisfy the no arbitrage condition. The three

most important ways in which problems arise are in credit risk, convertibility risk, and liquidity risk.

G.1.4.Credit Risk

The credit risk issue arises as the equation above assumes that the credit exposure in all four legs of the transaction (US interest rates, domestic interest rates, spot foreign exchange and forward foreign exchange) are identical. However, this is rarely the case. For example, taking the US interest rate, market convention is to use US\$ LIBOR. That interest rate, however, represents the cost of credit for LIBOR banks. By contrast, participants in the market for which the calculation is being made might have a different cost of credit, possibly lower or possibly higher.

One such extreme example is for Iceland in 2008. In April that year, the domestic interest rate (Reykjavik Interbank Offer Rate, REIBOR) for the 3-month tenor was at around 15.5%; the FX-implied interest rate was near zero. The explanation was that Icelandic banks were unable to fund directly in US dollars and so were borrowing synthetically through the FX market, with an implied US dollar cost of funds at around US LIBOR +15.5%. In this environment, not only is the FX-implied rate inaccurate but it will actually fall even as funding conditions deteriorate. We will return later to the issue of why a domestic US dollar interest rate is also not feasible.

G.1.5.Convertibility Risk

The FX-implied rate above assumes an absence of convertibility risk. In many instances this is a material risk and again is exacerbated during periods of heightened stress on the balance of payments. The clearest observation of this can be seen for non-deliverable forward (NDF) markets, although the application is broader if expectations of convertibility risk rise.

This phenomenon was seen clearly in Brazil in 2002, in the run-up to the presidential elections. At that time, FX-implied rates from the non-deliverable forward market were negative in the front end of the curve. This was caused by a significant preference to convert Brazilian Real (BRL) into US dollars immediately, rather than to risk being unable to move BRL offshore at the expiry of the NDF contract (an additional concern for NDF currencies is that this is a contract for difference, so although the payment at expiry is in USD, the full amount is not hedged).

G.1.6.Liquidity Risk

To avoid the credit risk issue highlighted above, the fx-implied rate can be based on paired spot and forward fx transactions (the reference spot rate for transacted FX forwards), along with the US\$ cost of funds for the same time period for the counterparties involved in that trade. While FX liquidity might be deeper than domestic interest rate liquidity either across the term structure or in longer tenors, this fx-implied approach requires not only liquidity in the spot and forward fx markets, but also in domestic US\$ liquidity. As noted in the Icelandic example above, during periods of financial distress, domestic banks might not be able to access US\$ liquidity, hence the problem of determining an accurate, traded interest rate remains unsolved.

G.1.7.Appropriateness for Offshore Financial Centres

In a very limited set of countries, fx-implied interest rates can be a relevant interest rate. We believe this is in the instance of offshore financial centres, where significant banking activity is conducted by a large proportion of international banks who fund primarily by bringing funding onshore through the foreign exchange market. Singapore is the clearest such example, and in this instance the Swap Offer Rate (SOR) is calculated as above. As we have noted though, the issue of determining the appropriate US\$ interest rate has been a key concern, with a switch from 1 January 2014 from using US\$ SIBOR (Singapore Interbank Offer Rate) to US\$ LIBOR, to address issues regarding liquidity of locally-determined US\$ funding.

G.1.8.Recommendation

Broadly then, we believe that FX-implied interest rates are not an appropriate reference rate as there are too many variables that can bias the result (credit, convertibility and liquidity) and in periods of distress, they fail to represent pricing of domestic liquidity.

G.2. CDS-Implied Synthetic Reference Rates

G.2.1. Introduction

The purpose of this note is to discuss the feasibility of a synthetic substitute for LIBOR based on the sum of a risk-free rate and a new short tenor CDS index rate.

Arguably, one of the reasons LIBOR is widely used as a benchmark is that it reflects the short term unsecured funding cost of financial institutions. To the extent that this is important then a synthetic alternative should have a similar credit quality. Of course, if most swap transactions are motivated by hedging interest rate risk, and only a subset of the participants care about the bank funding cost aspect of LIBOR rates, then it might be desirable to separate the two aspects and offer a floating rate benchmark indexed on widely accepted liquid transaction rates, such as OIS or TBill rates. Investors who want to be benchmarked against bank credit risk could then go out and purchase this component separately in the CDS market.

For this note we suppose that the synthetic LIBOR rate would be constructed as the sum of a reference risk-free rate and a credit adjustment to reflect the same level of (unsecured interbank) credit risk as LIBOR.

G.2.2. Reference Risk-Free Rate

The risk-free benchmark should be based on widely available transaction data preferably obtained from liquid markets so as to not be subject to potential manipulations. Natural candidates are the overnight interbank deposit rates, or the longer term OIS rates, or Treasury Bills. Given the at times idiosyncratic behavior of T-Bills yields and the lack of constant maturity yields, which would have to be interpolated from available data, it would seem preferable to use an OIS based reference risk-free rate.

G.2.3. Bank-CDX

Note that LIBOR reflects refreshed prime bank credit risk in that the constituents of the LIBOR panel may change over time so that the panel always reflects prime banks' credit worthiness. To construct a credit derivative on similar credit risk, one could design a basket CDS index (similar to CDX or Itraxx) that would reference a portfolio of banks with high credit quality. This index would be refreshed at a constant frequency (say every three months), so as to always reflect the best available credit quality banks. The new contract would operate on a full running basis (as opposed to the upfront plus running convention used in the CDX market) so that the quoted rate could be readily interpreted as a pure credit spread. Protection buyers would pay a premium every quarter, equal to the quoted rate times the outstanding notional of the contract. In exchange, protection sellers would cover any shortfall due to credit losses that would occur in the underlying basket (and that would result in a reduction of the notional of the underlying basket). The quoted rate on this Bank-CDX would then reflect the market's assessment of the 'average' credit spread on the underlying portfolio.

For each of a set of maturities of such Bank-CDX (for example, 3, 6, and 12 months), one could directly add the quoted CDX rate to the risk-free benchmark to obtain a reasonable synthetic substitute for LIBOR.

G.2.4. Discussion

While the above construction seems fairly simple it depends crucially on the successful launch of a bank-CDX contract. We discuss some of the features that may hamper a successful launch of such contract.

Liquidity

Liquidity in CDS is typically at much longer maturities. Five year CDS are typically considered the most liquid points for single name CDS as well as index products (CDX and ITraxx). It is rare to find high liquidity in maturities less than 1 year (especially for high grade securities), which is what would be required to construct a 3-month or 6-month Bank-CDX. An alternative is a series of 12-month CDX contracts, introduced at 3-month intervals, allowing interpolation of the 3-month and 6-month credit spreads from the stubs of the "off the run" 12-month CDX contracts.

If the liquidity of the market is not sufficient, there is potential scope for manipulation.

Marking to market, netting and novation

Secondary market trading and ease with which positions can be marked to market and/or netted and novated would be crucial for the new Bank-CDX market to take-off. This suggests that operating on an upfront with fixed running quoting convention would be preferred by market participants. Indeed, this has become the standard in the single-name CDS and the CDX markets for technical reasons (pertaining to the ease of netting and marking to market of positions) which would also apply here. Unfortunately, while trading on an upfront plus running would be desirable from a market design perspective, it would introduce another (somewhat model dependent) calculation to transform the upfront to the proper credit spread required as an add-on to the risk-free benchmark.

Complexity

The complexity attached with the synthetic LIBOR replacement, which would require sourcing information from two separate markets, one of which would be a new synthetic basket CDS market, seems unattractive in the current post-crisis context where the trend is rather towards simplification of financial contracts and away from complex synthetic derivatives.

Uncertainty in launching new market

The mere fact that the success of the new synthetic LIBOR substitute would be conditional on the successful launch of a new derivative market (the bank-CDX) makes it a difficult choice, operationally.

Difficulty to switch existing contracts

It is not clear how existing contracts that reference LIBOR could be transitioned into referencing a new synthetic LIBOR benchmark. The legal basis for such a transition would need to be investigated.

G.2.5. Conclusion

We have discussed the feasibility of a new CDS-based synthetic LIBOR substitute. While it is possible to create a relatively simple synthetic alternative to LIBOR that would have similar credit-risk characteristics, its success would depend crucially on the successful launch of a new synthetic CDS contract reflecting prime bank credit risk. Absent some indication of likely depth and volume for this hypothetical new CDS index market, a CDS-based synthetic substitute for LIBOR appears unlikely to be a consensus choice to replace LIBOR.

G.3. Futures Implied OIS Rates

Overnight Index Swap (OIS) fixings can be derived by using fed fund futures³¹, which are monthly contracts based on the arithmetic average of the daily effective fed funds rate. The key drivers for the variations in the fed effective rate include change in, and in some cases anticipation of a change in, the target fed funds rate as result of policy decision at the Federal Open Market Committee (FOMC) meetings, and periodic spikes in inter-bank lending activity as a result of any temporary drain or oversupply of liquidity. Although we lack granularity to back out daily fluctuation of the effective fed fund rate from a futures contract that is based on monthly averaging, it is possible to derive a reasonable estimate for the rate levels of medium to long term OIS contracts.

In this appendix, we illustrate a simple procedure that calibrates a set of implied fed fund futures rates, by solving a Quadratic Program (QP) over the input space of expected change in target fed fund rates on scheduled FOMC meeting dates. Results indicate that, even without sophisticated modeling of daily liquidity events, the model is able to calibrate a 3-month term OIS to within 10 bps and is robust over a period that spans multiple rate cycles.

G.3.1. OIS Fixing Model

The proposed OIS fixing calibration method relies on a set of assumptions deemed appropriate for the purpose.

- Target fed fund rate
 - On the day of the settlement, and before the first scheduled FOMC meeting, the model uses the target fed fund rate over this period. The model uses the realized effective fed fund rates over the period from the beginning of the month, to the settlement date.
- Convergence of effective fed fund rate to target rate
 - The model assumes that after each FOMC meeting, the effective fed fund rate immediately converges to the target rate. This assumption is strong, as there could be special market events that can lead to foreseeable deviation of the effective rate away from target. Figure 5 shows the difference between the two rates, over the period between 2013-02-01 and 2013-05-31. We see that, during this period when the FOMC is in a rate hike mode, the effective rate seems to increase days before the announcement, in anticipation of the expected hikes to come. Figure 6 shows the distribution of the difference between the two rates over the sample period. While careful modeling of the daily effective rate is crucial to ensure arbitrage free pricing, for reference rate fixing purposes, we could justify ignoring the impact of the effective-target rate basis.

The calibration process requires defining a set of implied fed fund futures rates, \hat{F}_k , for $k=1,2,\dots,n$, where $k=1$ indicates the month of the front contract, $k=2$ the month of the

³¹ See link for fed fund futures contract specifications: http://www.cmegroup.com/trading/interest-rates/stir/30-day-federal-fund_contract_specifications.html

second contract, etc., and finally, $k=n$ is the month of the n -th contract and the month in which the OIS terminates.

Let $d_{k,1}, d_{k,2}, \dots, d_{k,f}, \dots, d_{k,e}$, be dates in month k , where $d_{k,f}$ is the FOMC announcement date scheduled for that month, and $d_{k,e}$ is the last day of the month. For the front month implied future we have,

$$\hat{F}_1 = \frac{1}{d_{2,1} - d_{1,1}} \left[R_{d_s}^{(b)}(d_{2,1} - d_s) + \sum_{i=1}^{d_s} R_{d_{1,t}}^{(e)} + \Delta_1(d_{2,1} - d_{1,f}) \right],$$

where d_s is the settlement date of the OIS contract, $R_{d_{1,t}}^{(e)}$ is the realized effective fed fund rate for day i of the front month, $R_{d_{1,t}}^{(b)}$ is the target fed fund rate for day i , and Δ_1 is the expected change in the target fed fund rate for the scheduled FOMC meeting that falls in the front month. For back months up to and include the last month, n , where the OIS contract terminate, we have,

$$\hat{F}_k = R_{d_s}^{(b)} + \sum_{i=1}^{k-1} \Delta_i + \Delta_k \frac{d_{k+1,1} - d_{k,f}}{d_{k+1,1} - d_{k,1}}, \quad k = 2, \dots, n,$$

where Δ_i is the expected FOMC rate change for month i . If there is no scheduled meeting for that month, we set $\Delta_i = 0$.

In the optimization step, we calibrate the implied futures prices to market by solving the following constrained QP,

$$\min_{\Delta_1, \dots, \Delta_n} \|F - \hat{F}\|^2 + \lambda \sum_{i=2}^n \left(\frac{\Delta_k / \delta_k - \Delta_{k-1} / \delta_{k-1}}{(\delta_k - \delta_{k-1}) / 2} \right)^2 \quad (1)$$

s. t. $-1.0 \leq \Delta_k \leq 1.0, \quad k = 1, \dots, n,$

where δ_i is the number of days between the i -th and $(i-1)$ -th FOMC meetings. The second term in (1) is a discrete penalty function that penalizes excessive curvature.

Figure 7 shows an example that illustrates the various components of the calibration process, together with the intermediate calibration result, for a 3-month OIS term contract, with settlement date on 2013-02-15 and termination date on 2013-05-15. Table 22 shows the calibrated implied target rate change on scheduled FOMC meeting dates. At the end of the calibration process, we obtain the expected target fed fund rates, from which, with an application of geometric compounding over the period between the settlement and the terminate dates, we obtain the implied OIS fixings.

G.3.2. Result

In order to assess the robustness of the proposed procedure, we estimate the implied OIS fixings and compare those to the actual OIS fixings based on trade data, for the sample period between 2002-01-02 and 2013-05-29. This period covers two complete rate cycles, together with a wide range of target rates that peaked at 5.41% in 2006 and troughed at 0.04% in 2011. For each day in the sample period, the data set contains closing prices for

the front six serial fed fund futures contracts, together with the daily effective fed fund rate and the daily fixing of the 3-month term OIS rate based on actual trades. External data include target fed fund rate change decision of the FOMC meetings, and FOMC historical and future meeting schedules³².

For each business day in the sample period, we solve the QP, which calibrates the implied fed fund rate to the market, by minimizing (1), using the FOMC rate decision variables, Δ_k , for $k=1, \dots, n$, as inputs. At the end of the calibration process, we obtain a set of implied daily effective fed funds rates, from which we can derive the implied 3-month OIS fixing rates by compounding over the settlement and termination dates of the 3 month terms.

In Figure 8, the top panel shows the goodness of fit, as measured by the difference between the implied 3-month OIS versus the actual market traded rate. We see that the implied OIS follows closely the actual market. The majority of deviation occurs during the period where there had been extraordinary measures taken by the Federal Reserve during and right after the financial crisis of 2008. Figure 9 shows that the discrepancy between the implied and actual OIS fixing stays mostly within 10bps over the two rate cycles over a period that spans more than ten years. If we consider the period between 2007-06-01 and 2009-01-01, during which the Federal Reserve added liquidity aggressively to counteract the fallout from the finance crisis, as an outlier, then the goodness of fit increases to within 5bps, as shown in Figure 9.

³² Meeting calendars, statements, and minutes (2008-2014), published by the Board of Governors of the Federal Reserve System, available here <http://www.federalreserve.gov/monetarypolicy/fomccalendars.htm>.

G.3.3. Figures

Figure 5: Effective versus target fed fund rate for the period between 2013-02-01 and 2013-05-31

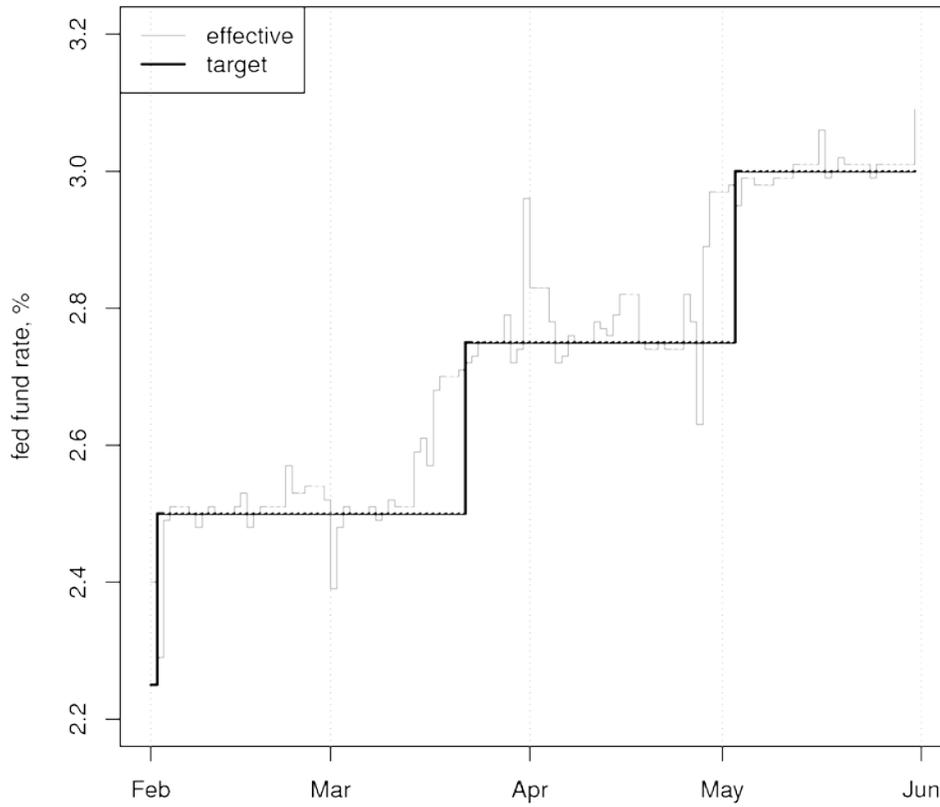


Figure 6: Histogram of the difference between effective and target fed fund rate for the period between 2013-02-01 and 2013-05-31.

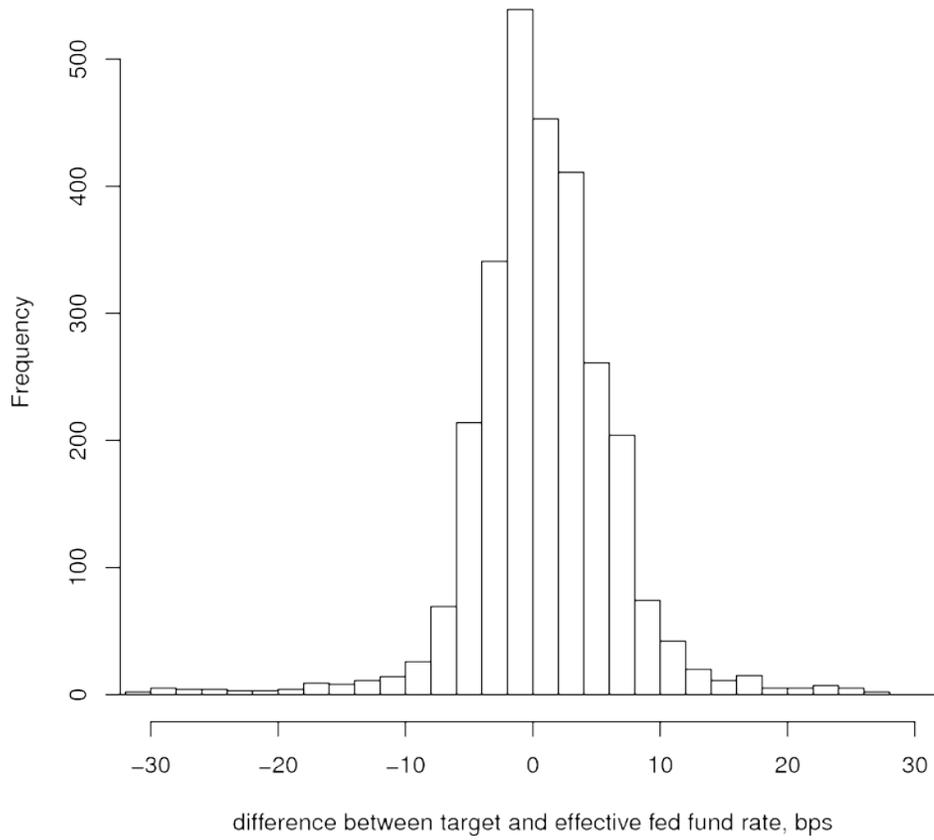


Figure 7: An example that illustrates the various components of the calibration process, together with the result, for a 3-month OIS term contract, with settlement date on 2005-02-15 and termination date on 2005-05-15, $\lambda = 0.0$. The labels FF1 to FF4 indicate the span of the front, second, third and fourth fed fund futures contract. The label 3M OIS indicates the span of the 3-month OIS term contract. Top panel: solid black line is the realized effective fed fund rate between 2005-02-01 and 2005-02-15; dash-line is the expected target fed fund rate; gray solid line is the historical effective fed fund rate. Bottom panel: solid black line is the actual market fed fund rate based on the closing price on 2005-02-11; dash-line is the implied rate based on the calibration procedure outlined in this section.

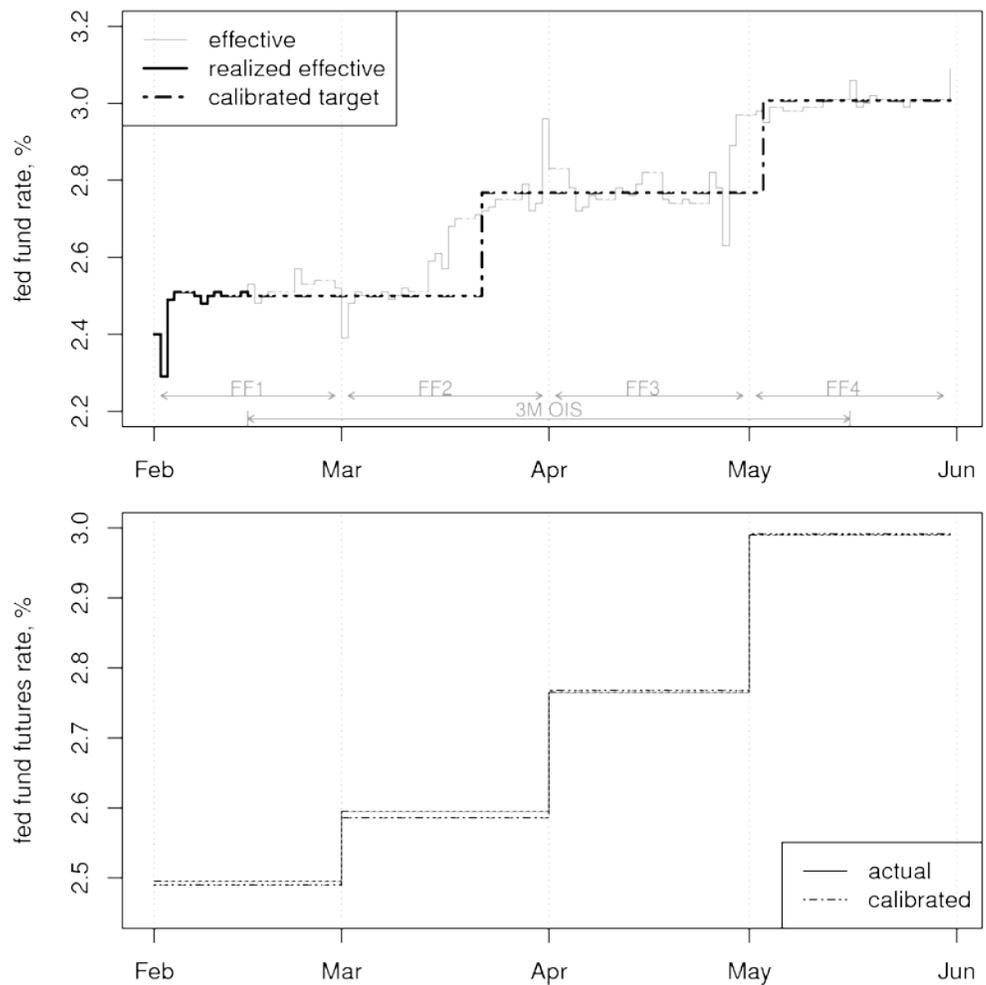


Figure 8: Calibration result, for period between 2002-01-02 and 2013-05-29, $\lambda = 0.0$. Top panel: difference between the actual and the implied 3-month OIS fixings, in basis points. Bottom panel: time series of the effective fed fund rate over the sample period.

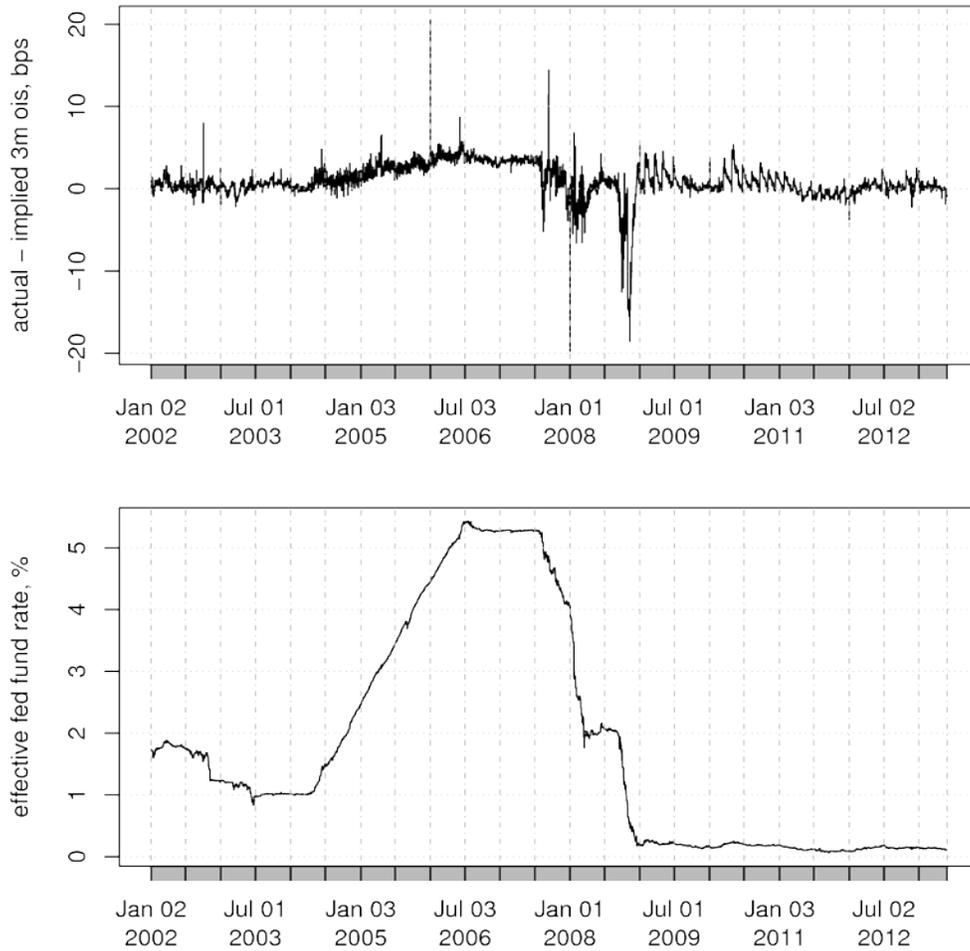


Figure 9: Histogram for the difference between the actual and the implied 3-month OIS fixings, in basis points, for the period between 2002-01-02 and 2013-05-29, $\lambda = 0.0$.

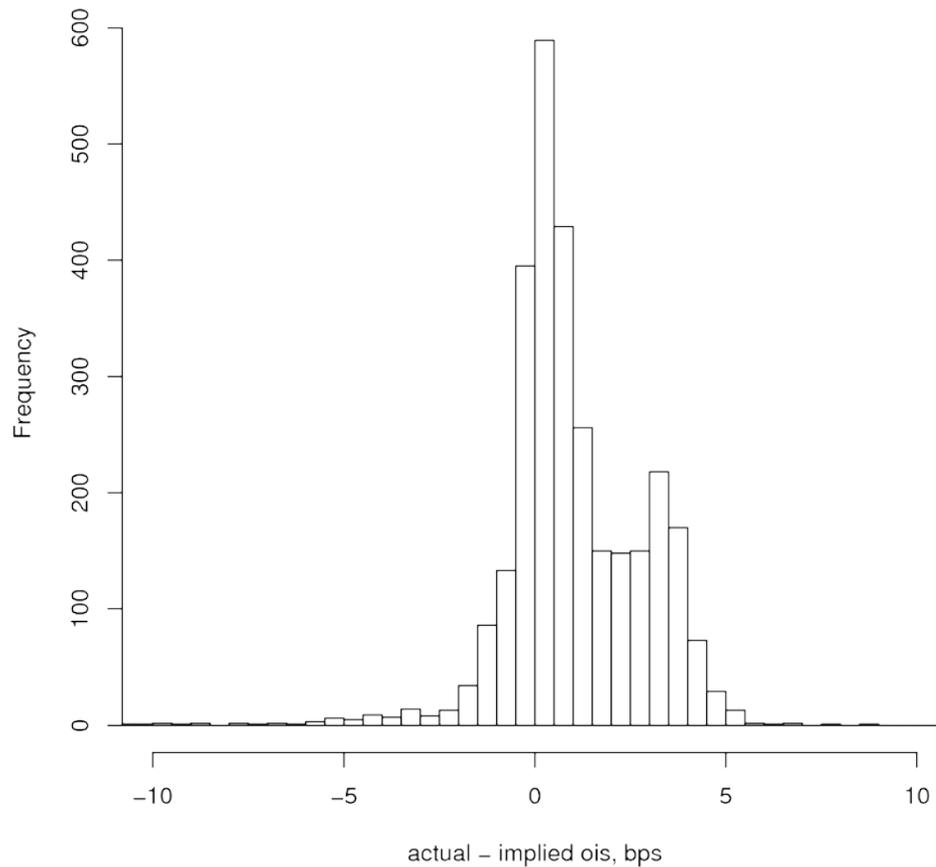
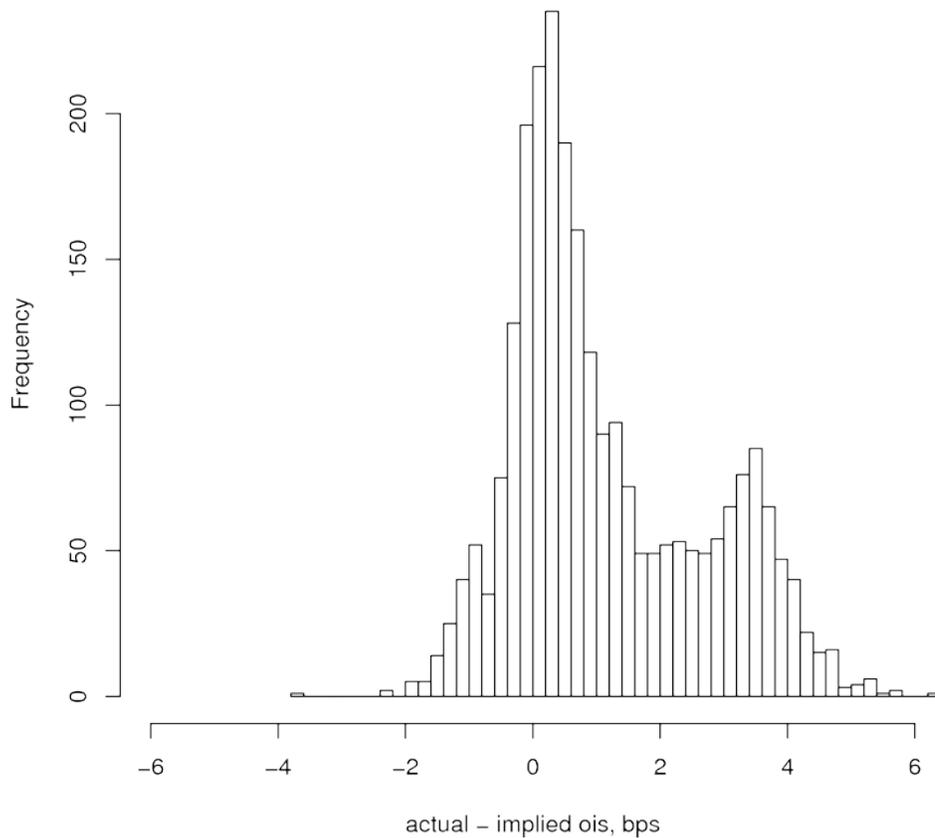


Chart 34 Histogram for the difference between the actual and the implied 3-month OIS fixings, in basis points, for the period between 2002-01-02 and 2013-05-29, $\lambda = 0.0$, excluding the period between Jun 2007 and Jan 2009.



G.3.4. Tables

Table 22: Calibrated fed fund target change that minimizes the objective function in (1), for the period between 2013-02-01 and 2013-05-31, $\lambda = 0.0$. The implied OIS fixing is 2.71%, compared to actual OIS fixing of 2.68% on 2013-05-15.

| | 2003-03-22 | 2005-05-03 | 2005-05-03 |
|---------------------------------|------------|------------|------------|
| Δ, bps | 26.77 | 23.96 | 17.78 |

G.4. Option-Implied Reference Rates

G.4.1. Introduction

This appendix discusses the feasibility of using put-call parity arbitrage relationships to infer reference rates from the prices of exchange-traded options. This approach was suggested to the MPG as a possible direction by market participants who participate in exchange-traded derivatives markets. After some evaluation, the MPG chose not to recommend this approach, for reasons to be explained below.

G.4.2. Put-Call Parity Implied Reference Rates

For a given underlying asset with actively traded European options, and for a given strike price K and option exercise date T , let $P(K,T)$ be the market price of the corresponding put option, let $C(K,T)$ be the price of the call option, let X be the price of the underlying asset, and let $B(T)$ be the price of a risk-free discount note with maturity T . In the absence of arbitrage, and ignoring transactions costs and default, by payoff equivalence we have

$$C(K,T) - P(K,T) + K B(T) = X.$$

One can solve for the implied bond price $B(T)$, given the other prices. One would take the mid-point of the bid and ask prices for the options and the underlying asset. Further, one can average the implied bond prices associated with various different strike prices, to reduce sampling noise and to improve robustness to manipulation. One can further average across different underlying assets and different option markets, provided the prices are executable quotes (or transactions prices) in the same currency as the strike price, and provided that the options are for the same exercise date T . One may also use options on futures.

One can then convert the implied bond price $B(T)$ to a money-market interest rate, as a candidate reference rate for maturity T .

One could in principle also infer reference rates from the prices of box spreads. Applying the same formula above at a different strike price K' , one can eliminate X and obtain

$$B(T) = [C(K',T) - C(K,T) + P(K,T) - P(K',T)] / (K - K').$$

The original put-call parity relationship is effectively a special case with $K'=0$, because $C(0,T) = X$ and $P(0,T) = 0$.

G.4.3. The Implied Borrower's Credit Quality

The box-spread pricing formula above shows that a bond can be constructed from a package of four option positions. The implied borrower is the agent that guarantees the performance of the four option contracts. For the case of options traded on a particular exchange, the implied borrower is therefore the clearinghouse of this exchange. The clearinghouse performs on based on the credit-quality of option writers, as well as initial margins, the default guarantee fund contributions of clearing members, and the capital of the clearinghouse. For effectively managed and regulated clearinghouses, this significant "waterfall" of resources implies that the implied synthetic bond has very high credit quality, and thus that the implied reference rate would be close to the risk-free rate.

G.4.4. Key Advantages and Disadvantages

The reference rates implied by put-call parity are reasonably accurate, provided that the underlying options are European (no early exercise) and are traded in a reasonably efficient market, and provided that care is taken when using the data (for sampling synchronicity, fees, and bid-ask effects). For example, when care is taken, put-call parity holds reasonably well for European options on major stock indices.³³ One market participant reported to us that reasonable accuracy has been obtained with Eurodollar futures options. (Of course, the Eurodollar futures option may be affected by reference rate reform.)

A major concern with applying this approach to obtain a global benchmark is that exchange-traded options have fixed periodic calendar-based exercise dates, typically once a quarter. In order to obtain accurate constant-maturity reference rates at tenors such as one month, three months, and six months, one would need corresponding (or nearly corresponding) exercise dates. Interpolation of constant-maturity risk-free rates from calendar quarter implied rates is unlikely to be accurate. A special series of option exercise dates could be introduced for the purpose of inferring reference rates, but these options would be thinly traded. The implied reference rates would be noisy and not robust to manipulation.

There is also a potential concern that if important global reference rates were to be based on the prices of packages of options, then these option packages might eventually become, in effect, actively traded synthetic bonds that are backed by the resources of exchange clearing houses. This might have unintended consequences, given that the primary role of the exchange clearing house is not that of a credit guarantor. We have not, however, considered this potential concern in depth, given the severe impediment already posed by calendar-based as opposed to constant-maturity exercise dates.

Because the implied reference rates are implicitly of very high credit quality, they are not a close substitute for Libor, and thus do not alleviate any transition disruption concerns.

G.4.5. Conclusion

Barring further market developments, we do not recommend that option-implied reference rates be considered as feasible and viable reference rates.

³³ See Avraham Kamara and Thomas Miller Jr. "Daily and Intraday Tests of European Put-Call Parity," *Journal of Financial and Quantitative Analysis*, Volume 30 (1995), and Lucy Ackert and Lisong Tian, "Efficiency in Index Options Markets and Trading in Stock Baskets," *Journal of Banking and Finance*, Volume 25 (2001), and Paul Draper and Joseph Fung "A Study of Arbitrage Efficiency Between the FTSE-100 Index Futures and Options Contracts," *Journal of Futures Markets*, Volume 22 (2001).

MTF/SEF-BASED FIXING APPROACH OVERVIEW

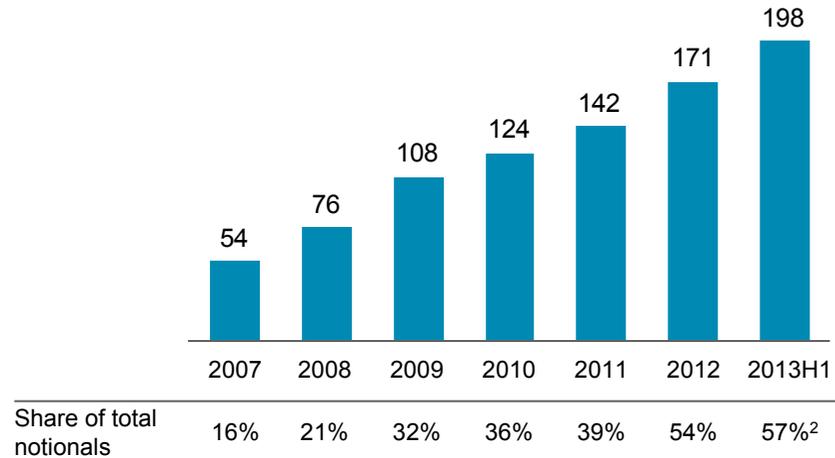
22nd OCTOBER 2013

Prospects for MTF / SEF based fixings for OIS rates

- Interest rate swaps are actively traded on MTFs / SEFs with CLOBs for Euro, USD and GBP
 - Euribor swaps launched on several MTFs in 2011/12
 - USD and GBP launched in 2013
- ISDA has recently announced they are planning to use an MTF-based methodology for fixing ISDAFIX rates for Euribor swaps in Q1 2014. USD and GBP swaps are expected to follow later in 2014.
- OIS trading is not currently offered on MTF platforms with CLOBs. However, OIS in Euro, GBP and USD are liquid out to 2 years with a significant number of market makers prepared to make two way prices with low bid-offer spreads.
- We expect to see MTF/SEF trading of OIS in 2014
 - Two MTF platforms operating CLOB's for IRS have indicated they plan to extend their product offering to Eonia swaps with 3 to 24 month maturities
 - Moreover, SEF rules under Dodd Frank will mandate trading of OIS on these, or similar, platforms for US persons.
- Provided these platforms attract a sufficient number of market makers prepared to stream live two way live prices, they should provide a viable source for OIS term reference rates.

Trading of vanilla IRS is changing, with increased clearing and usage of MTFs/SEFs, enabling an MTF/SEF-based approach to rate fixing

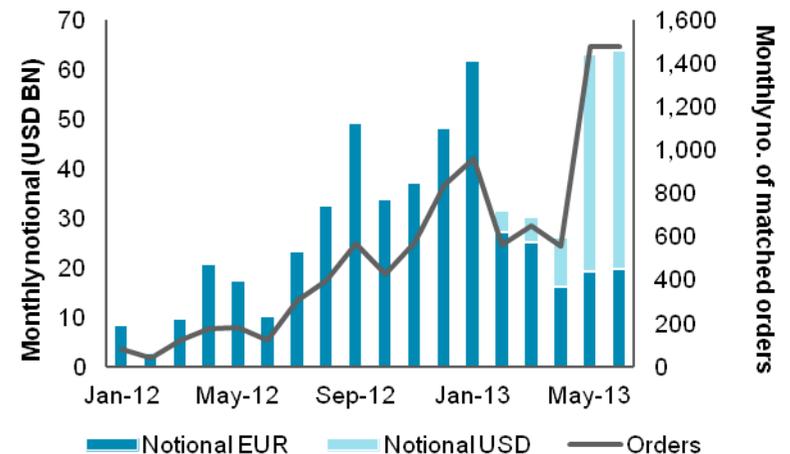
Cleared interest rate derivative notional outstanding¹
2007–2013 H1, USD TN



- Volume of cleared derivatives has increased rapidly and is set to continue due to new regulations (MiFID/MiFIR and Dodd Frank)
- Clearing derivatives requires a discount rate that should be free of credit risk and thus there is an increasing need for non-credit risk alternatives to LIBOR

MTF trading volumes

Example single MTF January 2012 - June 2013



- Volume of IRS traded on MTF/ SEFs remains relatively small but has developed positively since inception, although with lower matched trades in times of higher volatility
- MiFID/MiFIR and Dodd-Frank will require more IRS to be traded on MTF/SEF in the future
- MTFs / SEFs provide transparent and executable prices that could be used as input to reference rate composition

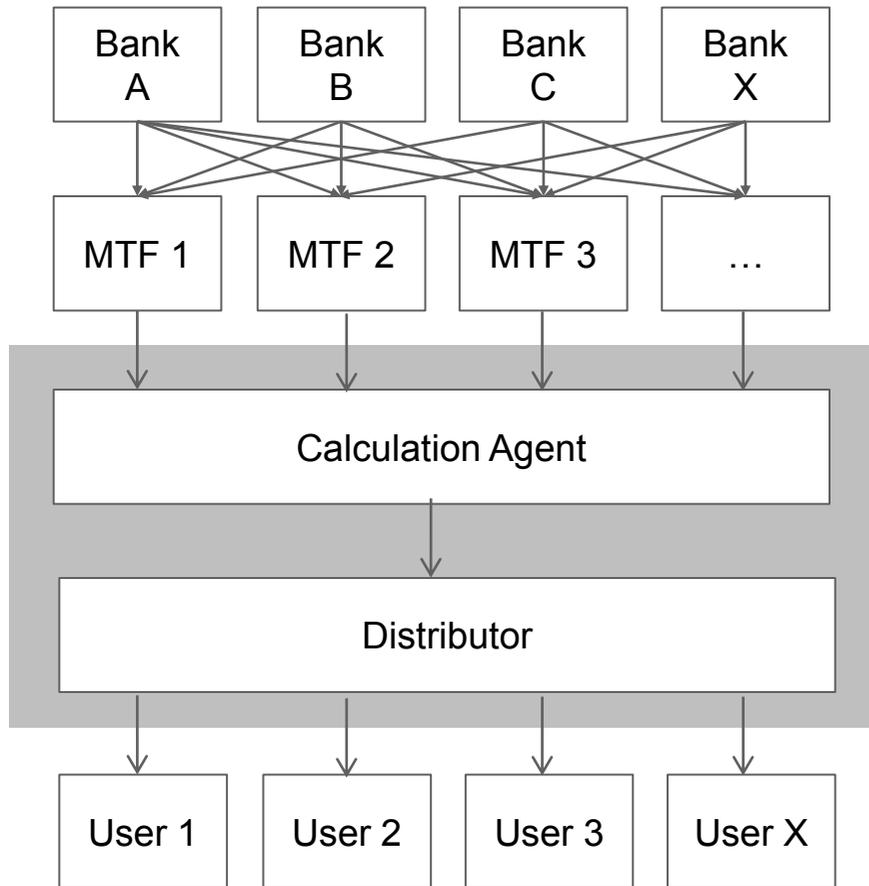
Source: ISDA OTC Derivative market analysis year end 2012, BIS, LCH & CME volume data, DTCC SDR, MTF commercial documentation (confidential)

Adjusted for double counting of cleared notionals

2013 total interest rate notional figure taken from DTCC, whereas 2007-2012 taken from BIS. BIS tends to report lower numbers, so % cleared may be under stated in 2013

There are multiple benefits of an MTF or SEF-based fixing approach

MTF-based approach



Benefits of an MTF based approach

- Live, fully executable prices from Central Limit Order Books
- Increased transparency and auditability
- Leverages MTF/SEF infrastructure and controls
- Aligned with regulatory-driven requirements to transact more standardized products on SEFs
- Leverages existing bank streaming of prices to MTFs and associated controls
- Eliminates need for separate submission to benchmark Calculation Agent, and associated regulatory risks and operational burden

An MTF/SEF-based rate could be calculated by creating a synthetic order book from multiple MTFs/SEFs and calculating a mid-price based on volume-weighted bids and offers at specific market sizes

Confidential data- not for distribution

MTF 1 order book

Typical contract size = €60 MM

| | Bids | | | Asks | | | Mid | |
|-------------|------------|----------------------|-----------------|------------|----------------------|-----------------|------------|--------------|
| | Rate (ppt) | Size of orders (€MM) | Order size used | Rate (ppt) | Size of orders (€MM) | Order size used | Rate (ppt) | Spread (ppt) |
| 1 | 1.4395 | 8.4 | 8.4 | 1.4605 | 2.1 | 2.1 | 1.4500 | 0.0210 |
| 2 | 1.4378 | 33.6 | 33.6 | 1.4635 | 6.3 | 6.3 | | |
| 3 | 1.4375 | 131.5 | 18 | 1.4755 | 2.1 | 2.1 | | |
| 4 | 1.4270 | 2.1 | 0 | 1.4765 | 26.7 | 26.7 | | |
| 5 | 1.4200 | 4.7 | 0 | 1.4770 | 15.3 | 15.3 | | |
| 6 | 1.4190 | 3.7 | 0 | 1.4880 | 33.6 | 7.5 | | |
| VWAP | 1.4379 | | 60 | 1.4761 | | 60 | 1.4570 | 0.0382 |

MTF 2 order book

Typical contract size = €60 MM

| | Bids | | | Asks | | | Mid | |
|-------------|------------|----------------------|-----------------|------------|----------------------|-----------------|------------|--------------|
| | Rate (ppt) | Size of orders (€MM) | Order size used | Rate (ppt) | Size of orders (€MM) | Order size used | Rate (ppt) | Spread (ppt) |
| 1 | 1.4410 | 50 | 50 | 1.4500 | 50 | 50 | 1.4455 | 0.0090 |
| 2 | 1.4360 | 45 | 10 | 1.4520 | 45 | 10 | | |
| 3 | | 0 | 0 | | 0 | 0 | | |
| 4 | | 0 | 0 | | 0 | 0 | | |
| VWAP | 1.4402 | | 60 | 1.4503 | | 60 | 1.4453 | 0.0102 |

Rate included in VWAP calculation

Synthetic combined order book from MTF 1 and 2

Typical contract size = €60 MM

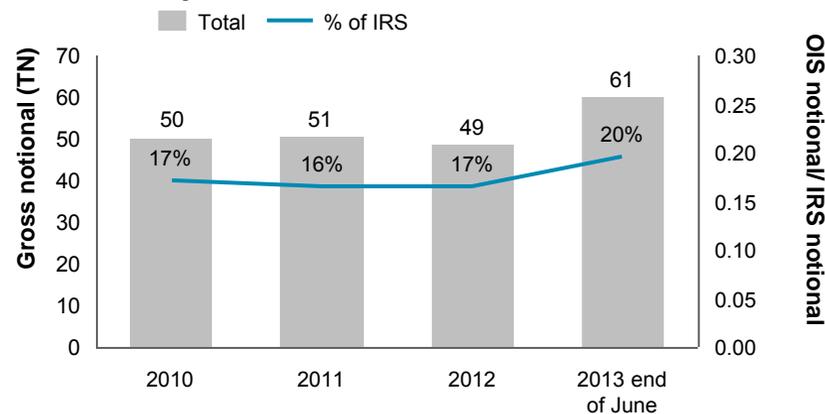
| | Bids | | | Asks | | | Mid | |
|-------------|------------|----------------------|-----------------|------------|----------------------|-----------------|------------|--------------|
| | Rate (ppt) | Size of orders (€MM) | Order size used | Rate (ppt) | Size of orders (€MM) | Order size used | Rate (ppt) | Spread (ppt) |
| 1 | 1.4410 | 50 | 50 | 1.4500 | 50 | 50 | 1.4455 | 0.0090 |
| 2 | 1.4395 | 8.4 | 8.4 | 1.4520 | 45 | 10 | | |
| 3 | 1.4378 | 33.6 | 1.6 | 1.4605 | 2.1 | 0 | | |
| 4 | 1.4375 | 131.5 | 0 | 1.4635 | 6.3 | 0 | | |
| 5 | 1.4360 | 45 | 0 | 1.4755 | 2.1 | 0 | | |
| 6 | 1.4270 | 2.1 | 0 | 1.4765 | 26.7 | 0 | | |
| 7 | 1.4200 | 4.7 | 0 | 1.4770 | 15.3 | 0 | | |
| 8 | 1.4190 | 3.6 | 0 | 1.4880 | 33.6 | 0 | | |
| VWAP | 1.4407 | | 60 | 1.4503 | | 60 | 1.4455 | 0.0096 |

Order taken from MTF1
 Order taken from MTF2

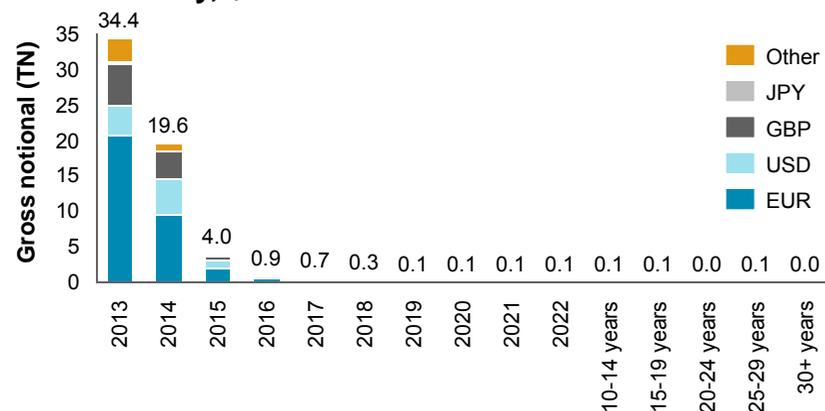


There is an active market in OIS out to 24 months in EUR, GBP and USD and regulations are expected to drive a material share of activity on to MTFs / SEFs, enabling a similar approach to fixing (1 of 2)

OIS outstanding gross notional, total and as a % of LIBOR swap notional, 2010-2013



OIS gross notional outstanding by year of maturity and currency, \$TN



Comments

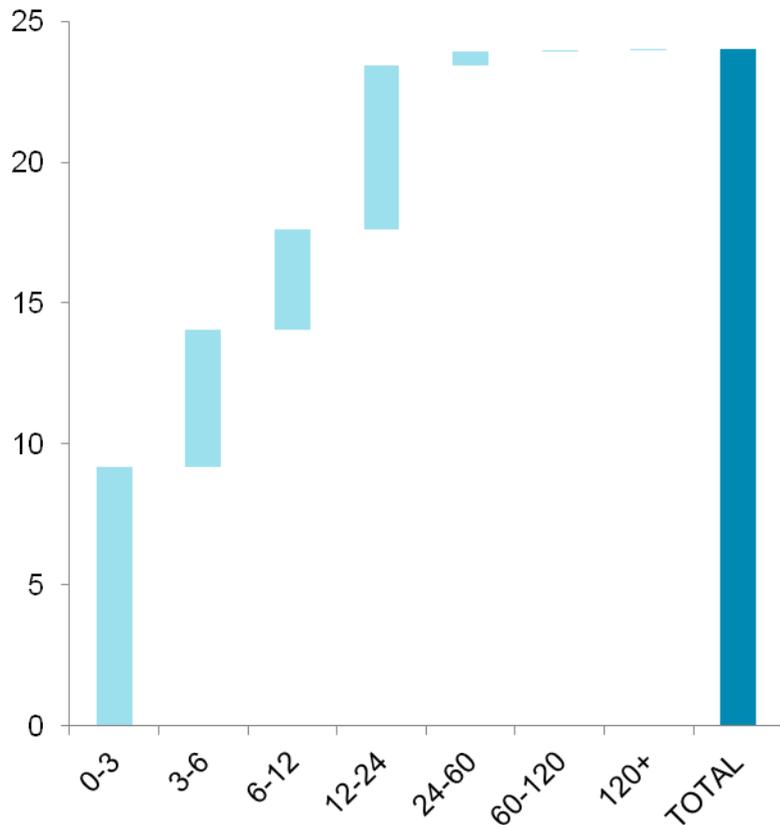
- Volumes of OIS outstanding and traded have been increasing over a number of years
 - Outstanding notionals and contracts have increased in absolute terms and as a share of the interest rate swap market
 - Liquidity is high at short tenors but still very low at long tenors
- Like IRS, OIS are suitable for trading on SEF/MTFs
 - Common and standardized form of derivative
 - Already embraced by other market infrastructure – LCH now clears 30+ year OIS
 - Subject to OTC derivative requirements in Dodd Frank and MiFID (although Dodd-Frank only requires OIS to be SEF-traded for maturities under two years, ESMA relates to underlying liquidity for MTF required trading)
- Currently no OIS term benchmarks exist, although rates are available across the interest rate curve
 - Overnight rates (SONIA and EONIA) act as the basis for OIS for GBP and EUR respectively
 - OIS GBP for example is based on all unsecured sterling overnight cash transactions brokered by WMBA member firms between midnight and 4.15pm with all counterparties in a minimum deal size of £25 MM
 - Data providers, e.g. Bloomberg, Reuters, provide rates to the market on a daily basis (e.g. OIS GBP captured at 18:15 GMT)

Source: DTCC, TriOptima

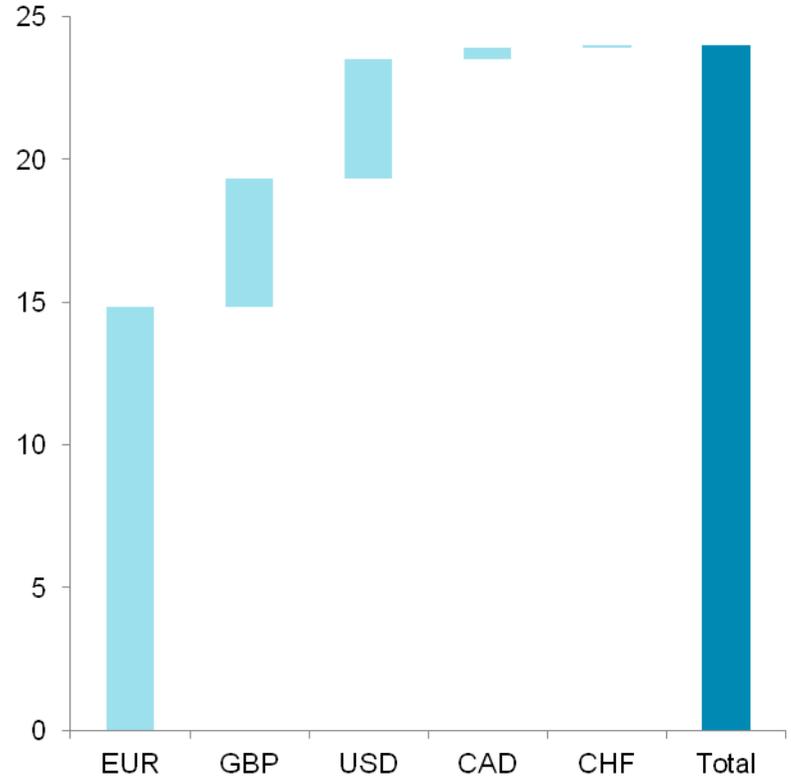
Notes- WMBA = wholesale markets brokers association – e.g. Tradition, Tullett Prebon, ICAP

There is an active market in OIS out to 24 months in EUR, GBP and USD and regulations are expected to drive a material share of activity on to MTFs / SEFs, enabling a similar approach to fixing (2 of 2)

Cleared OIS notional outstanding by tenor, USD TN



Cleared OIS notional outstanding by currency, USD TN



Source: CFTC September 20 weekly snapshot

Assessment criteria should be in place to determine when there is sufficient liquidity for an MTF-based reference rate

Potential criteria

1. Significant liquidity traded in that currency on MTF's
2. At least 2 MTF's offering that currency with relevant liquidity at a given contract size
3. At least 6 banks continually streaming live executable prices to a given MTF and a total of 10 banks across multiple MTFs for a given currency
4. CLOB in place, with fully executable prices and no last look mechanism
5. At least 3 months of shadow testing of MTF rates
6. Agreement from at least 2 MTF's to provide rates to the rate setting process

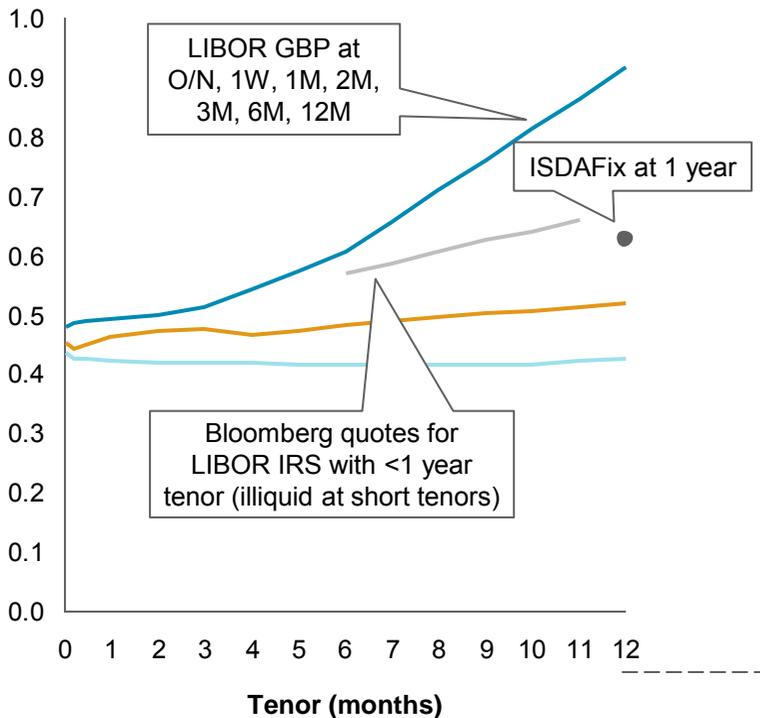
Fall-backs will need to be defined in case there is insufficient liquidity on MTFs / SEFs on certain days

Alternative price sources

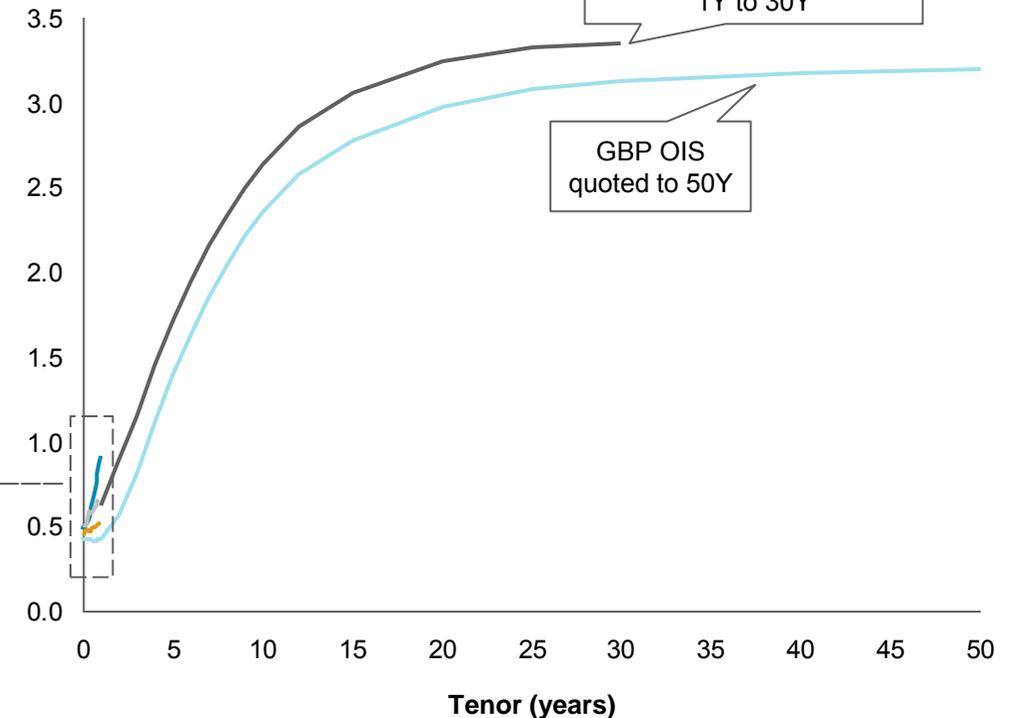
| | Price source | Description | Pros and cons as source for ISDAFIX | |
|---|--|--|---|---|
| <p>Degree of connection to executable trades</p> <p>High</p> <p>Low</p> | Executed trades from SDR | <ul style="list-style-type: none"> Weighted average of executed trade prices captured by Swap Data Repository | <ul style="list-style-type: none"> ✓ Actual executed transactions ✓ Low manipulation potential ✗ Requires averaging over period of time – point-in-time snapshot not possible ✗ Volumes may be low in times of volatility ✗ Requires interpolation for trades of non-standard tenors | Trade-based approach unlikely to be suitable as fallback due to different definition (average vs snapshot) |
| | MTF/SEF CLOB | <ul style="list-style-type: none"> Fully executable bids and offers streamed live on an electronic platform | <ul style="list-style-type: none"> ✓ Fully executable ✓ Low manipulation potential ✗ Volumes may be low in times of volatility | |
| | Futures CLOB (USD only) | <ul style="list-style-type: none"> Fully executable bids and offers from Futures CLOB Used to imply term OIS rates | <ul style="list-style-type: none"> ✓ Based on fully executable futures prices ✓ Low manipulation potential ✗ Futures-implied prices not always fully aligned with direct OIS prices | Potential fall-backs |
| | Daily Auction / central RFQ | <ul style="list-style-type: none"> Banks asked to provide executable bids and offers at a specified point in time for a given order size Orders are executed if they cross | <ul style="list-style-type: none"> ✓ Fully executable (or executed) ✗ Requires banks to commit to provide executable quotes on daily basis ✗ If few prices cross, then may not be fully IOSCO compliant – questionable whether prices would be considered anchored on real transactions | |
| | Indicative quotes from IDBs | <ul style="list-style-type: none"> Indicative prices gathered from IDBs, based on indicative prices streamed from dealers | <ul style="list-style-type: none"> ✓ Some rate will always be available ✗ Not executable ✗ Most difficult to audit/ verify | |
| | Rates submitted by dealers to Benchmark Calculation Agent | <ul style="list-style-type: none"> Dealers provide prices to Benchmark Administrator / Calculation Agent Similar to legacy LIBOR approach | <ul style="list-style-type: none"> ✓ Rates available (if dealers participate) ✗ Not executable ✗ Banks unlikely to be willing to contribute ✗ Not IOSCO compliant | |

OIS could be used for both the short and long end of the curve, providing a term structure without breaks or kinks

GBP Swap rates, 12 months
% interest rate



GBP Swap rates, 50 years
% interest rate



— GBP LIBOR — GBP OIS (SONIA) — GBP ISDAFix — GBP LIBOR IRS <1yr — GBP GC Repo

Additional swaps referencing 3 or 6-month OIS could be created in the future to meet user needs

Source: Bloomberg data, snapshot as at 24 June 2013

Appendix

**PROOF OF CONCEPT FOR MTF-
BASED FIXING OF ISDAFIX IRS
RATE**

Initial analysis provides strong support for moving to an MTF based submission process for ISDAFIX

- MTFs increasingly represent liquid and stable markets for interest rate swaps that provide a viable source for reference rates
 - iSwap, Trad-X and TPSwapdeal are the main platforms covering IRS; i-Swap and Trad-X offer EUR/USD/GBP rates, while TPSwapdeal offers EUR and is set to roll out to other currencies; a number of other players are registering to be a SEF, such as Bloomberg, GFI
 - Most banks on the ISDAFIX panel are represented on these MTFs, supporting like for like data feeds
 - Despite relatively low volumes, individual MTFs have large amounts of liquidity, with millions of orders per day
 - The implementation of Dodd-Frank and MiFID/ MiFIR are expected to lead to even greater liquidity on MTFs / SEFs over the next two years
- We have 3 MTF's signed up to support the proof of concept and initial analysis provides strong support for moving to an MTF based submission approach
 - MTF prices are very close to the ISDAFIX rate; average 0.02 bps difference to ISDAFIX for MTF 1 and 0.00bps for MTF 2 over an 18 month testing period
 - Streamed prices were available 99.3% of days/ tenors for EURIBOR on one MTF and 98.1% on another, with the gaps mostly covering low liquid tenors
- The process for the calculation of rates from MTF data must be designed carefully
 - To ensure rates are robust to changes in microstructure, MTF fixes should be calculated for VWAP at the specified market sizes
 - If MTFs do not have sufficient liquidity to execute the minimum order size, ISDAFIX should fall back on voice brokers / RFQ for rates
- Governance will need to be put in place to support the movement to an MTF based approach for ISDAFIX
 - Establishing SLA's and working contracts with MTFs
 - Updating the role and responsibilities of the calculation agent
 - Formalizing contingency plans where liquidity is not present on MTF's
- The target for transition to a MTF submission based approach is Q1 2014 for EUR, with USD and GBP following later in 2014 once there is sufficient liquidity and order book depth across MTF's

Prices are readily available on MTF's for EUR, with no days in 2013 without prices on at least one MTF

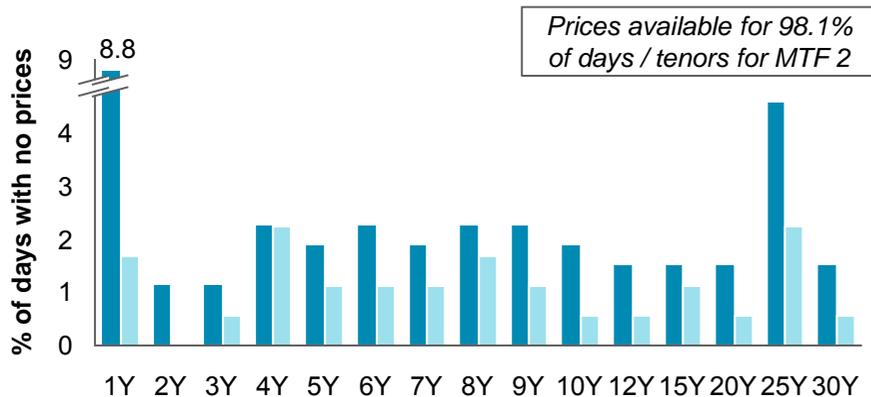
Confidential data- not for distribution

Percent of days without live bids and offers at 10AM
January 2012 – Jun 2013, EURIBOR

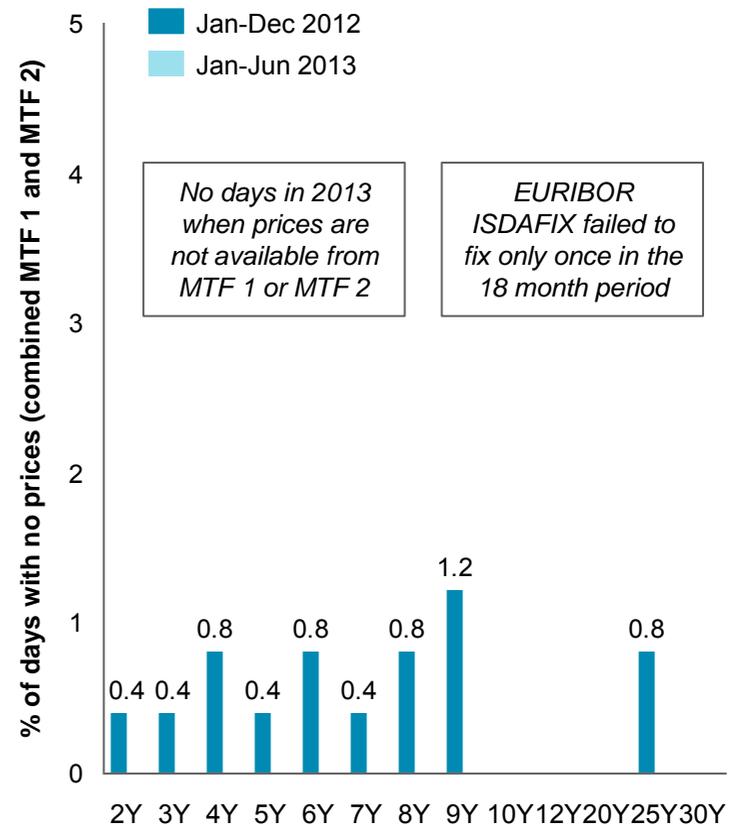
MTF 1



MTF 2



Percent of days without live bids and offers on either MTF at 10AM
January 2012 – June 2013, EURIBOR

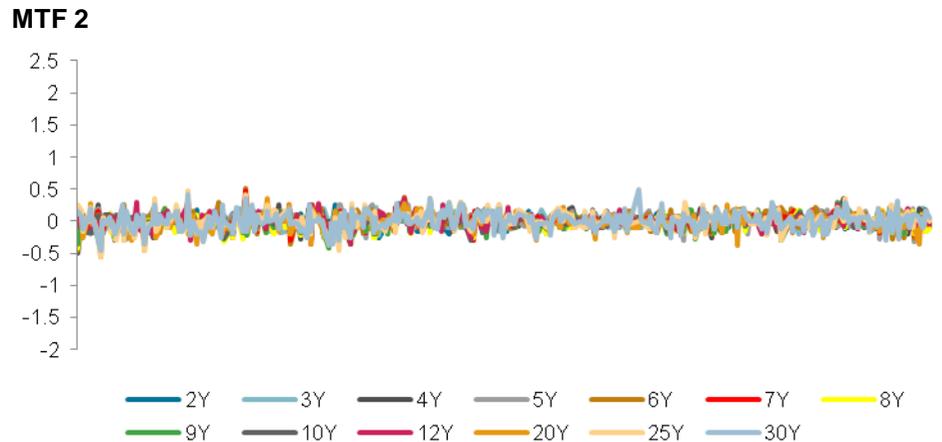
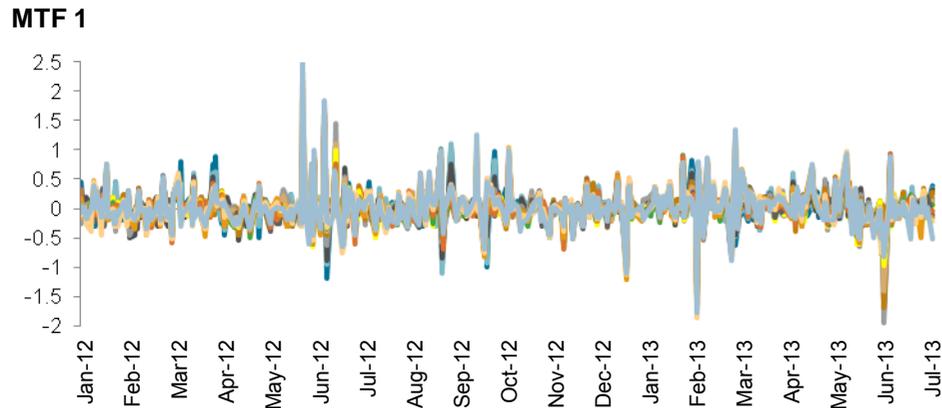


Source: Confidential data provided by two MTF's.

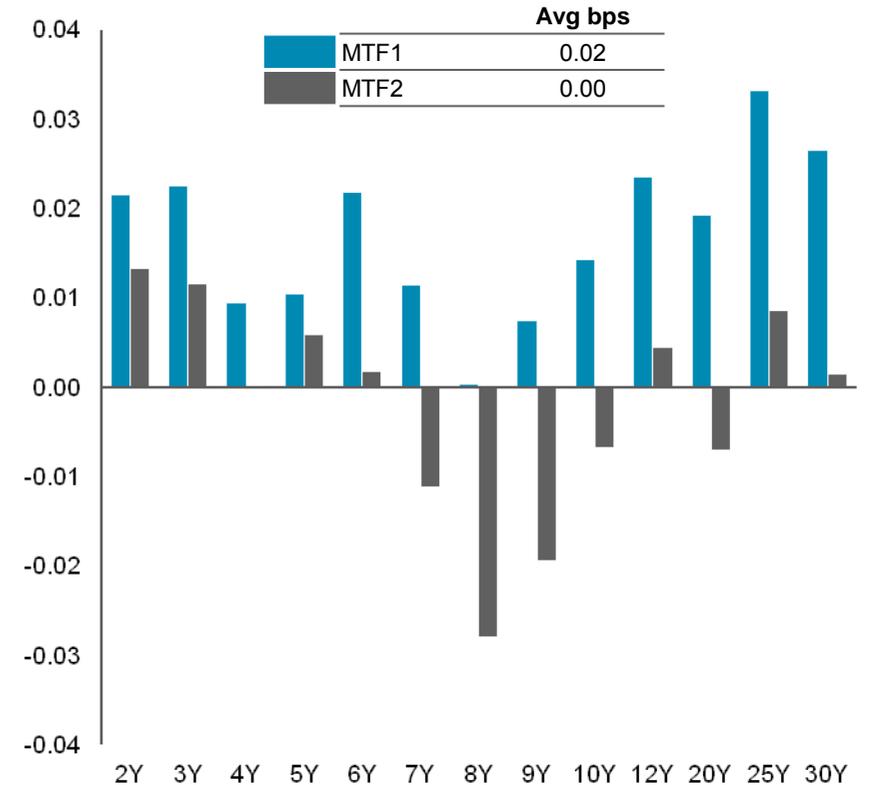
Historical analysis of MTF rates shows that the prices from MTFs are extremely close on average to the ISDAFIX rate

Confidential data- not for distribution

Daily value of difference to ISDAFIX for EURIBOR, bps
January 2012 – June 2013, negative when ISDAFIX higher



Average difference in rate, bps (best bid / offer of MTF)
January 2012 - June 2013, EURIBOR

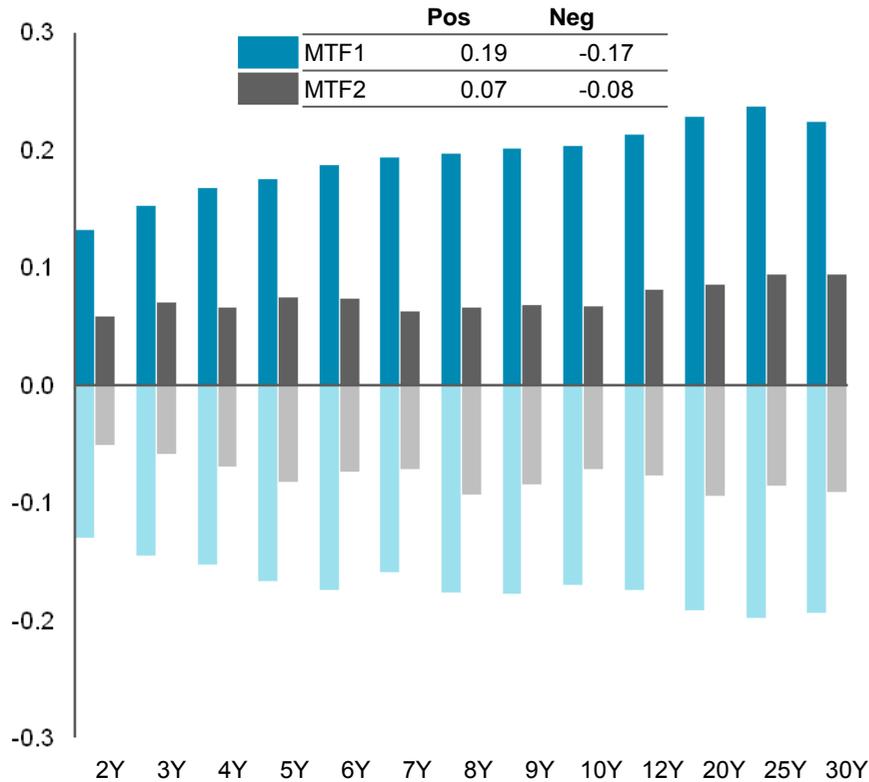


Source: Confidential data provided by two MTF's. ISDAFIX rates provided by Thomson Reuters

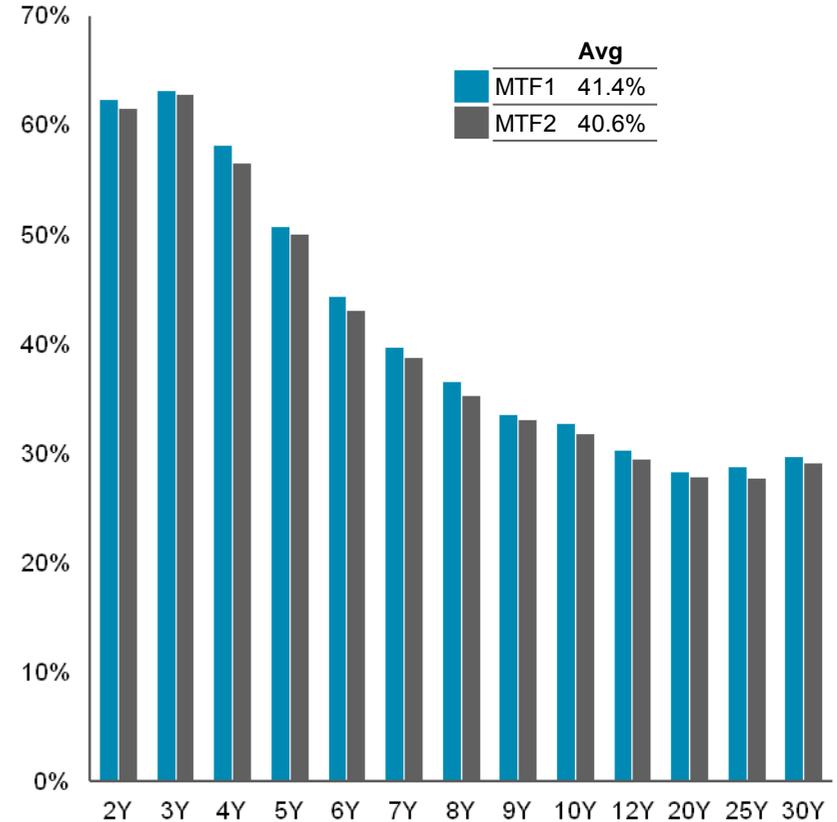
The average absolute difference in prices from MTF's to ISDAFIX is also small

Confidential data- not for distribution

Average +ve / -ve value of difference of rate, bps
January 2012 – June 2013, EURIBOR



Annualised volatility, %
January 2012 – June 2013



Source: Confidential data provided by two MTF's. ISDAFIX rates provided by Thomson Reuters
Note: Days/tenors with no available executable electronic orders are excluded

Rates from the synthetic order book show promise at smoothing out fluctuations in MTF rates

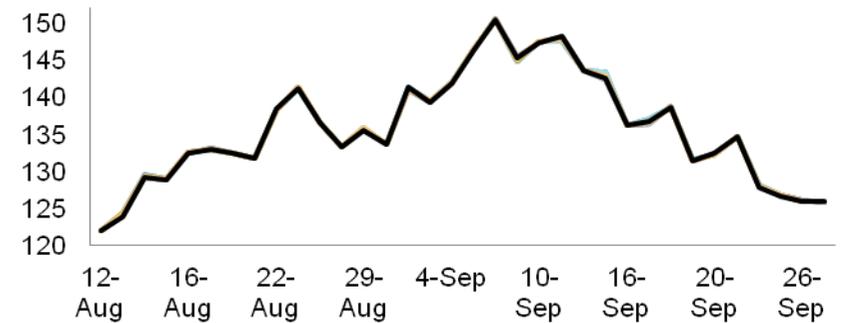
Confidential data- not for distribution

Summary statistics for differences between rates¹ EURIBOR all tenors, 12-Aug-2013 – 27-Sep-2013, bps

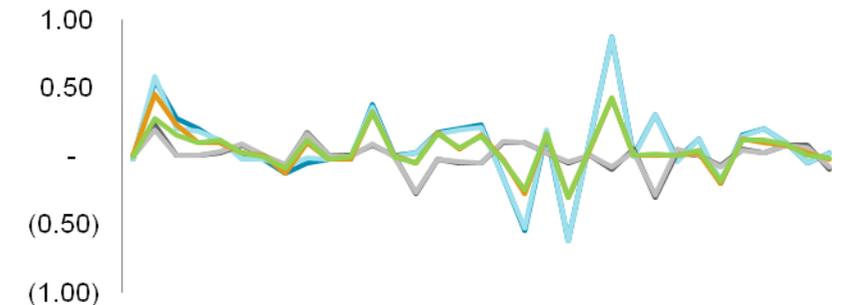
| | | $\Delta(\text{Synth- ISDAFIX})$ | $\Delta(\text{MTF1- ISDAFIX})$ | $\Delta(\text{MTF3- ISDAFIX})$ | $\Delta(\text{MTF1- MTF3})$ |
|---------------------|--|---------------------------------|--------------------------------|--------------------------------|-----------------------------|
| Best bid/ask | Avg Δ | 0.03 | 0.06 | -0.01 | 0.07 |
| | Avg abs value (Δ) | 0.10 | 0.17 | 0.08 | 0.20 |
| | Max or min Δ | 0.63 | 1.10 | -0.40 | 1.01 |
| VWAP | Avg Δ | 0.03 | 0.06 | -0.01 | 0.07 |
| | Avg abs value (Δ) | 0.10 | 0.17 | 0.08 | 0.20 |
| | Max or min Δ | 0.57 | 1.30 | -0.38 | 1.18 |

5Y Difference between ISDAFIX and different MTF rates EURIBOR 5Y Tenor, 12-Aug-2013 – 27-Sep-2013, bps

5Y Tenor – absolute rates



5Y Tenor – delta to ISDAFIX



— MTF 1 B/O — MTF 3 B/O — Synthetic B/O — ISDAFIX
— MTF 1 VWAP — MTF 3 VWAP — Synthetic VWAP

Source- Proprietary data from two MTF's

1. 26th Aug excluded due to UK bank Holiday. Days/tenors with no streamed prices also excluded – namely 8Y and 9Y in MTF1 on August 13th

The target is to switch to a MTF approach for EURIBOR at the start of 2014 with other currencies to follow once they meet a set criteria

Indicative timing to move to a MTF approach

| Currency | Potential date for switch to MTF approach | MTFs streaming and date started |
|------------------|--|---|
| EUR | <ul style="list-style-type: none"> Q1 2014 | <ul style="list-style-type: none"> iSwap- Sept 2010 Trad-X- Mar 2011 tpSWAPDEAL- June 2013 |
| USD | <ul style="list-style-type: none"> H2 2014 | <ul style="list-style-type: none"> iSwap- Feb 2013 Trad-X- Feb 2013 Dealerweb- Mar 2013 |
| GBP | <ul style="list-style-type: none"> H2 2014 | <ul style="list-style-type: none"> iSwap- Jun 2013 Trad-X- Jun 2013 |
| CHF / JPY | <ul style="list-style-type: none"> 2015 onwards | <ul style="list-style-type: none"> No MTF's currently |

Assessment criteria

- Assessment criteria should be in place in order to determine when currencies are ready to switch to an MTF-based process
- Potential criteria for assessment
 - Significant liquidity traded in that currency on MTF's
 - At least 2 MTF's offering that currency with relevant liquidity at a given contract size
 - At least 6 banks continually streaming live executable prices to a given MTF and a total of 10 banks across multiple MTFs for a given currency
 - CLOB in place, with fully executable prices and no last look mechanism
 - At least 3 months of shadow testing of MTF rates compared to ISDAFIX rates
 - MTF rates to be within at least an average of 0.05bps of the ISDAFIX rate
 - Agreement from at least 2 MTF's to provide rates to the ISDAFIX setting process

MPG Corporate Outreach - Interest Rate Benchmarks

1. Section A: Corporate Respondent classification

This questionnaire is intended for use by corporate (non-financial) end users of the Libor, Euribor and Tibor family of interest rate benchmarks. The closing date for responses is Friday 31 January 2014.

The Financial Stability Board (FSB) has been tasked by the G20 to promote consistency in standards of governance, transparency and reliability to which widely-used financial benchmarks should be held. To advance this work, the FSB has established a high-level Official Sector Steering Group (OSSG) of regulators and central banks. The OSSG has in turn established the "Market Participants Group on Reforming Interest Rate Benchmarks" (MPG). The terms of reference for the group fall into two main areas:

- a. Proposing options for robust reference interest rates that could serve as potential alternatives to the most widely-used, existing benchmark rates.
- b. Proposing strategies for any potential transition to new reference rates and for dealing with legacy contracts in the national or regional currency.

The MPG has been asked to provide its final report to the OSSG by March 2014. The report will cover interest rate benchmarks in five major currencies: USD, EUR, GBP, CHF and JPY.

The focus will be on LIBOR, EURIBOR and TIBOR rates - collectively referred to as "IBOR" in this report.

The purpose of this questionnaire is to ensure that the views and concerns of non-financial corporate end-users of the relevant interest rate benchmarks are being addressed.

We estimate that this questionnaire will take approximately one hour to be completed.

This questionnaire is just one of the inputs to the MPG's study. No inferences should be drawn from this document as to the likely outcomes of the MPG's final report. All data collected will be aggregated, with nothing attributable to any individual or company and will not be used for any other purpose. The Confederation of British Industry (CBI) and consulting firm Oliver Wyman are acting as administrators of this survey and will collate the findings and provide these to the MPG.

Respondent details and individual responses will be treated as confidential.

For more information about these efforts and the membership of the OSSG and MPG, please see [here](#).

The majority of questions are optional, except a small number in sections A & B which are compulsory (and are marked with a *). Please note that you cannot proceed to the next page of the online survey without answering the compulsory questions.

For your ease of reference a pdf version of this questionnaire can be downloaded by clicking [here](#).

However, please ensure that you submit your response through the online survey.

The questionnaire has the following structure:

SECTION A: Respondent classification

SECTION B: Market Footprint

SECTION C: Reference rate reform scenarios

SECTION D: Transition scenarios

SECTION E: Other Considerations

1. Name of Company/Organization

MPG Corporate Outreach - Interest Rate Benchmarks

2. Name of Respondent

3. Contact e-mail address

*4. Please name the association who sent you this survey

Association

Other (please specify)

*5. I am replying on behalf of a:

(note: for future questions, this organization will be referred to as your “company”)

- Parent / Holding company /Group
- Subsidiary of a parent or holding company
- Corporate treasury centre
- Industry Association
- Private Individual
- Other (please specify)

Other (please specify)

*6. What sector does your company operate in?

Sector

Not applicable/Other (please specify)

*7. What is your company's annual turnover?

- USD 50BN+
- USD 10BN-50BN
- USD 1BN-10BN
- USD 100MM-1BN
- USD 100MM
- USD 25MM or less
- Not Applicable

MPG Corporate Outreach - Interest Rate Benchmarks

***8. Which of these reference currencies does your company use for financial transactions?**

(please rank the currencies in order of materiality, where 1 is most material and 6 is least material.) (Please note that the currencies will shift to the order you input)

| | | | |
|----------------------|-------|--------------------------|----------------|
| <input type="text"/> | USD | <input type="checkbox"/> | Not applicable |
| <input type="text"/> | EUR | <input type="checkbox"/> | Not applicable |
| <input type="text"/> | GBP | <input type="checkbox"/> | Not applicable |
| <input type="text"/> | CHF | <input type="checkbox"/> | Not applicable |
| <input type="text"/> | JPY | <input type="checkbox"/> | Not applicable |
| <input type="text"/> | Other | <input type="checkbox"/> | Not applicable |

9. If selecting "other" on the above question, please specify which

Currency

Other (please specify)

MPG Corporate Outreach - Interest Rate Benchmarks

***10. Later sections of this questionnaire will present some scenarios for possible changes to IBOR reference rates. Potentially such changes could have tax and/or contractual implications for some respondents. To help us to identify those countries that are relevant for your own responses, please indicate here the main legal and/or fiscal jurisdictions where a change to IBOR reference rates may have a material impact for your company?**

(Please select only the countries in which you may have a significant exposure to changes in IBOR reference rates)

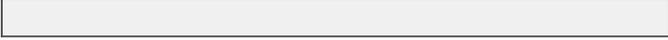
- Argentina
- Australia
- Austria
- Belgium
- Bermuda
- Brazil
- Canada
- Carribean Islands excluding Bermuda
- Chile
- China
- Colombia
- Croatia
- Cyprus
- Czech Republic
- Denmark
- Egypt
- Finland
- France
- Germany
- Greece
- Hong Kong
- Hungary
- India
- Indonesia
- Ireland
- Israel
- Ivory Coast

MPG Corporate Outreach - Interest Rate Benchmarks

- Italy
- Japan
- Luxembourg
- Malaysia
- Mexico
- Morocco
- Netherlands
- New Zealand
- Nigeria
- Norway
- Pakistan
- Peru
- Philippines
- Poland
- Portugal
- Russia
- Saudi Arabia
- Singapore
- Slovakia
- Slovenia
- South Africa
- South Korea
- Spain
- Sweden
- Switzerland
- Thailand
- Turkey
- UK Channel Islands/Isle of Man
- United Arab Emirates
- United Kingdom
- United States
- Venezuela
- Other

Other (please specify)

MPG Corporate Outreach - Interest Rate Benchmarks



2. Section B: Market Footprint

Libor, Euribor and Tibor (collectively referred to as 'IBOR') are widely used as benchmarks for both debt ('Cash') and derivative markets. The MPG is cataloguing the classes and types of financial instruments that currently reference these benchmarks and the tenors most commonly used. This information is intended to inform the MPG in its work to identify alternative reference rates and to design transition strategies.

- Libor is the predominant interbank interest rate benchmark for USD, GBP, CHF and JPY, although for JPY contracts, Tibor is also widely used. For Euro, Euribor is significantly more commonly used than Euro-Libor.
- The largest classes of contracts referencing IBOR are Over-the-Counter (OTC) and exchange traded derivatives, including Interest Rate Futures, Options and Swaps, FRAs and Cross-currency swaps.
- A large proportion of syndicated loans and Floating rate bonds and notes across the 5 currencies reference IBOR (as much as 90% in some jurisdictions). Bilateral corporate loans also commonly reference IBOR.
- A large volume of securitized products, including Retail and Commercial Mortgage Backed Securities (RMBS, CMBS), Asset Backed Securities (ABS) and Collateralised Debt Obligations (CDO) are linked to USD-Libor and GBP-Libor and Euribor. Volumes of securitised products referencing other IBOR rates are limited.
- In a number of jurisdiction (e.g., in the US and some European countries), a significant volume of Retail mortgages are linked to Libor/Euribor. Other retail financial contracts do not commonly reference IBOR.
- A limited volume of retail and corporate deposits are linked to IBOR.

The IBOR tenors most commonly used vary by currency and asset class:

- In USD, 3-month and 1-month are the most commonly referenced tenors across all product groups, with 6-month used across a subset of products and the 12-month tenor used only in a limited number of cases. Other USD-LIBOR tenors are rarely used.
- GBP contracts are most commonly linked to 3-month Libor, with some contracts referencing 1-month and 6-month Libor and other tenors rarely used.
- The use of Euribor tenors varies by jurisdiction and contract type. 1-month, 3-month and 6-month are used across a wide range of products. 12-month is used for a small subset of products, notably for retail mortgages in some EU countries.
- For JPY-Libor and CHF-Libor, the 3-month and 6-month tenors are used across a wide range of contract types. Other tenors are not commonly used.
- For Tibor, the 6-month and 3-month tenors are most commonly used, some loans are linked to 1-month Tibor and other tenors are not commonly used.

The MPG notes that non-financial corporates have a range of other important applications for IBOR reference rates, and that these applications may be affected by any change to reference interest rates.

MPG Corporate Outreach - Interest Rate Benchmarks

1. Does your company use IBOR reference rates or instruments referring to IBOR reference rates for any of the following?

(Please select all that apply)

- Late payment clauses in commercial contracts
- Standard interest rates for pricing long-term commercial contracts
- Discount rates for valuation purposes
- Pricing of intra-group loans
- Hedging of discount rates and/or inflation in respect of defined benefit pension liabilities or other post employment liabilities.
- Performance benchmark for money market funds and/or other asset managers
- Long term project finance contracts / joint ventures
- Trade Financing Solutions (e.g. factoring)
- Hedging the variable interest rate on a floating-rate debt obligation by "swapping" to a fixed rate using an interest rate derivative
- Swapping a debt obligation in one currency to another currency using a cross-currency swap that involves an IBOR

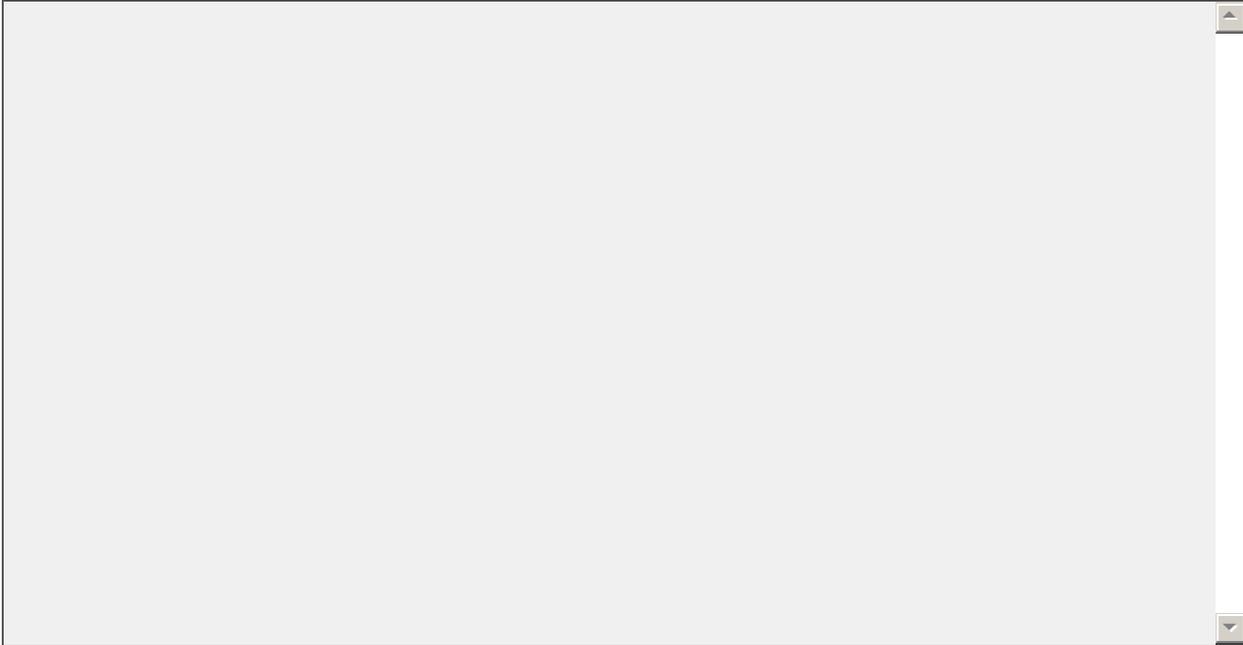
Please provide additional detail for the options you have selected, if possible

MPG Corporate Outreach - Interest Rate Benchmarks

***2. Does your company have any other significant uses of or exposures to IBOR (which have not been considered in the above analysis)?**

- No
- Yes
- I cannot answer this question at the present time

If yes, please provide as much detail as possible about the other significant exposures



3. Please indicate your agreement with the following statement:

"I am confident that my company can identify all its (significant) applications that reference IBOR rates."

- Strongly Agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly Disagree
- Not Applicable - no exposures to IBOR

4. What is the size of your company's main committed credit agreement?

- Not applicable
- < USD 10 Million
- USD 10 - 99 Million
- USD 100 - 999 Million
- USD 1 - 5 Billion
- > USD 5 Billion

MPG Corporate Outreach - Interest Rate Benchmarks

5. Please provide information regarding your company's main committed credit agreement - what is the period for which the agreed credit facility is available?

- 1 Month or less
- 3 Months
- 6 Months
- 12 Months (1 year)
- >1 year and ≤3 years
- 3 years and ≤5 years
- > 5 years
- Not applicable

6. How many banks participate in your company's main committed credit agreement?

- Not Applicable
- 1
- 2-5
- 6-10
- 11-15
- 16-25
- > 25

7. Do you require banks providing committed credit to your company to maintain a minimum credit rating and, if so, what is it?

- No minimum credit rating
- BBB/Baa2
- BBB+/Baa1
- A-/A3
- A/A2
- A+/A1 or higher

MPG Corporate Outreach - Interest Rate Benchmarks

8. Please provide information regarding the terms of your company's main committed credit agreement - Largest or functional currency:

- USD
- EUR
- GBP
- CHF
- JPY
- Multi-currency
- Other

Other (please specify)

9. Please provide information regarding the terms of your company's main committed credit agreement - What is the reference Rate (e.g. Euribor):

- USD LIBOR
- EURIBOR
- EUR LIBOR
- EONIA
- GBP LIBOR
- SONIA
- CHF LIBOR
- JPY LIBOR
- Other IBOR rate
- Base rate
- Treasury bill rate
- Bank prime rate
- Bank deposit rate
- Bank bill rate
- Swap rate
- Corporate Deposit (CD) rate
- Commercial Papers (CP) rate
- Fed Funds Effective Rate (FFER)
- Other

Other (please specify)

MPG Corporate Outreach - Interest Rate Benchmarks

10. Please provide information regarding the terms of your company's main committed credit agreement – What is the Tenor for the reference rate selected in the previous question (please choose the closest option or, if applicable, all that are likely to apply)."

- Daily/overnight
- 1 week
- 1 Month
- 3 Months
- 6 Months
- 12 Months (1 year)
- >1 year

MPG Corporate Outreach - Interest Rate Benchmarks

3. Section C: Reference rate reform scenarios

The OSSG has asked the MPG to propose reference rate menus that would adhere to the IOSCO (International Organization of Securities Commissions) Principles for Financial Benchmarks (See IOSCO Principles [here](#))

Key elements considered by MPG for IOSCO compliance include:

- Rates should be based on prices formed by competitive supply and demand and anchored in observable transactions (Principles 6, 7).
- Rates could be based on executable bids and offers (Principle 7).
- Expert judgment can be used, but in such cases a hierarchy of data inputs, for example from transactions or quotes, and the role of expert judgment must be clear and transparent (Principle 8).

In this questionnaire we present three potential IOSCO compliant reference rates:

1. Transaction-based IBOR ("IBOR+")
2. Overnight Index Swaps (OIS)
3. T-Bills (where available)

When proposing a reference rate, the MPG will consider the feasibility of fixing an IOSCO compliant rate and whether the rate is likely to be useful to market participants. As different reference rates may be more appropriate for different users, contracts and jurisdictions, the final report might propose more than one reference rate.

1. Transaction-based IBOR ("IBOR+") IBOR+, if chosen, could be an estimate of interbank borrowing rates that are based on transactions from a broader set of financial instruments that banks use to obtain unsecured financing, and not restricted to interbank loans.

- IBOR+, would be intended to represent rates comparable to existing IBOR rates, encompassing bank term credit and liquidity premiums.
- Due to its transaction based fixing, IBOR+ would be expected to be more volatile than IBOR. Some of this volatility may be mitigated by use of smoothing methods, such as reliance on moving averages of lagged transactions.
- Depending on the availability of data it may not be possible to fix IBOR+ rates at tenors of 6 months or longer.

2. Overnight Index Swaps (OIS) OIS are over-the-counter (OTC) derivative contracts in which one counterparty pays a negotiated fixed rate in exchange for the rate computed by compounding a reference overnight rate each night over the reference period (the reference overnight rate for USD is Federal Funds Effective rate - FFER, which is the interest rate at which depository institutions actively trade balances held at the US Federal Reserve and is published daily as an index by the US Federal Reserve).

- The OIS rates could, if chosen as benchmarks, be fixed as reference rates based on executable quotes on recognised Swap Execution Facilities (SEFs) or on executed transactions from swap data repositories.
- OIS are collateralised on a daily basis and do not incorporate a term credit premium.

The active markets in OIS could offer robust fixings for 1-, 3-, 6- and 12 month tenors. Back-up fixing methodologies could be set in case of insufficient market volumes.

3. Treasury bill (T-bill) rates (for USD, CHF, JPY) Treasury bill rates, if chosen as benchmark rates, would be fixed as the money market interest rates associated with secondary market transactions in T-bills. These rates are currently fixed and reported daily by treasury departments at tenors up to 1 year. T-bill rates are already commonly used for certain financial contracts, e.g., ARMs in the US. T-bill rates do not incorporate bank term credit premiums.

MPG Corporate Outreach - Interest Rate Benchmarks

1. Which of the following characteristics of reference rates are important to your company?

| | Low importance | Medium importance | High importance |
|---|-----------------------|-----------------------|-----------------------|
| Exclusively transaction based | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Transaction based but with role for judgment where markets are thin or volatile | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Transparent | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Administered by a public body | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Supervised/regulated by a public body | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Large number of contributors | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Only high credit quality contributors | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Published in real-time (i.e. daily, not a running average) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Always available even in turbulent markets | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Availability of 6-month tenor | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Availability of 12-month tenor | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Represents an unsecured interbank rate | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Continuity of references that are specified in existing commercial contracts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other (please specify) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

If choosing "Other" please specify and/or please provide any additional information relating to your ratings of the characteristics of reference rates

MPG Corporate Outreach - Interest Rate Benchmarks

2. Assume a hypothetical scenario where your company is mandated to transition from IBOR reference rates to a benchmark rate that is based on transactions.

If IBOR+ had a significantly different value to IBOR (e.g. systematically >5bp higher or lower), would your company elect to transition to IBOR+ or to an alternative rate? (IBOR+ is explained in the introduction to this section)

- Definitely transition to IBOR+
- Probably transition to IBOR+
- Undecided
- Probably transition to a different rate other than IBOR+
- Definitely transition to a different rate other than IBOR+

Please provide additional details as to why you have chosen your particular option

3. If you answered above that you were 'undecided' or that you would probably or definitely transition to a rate other than IBOR+, then please answer the following question:

In a scenario where IBOR+ was systematically >5bp higher or lower but where bank spreads would be adjusted to compensate for this difference, such that there was no significant change to your actual cost of borrowing, then (in this scenario) would you probably or definitely transition to IBOR+?

- No
- Undecided
- Yes

MPG Corporate Outreach - Interest Rate Benchmarks

4. If IBOR+ was significantly more volatile than IBOR, would your company transition to IBOR+ or to an alternative reference rate?

- Definitely transition to IBOR+
- Probably transition to IBOR+
- Undecided
- Probably transition to a different rate other than IBOR+
- Definitely transition to a different rate other than IBOR+

Please provide additional details as to why you have chosen your particular option

5. Looking at your company's current usage of IBOR, to what extent do you explicitly require a rate that encompasses bank term credit and liquidity premiums?

- We need a rate with credit and liquidity premiums for our internal purposes
- We are likely to prefer a rate with bank credit and liquidity premiums to avoid a reduction in the supply of bank credit
- We would prefer a rate with bank credit and liquidity premiums to avoid higher all-in costs of funding due to banks pricing in their additional basis risk
- We don't require a rate which encompasses these premiums. In fact, if the market shifted to using a rate without these premiums we would also shift accordingly
- Other

Other (please specify)

6. If it is not possible to fix robust 6-month and 12-month IBOR+ rates, then... Would this adversely affect your company?

- Yes
- Not sure of potential impact
- No
- Not applicable (we do not use rates >3M)

MPG Corporate Outreach - Interest Rate Benchmarks

7. If it is not possible to fix robust 6-month and 12-month IBOR+ rates, then...

What would be your preferred alternative rate in this case?

| | First choice | Second choice | Third choice | Fourth choice |
|------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1w to 3m IBOR+ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6m or 12m OIS | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6m or 12m T-Bills | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other (please specify below) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please specify "Other" and/or provide additional details as to why you have ranked the options in this way

8. If no IOSCO compliant IBOR+ can be fixed, what other reference rate would you choose to transition to?

| | First choice | Second choice | Third choice |
|---|-----------------------|-----------------------|-----------------------|
| OIS | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| T-Bills | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other alternatives (please specify below) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please specify "Other" and/or provide additional details as to why you have ranked the options in this way

9. If 6month or 12month rates were not available, then would you transition to 3month rates?

- Yes
- Undecided
- No

MPG Corporate Outreach - Interest Rate Benchmarks

10. Does your company have a standard fallback reference rate within its contracts for a case where an IBOR rate become unavailable?

- No
- Not sure
- In the majority of contracts
- Yes

If you answered "In the majority of contracts" or "yes" please describe the nature of the fall-back clause

4. Section D: Transition scenarios

This section seeks opinions on various hypothetical scenarios of a transition away from IBOR. This is for the purpose of understanding how companies might react to such a situation but should not be taken to imply that it will necessarily occur.

In this questionnaire we present three potential Transition options:

1. Hard cut-over
2. Cut-over after a transition period
3. Voluntary market-led transition

More than one of these transition options may be pursued in parallel for different proposed rates. e.g., it may be preferable to enforce a hard cut-over from IBOR to IBOR+ with or without a parallel-run transition period while encouraging a market led transition to OIS or T-bill reference rates wherever these are preferred.

1. Hard cut-over – Terminate IBOR after a notice period and transition all outstanding contracts to the new reference rate.

- Transition would be formulaic, for example by replacing legacy LIBOR with a new “LIBOR+” plus X% spread or OIS + Y% spread.
- The benchmark administrator would aim to align IBOR and the new reference rate fixings as closely as possible, or at least ensure any basis is readily understood and predictable.
- Legislative provisions may be required to protect against contract frustration

2. Cut-over after a transition period – Launch new reference rate and run in parallel to IBOR rates for a transition period. Discontinue the IBOR rates after the transition period.

- The official sector would communicate a clear timeline for the transition.
- An extended parallel run prior to a market-wide protocol would allow for a majority of outstanding IBOR related contract to roll off and for many longer dated contracts to be renegotiated.

3. Market led transition – Launch new reference rate while retaining the relevant IBOR rates, allow market to determine the pace of transition, with no mandatory cut-over.

- Transition to the new reference rate will not be imposed by regulators, but rather adopted and led by active markets participants.
- Given sufficient liquidity in the market, it should be possible voluntarily to transition the majority of contracts (including legacy contracts) to the new rate
- A number of initiatives may be put in place to encourage transition
- The design and implementation of compression and conversion cycles designed to convert legacy portfolios to the new rate en masse.
- An auction process whereby active derivatives market participants would agree to convert submitted portfolios at a basis curve established via auction.
- The development of OIS trading on electronic platforms.
- The official sector could agree a timeline for explicit conversion targets with dealers and other major market participants who are willing to take part.

MPG Corporate Outreach - Interest Rate Benchmarks

1. What notice period would be sufficient before implementing a hard cut-over to IBOR+ or another alternative?

(please select one)

- < 12m
- 12m
- 18m
- 2 years
- 3 years
- 5 years
- 7 years
- > 7 years (please specify below)
- Don't know

If more than 7 years, please specify here

2. An alternative scenario is the introduction of new reference rates in parallel to existing IBOR rates. In your view, what would constitute a sufficient period of time to allow for legacy IBOR contracts to run off or be renegotiated before the termination of IBOR?

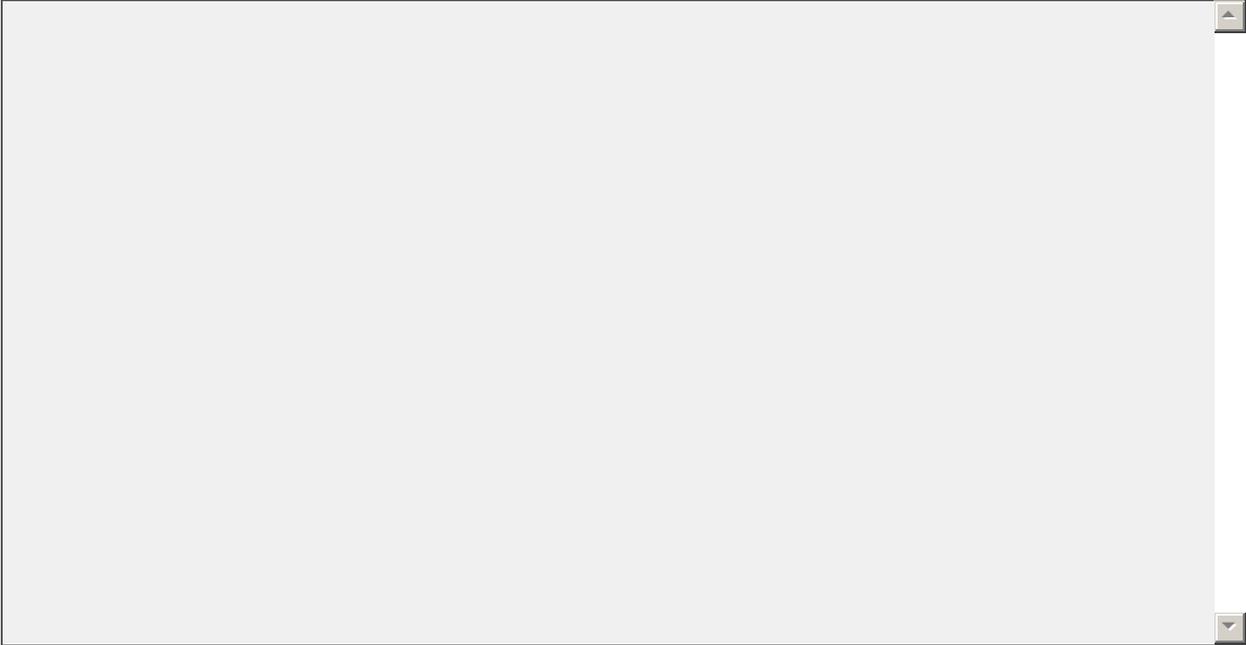
(please select one)

- < 5 years
- 5 years
- 7 years
- 10 years
- 30 years
- > 30 years (please specify below)
- Don't know

If more than 30 years, please specify here

MPG Corporate Outreach - Interest Rate Benchmarks

3. Please detail any scenarios that your company may experience where the transition to the new reference rate framework would not be possible.



MPG Corporate Outreach - Interest Rate Benchmarks

4. Which of the following potential regulatory capital, accounting and tax issues are relevant to your company?

In each instance, would this issue discourage your company from transitioning to the new reference rate framework? (Assuming that transitioning is optional)

(Please choose one box for each statement a-f below)

| | Issue would discourage my company from transitioning | I am uncertain about the potential impact of this issue | Issue would not discourage my company from transitioning | Issue is not applicable |
|--|--|---|--|-------------------------|
| A. Changing of the reference rate may be seen by fiscal authorities as a taxable gain/loss | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| B. Changing of the reference rate may invalidate my company's hedge accounting | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| C. Changing of the reference rate may invalidate my legal contracts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| D. Changing the reference rate may invoke loan repayment clauses or force me to re-negotiate my loans or other bank facilities | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| E. Changing the reference rate may adversely impact a pension arrangement that is sponsored by my company | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| F. Other (please specify below) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please specify "Other"

5. Please suggest any mitigating actions for the issues detailed in question D4 above.

A

B

C

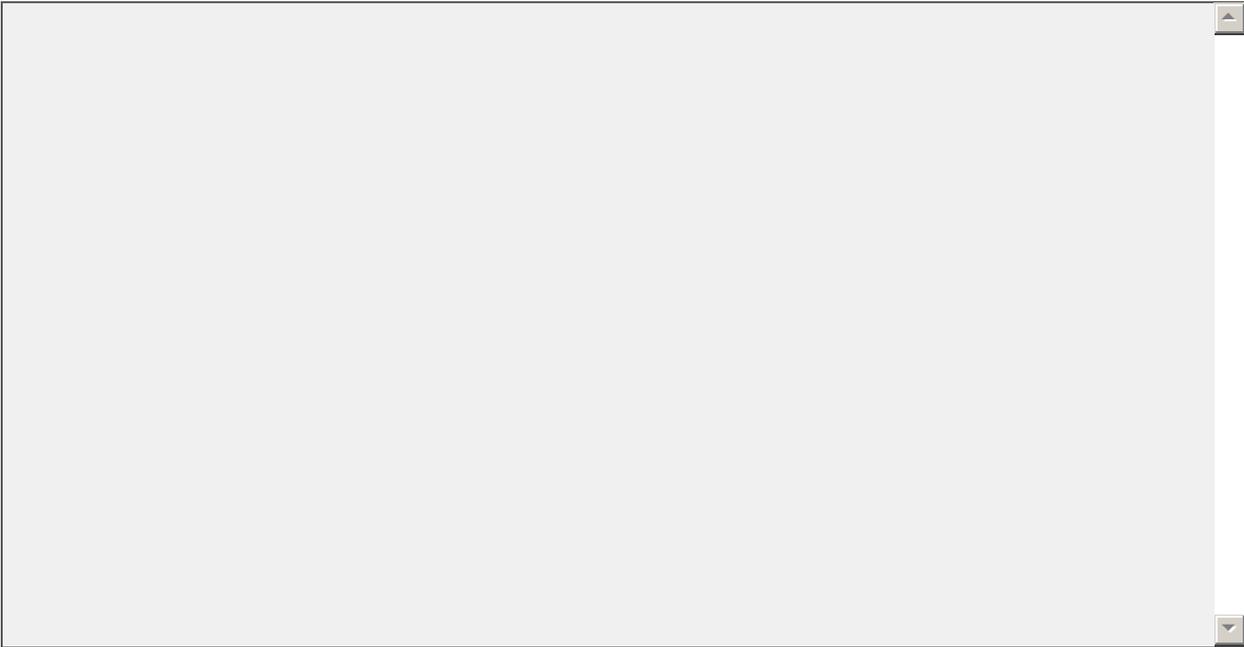
D

E

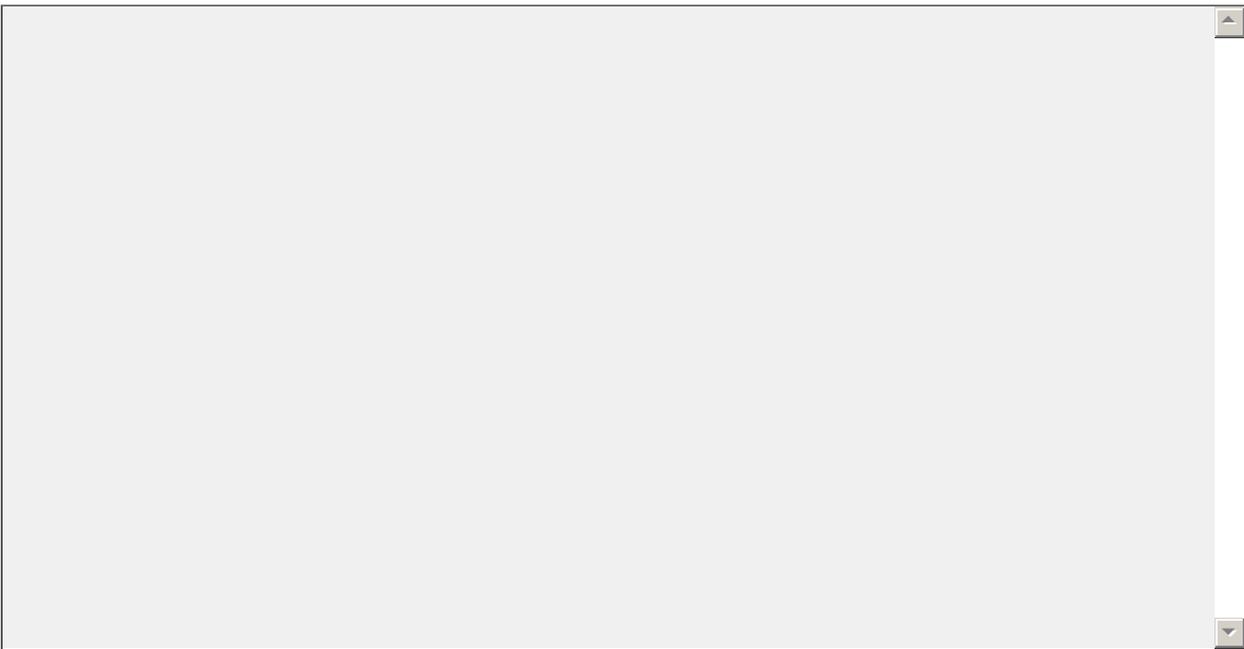
F

MPG Corporate Outreach - Interest Rate Benchmarks

6. Please detail any policies and initiatives, other than those listed above, that could be put in place to minimize market disruptions at the time of transition.

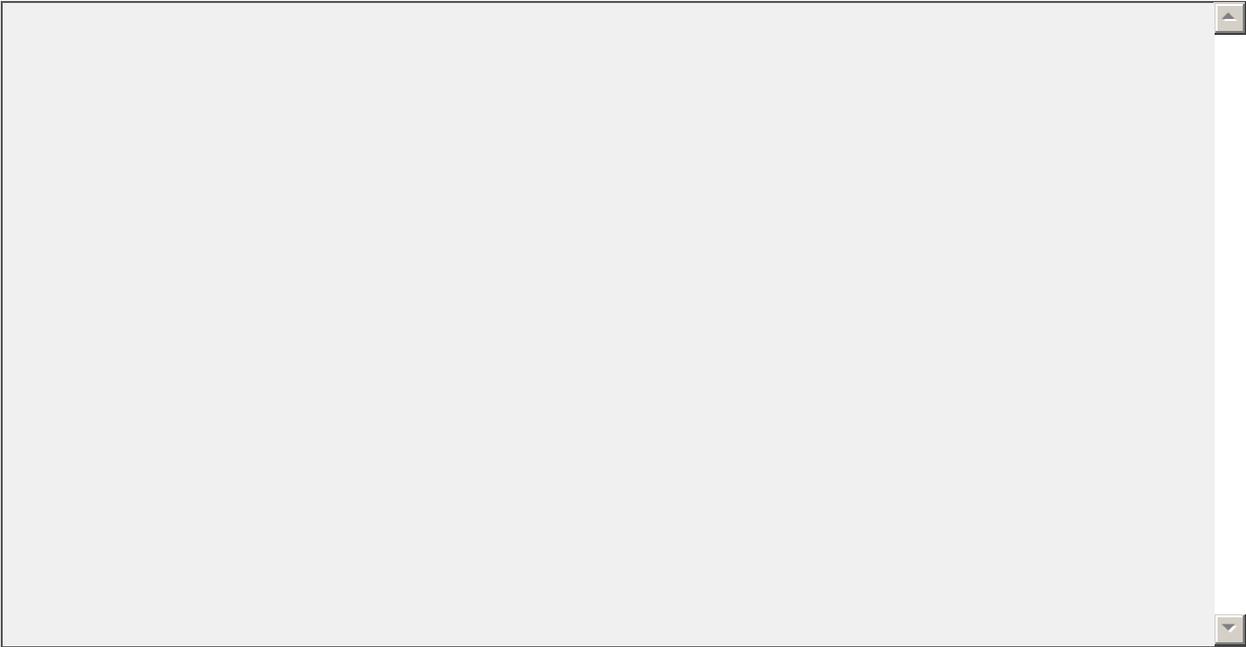
A large, empty rectangular text box with a light gray background and a thin black border. It is intended for the user to provide detailed policies and initiatives to minimize market disruptions during a transition. The box includes a vertical scrollbar on the right side.

7. Please provide any other remarks regarding the questions in this section.

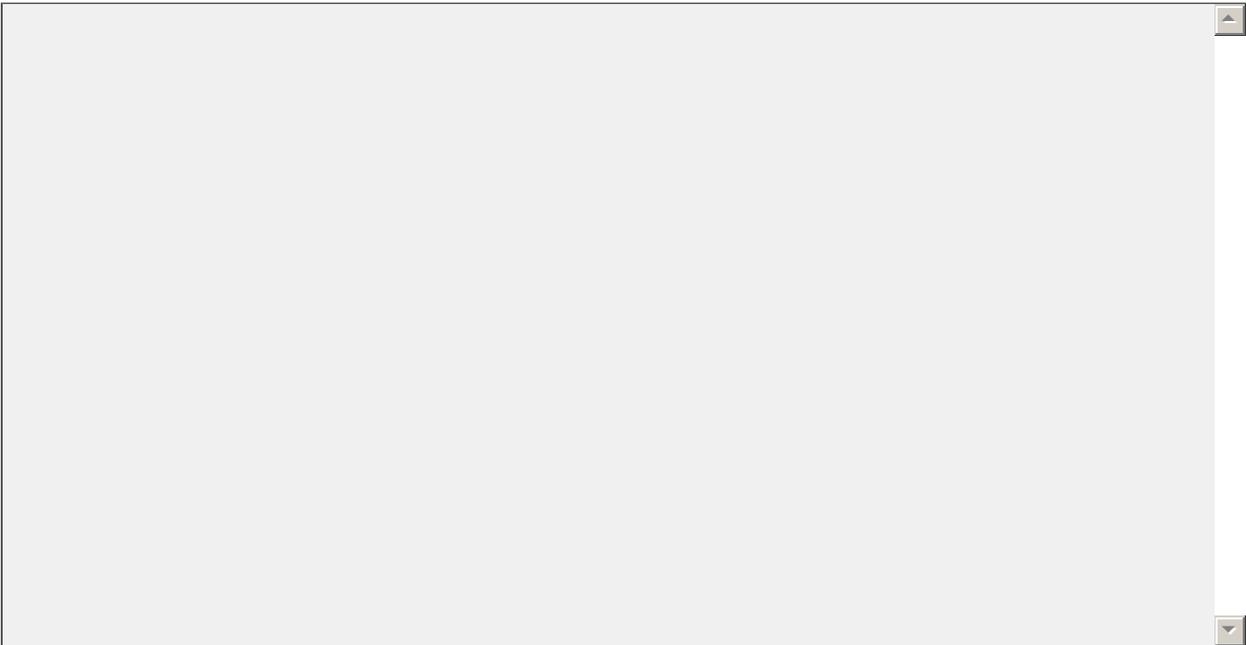
A large, empty rectangular text box with a light gray background and a thin black border. It is intended for the user to provide any other remarks regarding the questions in this section. The box includes a vertical scrollbar on the right side.

5. Section E: Other Considerations

1. Please state any significant considerations or questions regarding the reform of interest rate benchmarks that have not been covered elsewhere in this questionnaire?

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2. Do you have any significant negative / unfavorable observations?

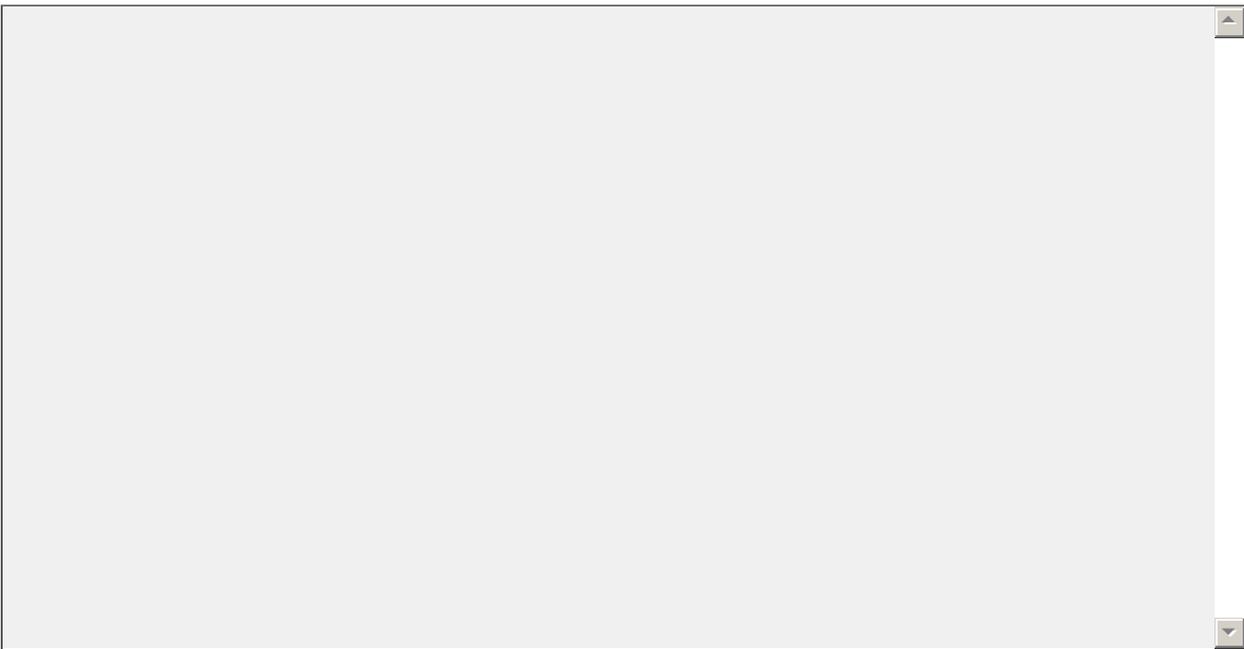
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MPG Corporate Outreach - Interest Rate Benchmarks

3. Do you have any significant positive / favorable observations?

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4. Do you have any recommendations or proposals regarding the reform of interest rate benchmarks?

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***5. Are you ready to submit your final answers to this survey?**

If not, please use the "Prev" button to amend your previous responses. If yes, please confirm below and then click "Done" to submit.

Yes

Market Participants Group on Reforming Interest Rate Benchmarks

USD Currency Report

March 2014

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Executive Summary

Overview

The Market Participants Group (MPG) on Reforming Interest Rate Benchmarks, in response to a request from the Official Sector Steering Group (OSSG) of the Financial Stability Board (FSB), has developed preliminary recommendations relating to the feasibility of adopting additional reference interest rates that adhere to IOSCO principles. The goal of this paper is to summarize the work that has been conducted by the MPG on issues specific to the US Dollar (USD) markets, although many of the considerations and recommendations have broader applicability.

The USD markets cover a wide range of products that reference USD LIBOR across asset classes in both the wholesale and retail marketplaces domestically and internationally. The depth, global extent and complexity of products in the USD markets make the potential transition from USD LIBOR to a new set of benchmark rates arguably the most challenging of all such transitions being contemplated by the MPG.

The USD Workstream consisted of participants from the following institutions: Blackrock, FMC Corporation, Goldman Sachs, ISDA, JPMorgan Chase, London School of Economics, Morgan Stanley, Oliver Wyman, Partner Management Fund, PIMCO, Promontory Financial Group, and Stanford University. Members met on a regular basis and conducted outreach with other market participants as appropriate. The objective of the USD workstreams was to identify and provide a series of options for LIBOR alternatives, and where possible, to quantify or explain the costs and benefits to changes. The group considered the preliminary findings of other currencies, but primarily focused on issues affecting USD denominated LIBOR.

Similar to other currency workstreams, the USD Workstream consisted of six functional workstreams: USD Market Outreach, USD Market Footprint, USD Legal Analysis, USD Transition Designs, USD Fixing Methods, and USD Reference Rate Menus. Each workstream has developed preliminary recommendations which are summarized in this USD Currency Report and are provided in detail in the full MPG Report.

Key Takeaways

Several key themes have emerged from the work completed by each of the respective USD workstreams.

Scale of Transition: The informal outreach process and assessment thereof indicate that any wholesale revisions to the construction of LIBOR would require significant lead time to ensure the least amount of disruption to market participants. Given the global extent and scale of use of USD LIBOR, any transition to a new benchmark will require careful consideration of the infrastructure, operational and legal risks and costs. Official sector support, both from US and international authorities, would be helpful to ensure the success of a transition.

Type of Transition: Official sector authorities in different jurisdictions are taking varying approaches to benchmark reform. In the US, authorities are broadly looking to the marketplace to drive reform and innovation of benchmarks. In other jurisdictions, the public

sector is taking a more directly activist stance. For example, the European Commission has recently proposed detailed legislation for reform of benchmark activities, including interest rate benchmarks, for the European Union. Similarly, the UK government has adopted legislation for reform of LIBOR. Thus, our USD recommendations are based on a market-led reforms and adoption of alternative benchmarks, while calling for broad official sector support.

Future USD Benchmark Environment: Based on the preliminary analysis, we recommend the development of a more diverse system of interest rate benchmarks for the USD markets, consisting of a combination of a reformed USD LIBOR for application to funding products, and one or more alternative benchmarks for derivatives markets. Specifically, maintaining a reformed LIBOR, after making relevant revisions to its definition and fixing methodology to ensure closer adherence to the IOSCO Principles, would help minimize contract frustration, given that there are historical transition precedents for benchmark definitional change with minimal market disruption. We anticipate that financial institutions would welcome a change to a transaction-based LIBOR+, compared to a LIBOR which would require continued quote submissions. For derivative products, we recommend that reference rates based on the OIS market be considered as a new standard. There are already well-established, clearable OIS markets with robust liquidity out to two years and IBOR/OIS basis markets which are liquid out to 50 years. OIS are the predominant contractual discount rates for cleared and collateralized bilateral swaps. Hence, swaps that reference IBOR rates generate IBOR/OIS basis exposures (i.e. the basis between the reference rate and the discount rate). Clearly, a move to standardize OIS for both discount and reference rates would remove that basis risk.

The bifurcation of the market across a Type I (a change to the definition or fixing methodology of current LIBOR) and Type II (an introduction of one or more new benchmarks) transition would aim to solve issues of illiquidity across longer-term LIBOR maturities and the subsequent lack of transaction data. Based on analysis conducted thus far, there does not seem to be a need to develop a completely new benchmark rate that stands apart from existing benchmarks. The further development of basis markets between LIBOR/LIBOR+ and OIS would facilitate the evolution of this more diverse benchmark environment, in particular, by ensuring that LIBOR-referencing cash products can continue to be hedged into liquid derivative markets.

Transaction-based Approach to Calculating LIBOR (LIBOR+): Our research suggests that LIBOR+ is likely to be more volatile than the current LIBOR. There are generally a sufficient number of trades available to support constructing a LIBOR-like benchmark, based on transactions for tenors up to 3 months, but insufficient data for longer tenors. A benchmark for longer tenors reflecting bank transactions could be constructed using an interpolated method, based on bank financing instruments with maturities up to 3 years. Given the expanded data sources we recommend be used to construct LIBOR+, we also recommend some method of controlling for the underlying credit quality of banks involved. Even with such mitigating factors, however, LIBOR+ is likely to be significantly more volatile than BBA LIBOR given the nature of the underlying transactions data. In considering such volatility, it is important to distinguish between movements in LIBOR+ reflecting general changes in market rates, on the one hand, and movements arising from artifacts of the benchmark calculation method. The latter such idiosyncratic volatility is generally undesirable. A combination of data augmentation and statistical methods may be needed to reduce these idiosyncratic effects to acceptable levels. Even with a more volatile LIBOR+, it is likely that an institution providing retail and consumer products may prefer to continue referencing LIBOR+ to minimize operational and legal challenges associated moving to an

alternative benchmark. Product features – for example using an average approach when referencing LIBOR+ - may be adjusted to accommodate the additional volatility arising from closer reflection of movements in wholesale market rates.

Risks: Particularly significant risks which must be considered include the impact that bifurcation across products between multiple benchmarks may have on the market, the operationalization of different transitions for different products simultaneously, and whether a market-led transition, without official sector impetus, will occur within a reasonable time horizon. Additionally, the risks and impacts of benchmark reform and the use of alternatives associated with retail products and consumers must be considered. These risks are discussed in detail in the relevant workstream reports.

USD Outreach

In Fall 2013, the USD MPG Working Group sent a questionnaire to a range of financial institutions including banks, asset managers, and insurance companies. Three trade associations (Securities Industry and Financial Markets Association (SIFMA), the Financial Services Roundtable (FSR), and the Managed Funds Association (MFA)) were, in turn, asked to send the questionnaire to member organizations. The questionnaire was designed to assess which benchmarks and tenors respondents use, respondent's opinions on potential transition considerations, and proposals for potential benchmark replacements and data/instruments in the markets that could serve as benchmarks in the future.

The survey results confirmed the analysis conducted by the USD Market Footprint Workstream on the breadth of use of USD LIBOR as a reference rate for a diverse range of products including commercial and syndicated loans, structured products such as CLOs and CMBS's, derivatives, consumer liquidity products, and a wide array of bonds. Respondents also reported using a variety of other benchmarks including, among others, the Fed Funds Effective Rate, OIS, and US Treasury rates.

For USD denominated derivatives contracts, the majority of respondents cited OIS as a potential alternative. The liquidity of the underlying market as well as potential for OIS to serve as a robust and transparent rate were key factors in respondents' opinions. Other alternative to LIBORs cited by respondents included the Repo Index, Treasury Bill Index, GCF Repo Index, and the Fed Funds Effective Rate.

Most importantly, the majority of bank respondents indicated that they would prefer that LIBOR be maintained for at least an intermediate period while new benchmarks develop. The respondents cited operational, accounting, tax, and legal difficulties associated with a move away from LIBOR to a completely new benchmark. Respondents suggested that LIBOR be maintained with definitional and rate fixing methodology changes that would minimize the operational, infrastructure, and legal complexities.

Given the number of impacted products, respondents raised many concerns regarding a transition to a new benchmark, with the majority of concerns surrounding altering existing contracts and potential impact on legacy positions. Multiple respondents indicated that a transition to another benchmark should not be mandatory and that a multiple-year transition period would be required to make the necessary changes. Respondents indicated that a transition would need to be long enough to accommodate re-writing of existing contracts. In addition, there would need to be a deep and liquid market for any new benchmark at all of the relevant tenors. In addition, respondents encouraged MPG to

consider the availability of information on new benchmarks, the size of legacy positions, the costs associated with any transition to a new benchmark in its analysis and the importance of having a globally consistent solution. Respondents further suggested that the MPG consider the willingness of the official sector, including accounting and tax authorities, to make laws and provide interpretation in order to accommodate a move to a new benchmark.

In Phase II, the Impact on Corporates workstream conducted an outreach exercise to ensure that the views and concerns of non-financial corporate end-users (“Corporates”) of the relevant interest rate benchmarks were considered in the MPG report. A total of 82 responses were received to the Corporates survey. These 82 respondents represent a wide geographical view of Corporates as well as significant diversity in the type of industry and type of Corporate.

The Corporates survey identified that the Corporate Sector uses IBOR reference rates for a wider range of purposes than the Financial Sector. Interest rate benchmarks at Corporates are used mainly for pricing loans, in financial instruments, valuations, discounting and benchmarking purposes and in commercial and trade finance contracts.

Corporates expressed support for stronger governance around IBOR but survey results indicate a reluctance to support a more fundamental change, owing to Corporates’ concerns about the potential impact. Based on the survey results, Corporates have a preference for IBOR-styled rates over OIS or T-Bills. Additionally, Corporates expressed concern over the potential increased volatility of an alternative IBOR+ rate, with just 20% of all respondents saying that would definitely transfer to an alternative benchmark that was significantly more volatile than current IBORs.

With respect to transition considerations, Corporates generally indicated they would see legal continuity of contracts through the transition period and further recommended that official sector parties put in place international frameworks to ensure prior alignment of legal, fiscal, and account treatments in respect of any transition. This would include consultation with international accounting authorities and national fiscal authorities.

Preliminary recommendations include:

- Actors with large stakes and significant expertise in benchmarks, such as benchmark administrators, calculation agents, international accounting authorities and others, should be included in the development of transition plans and operational recommendations by the OSSG. Input from benchmark administrators and calculation agents will be particularly critical to ensure smooth transitions that can be accomplished without operational and structural hindrances.

USD Market Footprint

The USD Market Footprint Report describes the distribution of contractual maturities of products referencing USD LIBOR and the distribution of USD LIBOR tenors used by product.

The distribution by LIBOR tenor is relevant as volumes in the interbank market represented by the current USD LIBOR are limited beyond 3 months. For redesigns of the current LIBOR or transitions to new benchmarks, consideration needs to be given to either discontinuing the longer tenors or to finding viable alternative determination methods or replacement rates at these tenors.

The distribution by contract maturity is relevant to considerations of any amendments to the current fixing methodologies, the analysis of the USD reference rate menu, and the determination of the length of transition period that may be needed. For transition purposes, to the extent that the bulk of legacy contracts mature within the medium term of about five years, it will be preferable to continue to produce LIBOR for at least that period, in parallel with any new benchmark, to reduce the volume of legacy positions that have to be ultimately transitioned. This would serve to reduce both the operational burden of contract changes and the legal risks in discontinuing LIBOR.

Specific observations regarding the USD Market Footprint include:

- A significant percentage of the \$3.4 trillion USD syndicated loan market is linked to LIBOR. Based on initial analysis, more than 80% of these will mature within 5 years.
- In terms of USD notional or principal amounts, OTC derivatives account for the overwhelming majority of outstanding contracts tied to USD LIBOR. Approximately 65% of IR Swaps, Forward Rate Agreements, IR Options, and Cross-currency Swaps are linked to LIBOR. Of these, about 75% mature in 7 years or less.
- The large volume of securitized products linked to LIBOR underscores the importance that will have to be placed on consultations with Trustee bodies during a transition. Board Trustees will have an obligation to their bondholders to ensure that the bondholders are not disadvantaged as a result of a transition affecting the benchmark reference by the bond classes of the underlying assets.
- Retail mortgages represent one of the largest debt product segments, with an estimated total outstanding volume of \$9.6 trillion. By their nature, they are also likely to have one of the greatest numbers of outstanding contracts and to exhibit significant contract variation. Even though only approximately 15% of this population is tied to LIBOR, this is a critical segment to consider for transition purposes, given the legal, functional and operational risks involved in dealing with millions of consumer contracts.

As noted in the USD Market Footprint Report, of the estimated \$2.1 trillion in outstanding adjustable rate mortgage debt, about \$1.4 trillion is based on LIBOR, as compared to \$500 billion based on US Treasury rates and the remaining \$200 billion tied to other rates. Such mortgages tend to be based on longer-tenor LIBORs – 6-month and 1-year tenor.

- USD LIBOR exchange traded derivatives, consisting primarily of Eurodollar futures and their associated options, should be considered carefully during the transition phase. It is important to note that while the contracts are listed up to 10 years, the heavy concentration of futures “open interest” lies in the first three years, with much reduced amounts at the longer maturities. Contracts expiring beyond 5 years comprise less than 1% of the open interest in CME Eurodollar futures, the main USD STIR future complex referencing USD LIBOR.

A transition period which lasts five to seven years will thus allow much of the heavy open interest to roll off. Furthermore, the economic impact of the longer-term maturity contracts will be lessened to a certain extent because of the daily margin/mark-to-market nature of exchange traded products. Contracts which reference a new benchmark will also likely be introduced, thus creating an opportunity for a basis market to be readily developed. Exchange entities do, however, need to be consulted early in

the transition process so that transition protocols and new contracts can be designed to minimize disruption.

Preliminary recommendations include:

- Consideration should be given to the significance of retail products, given the legal and functional risks involved. The number of contracts in each product class should be evaluated to help provide the scope for any bilateral contract negotiations that may have to take place within the consumer segments under different transition scenarios.
- Further analysis needs to be undertaken to assess the maturity distribution profile, particularly for products in consumer segments that are likely to have volume at very long maturities. The number of contracts in each product class should be evaluated to help evaluate the scope for any bilateral contract negotiations that may have to take place within the consumer segments under different transition scenarios. Notional amounts may be a misleading metric by which to evaluate transition issues. To the extent that bilateral contract negotiations may have to take place, as opposed to the use of a market protocol, the absolute number of contracts rather than just the dollar amount will need to be taken into account. This will be a particular consideration in the consumer segments, in structured products and in product categories where there are a high proportion of linked contracts, for example for hedging purposes. The Market Footprint analysis may need to be extended to include estimates of the number of contracts in each product class.
- Consideration should be given to replacing longer-term LIBOR tenors, where liquidity is low, with a hybrid model based on a wide mix of bank financial instruments with maturities up to 3 years.
- Publishing LIBOR for a period of 5-7 years should be sufficient to allow for the majority of legacy contracts to mature during a transition period.

USD Reference Rate Menus

The USD Reference Rates Menu Workstream reviewed a wide array of options in order to determine the recommended alternative reference rates. Extensive discussions were held analyzing the costs and benefits of alternative reference rates and fixing methods. This analysis was informed by findings from the US Market Footprint work in addition to responses from the USD Outreach exercise. Reference rates were judged against IOSCO principles, particularly the preference for a transaction-based rate, and their representativeness of the underlying market and economic conditions. Consideration was also given to maintaining liquidity across designated reference rates and the associated tenors.

Preliminary recommendations include:

- The recommended USD reference rates include the official central-bank overnight rates (either the Federal Funds Effective Rate, Interest on Excess Reserves rate, Federal Reserve Reverse Report Fixed Rate, and Overnight General Collateral Repo Rate) and three classes of term reference rates, based respectively on OIS, US Treasury Bills, and unsecured bank debt (LIBOR+).

- The Fed recently introduced a reverse repurchase facility that allows a wide range of market participants to enter overnight repurchase agreements with the Fed at a “floor” rate. If this “floor” rate were to become a regular feature of Fed monetary policy, it would also be a suitable reference rate.
- A new overnight benchmark rate, informally named the Overnight General Collateral Repo Rate, could also serve as a feasible reference rate. It would be fixed as a weighted average or median transaction rate on representative general collateral overnight repos backed by U.S. treasuries, using a method and data to be determined by the benchmark administrator or by its designated successor. This rate could at some point be used as a new foundation for the USD OIS market and for relevant futures contracts, in order to cover the contingency that the Fed Funds Effective Rate is eventually discontinued or becomes untethered from true market financing conditions so that it ceases to be an effective benchmark.
- It is important to note that while Treasury Bills may be an attractive alternative for cash markets, it is unlikely that derivatives will voluntarily select Treasury Bills as a benchmark, and would likely result in added transitional complexity and negative liquidity implications. For derivatives, designating Treasury Bills as a benchmark would have to be in addition to OIS, as OIS is the contractual discount rate. The USD Reference Rate Report details benefits and costs for each of these reference rates.
- Development of new regulatory capital, liquidity and risk management rules should include assessments of the impact on underlying markets on which major benchmarks are based. Adverse liquidity impacts may contribute to the need to transition from an existing reference rate or may affect the viability of alternative reference rates.

USD Fixing Methodologies

Scope

Consideration of rate fixing methodologies covers two broad areas, relevant to Type I and Type II transitions respectively:

1. Adjusting the fixing method of current USD LIBOR to enhance robustness, while preserving the continuity of the LIBOR index – essentially the technical means to develop USD LIBOR+; and
2. Adopting, designing or enhancing fixing methodologies for replacement benchmarks, with an emphasis on adherence to IOSCO Principles.

The work of the USD Fixing Methodologies and Reference Rate Menus Workstreams address these areas.

Design Principles

Revised fixing methodologies need to balance a number of factors, including:-

- Leverage available data on rates from completed transactions and executable quotes;
- Ensure that input rate or price data are derived from a reasonably homogeneous set of contracts which in turn are representative of the underlying interest being measured;

- Employ a transparent and replicable calculation methodology;
- Provide fallback arrangements in the event of short-term or long term data insufficiency;
- Avoid adversely impacting the technical quality of the benchmark in respect to the uses made of the benchmark, particularly with respect to introducing idiosyncratic day-to-day volatility; and
- Improve resiliency to manipulation attempts.

In relation to the development of USD LIBOR+, further considerations are that any changes to fixing method should:

- Ensure that LIBOR+ inherits the broad notion of LIBOR as a measure of bank funding costs in order to mitigate contract frustration challenges; and
- Preserve broad continuity of the rate level over time – i.e. not entail a material discontinuity between current LIBOR and LIBOR+.

Options and Recommendations include:

For USD LIBOR+, a range of options for revised fixing methods were considered. These included:

1. A hybrid approach based on money market transactions for the shorter tenors (3 months and under) and an interpolated rate for longer tenors based on 3-month money market data and TRACE data on corporate bond spreads;
2. A combination based on money market transactions for the shorter tenors, blended with rates derived from the highly liquid Eurodollar futures markets for longer tenors;
3. An approach using USD OIS as the foundation, with a basis credit-spread add-on;

The recommended proposed methodology in the USD Fixing Methodologies Report is based on an analysis over the 3-year period 2011-2013, and uses money market transactions to fix overnight, 1-week, 1-month, 3-month, and 6-month USD LIBOR. Transactional data from counterparties with a Tier 1 short-term rating was used. This filter was introduced to achieve short-term credit homogeneity in the data set and includes 94% of all transactions. Using this methodology, in all tenors up to 3 months, LIBOR+ tracks BBA LIBOR reasonably well. The average spread between LIBOR+ and BBA LIBOR over the analysis period is 0.5, -0.5, 0.7 and -2.6 bp for overnight, 1-week, 1-month, and 3-month, respectively (a positive number means LIBOR+ is higher). The observed standard deviation of daily changes is also reasonable when compared against the corresponding values of OIS (we should expect Libor+ to be at least as volatile as OIS, a behavior that BBA Libor does not exhibit).

The analysis conducted and presented in the USD Fixing Methodologies Report further indicates that even if sufficient transactional data is available for the 6-month tenor, the methodology used may be found to be inadequate for the calculation of this tenor, due to the credit composition of issues across maturities (generally only higher quality borrowers have access to longer term borrowings). The USD Fixing Methodologies Report provides an alternative methodology for 6-month USD LIBOR+ which utilizes trade observations from the bond market, available on the TRACE database, to amplify the statistical power of the 6-month calculation.

With respect to new reference rates, a number of alternative fixing methods continue to be evaluated. These are grounded in the use of OIS markets against the Fed Funds Effective Rate as the basis for developing short-maturity benchmarks. The fixing methods largely vary by the data sources, and include determinations based on:

1. Interpolated rates based on a yield curve generated off the CME Fed Funds futures contracts;
2. Executable quotes from Swap Execution Facilities;
3. Averaged rates based on swap transactions reported to a Swaps Data Repository.

The first of these shows the most promise for an immediately robust and available fixing method, while reflecting a market with a high degree of existing liquidity. The other two require, to varying degrees, the further development of either market or venue liquidity. The principal difficulty with the first approach is the need to interpolate between futures settlement dates to fix constant maturity 1, 3, and 6 month OIS rates. Standard interpolation methodologies do not work well because of the potential for intra-month step changes in the FFER, and fitting errors may be larger during periods of financial stress.

USD Legal Analysis

Benchmark revision and transition arrangements will need to include provisions to reduce legal and documentation risks.

Much of the legal risk associated with interest rate benchmark changes relate to legacy contracts. The driving features to be considered with respect to legacy contracts are contractual construction and fallback provisions, the risk of contract frustration, and the use of protocols or other legal mechanisms as an impetus for transition. Counterparty claims may arise as a result of changes and force firms to incur operational and financial costs.

A “legal footprint” survey was undertaken as part of this review to understand contractual construction and fallback provisions across products. In order to develop more complete recommendations, especially as they relate to transition, it will be important to refine this survey further. The homogeneity of contract types within product category also needs to be considered. Whereas it is probable that most IR swaps are executed under standard ISDA agreements, structured products and, particularly, consumer products are likely to have many idiosyncratic contract variants.

Contract frustration claims may materialize if a new benchmark is materially different from legacy benchmarks. For most commercial contracts, however, there is only a modest risk that legacy contracts would terminate upon the disappearance of the prior reference rate. Preliminary research suggests that US Courts are generally reluctant to adjudicate in favor of a claim of frustration of purpose, apart from a finding that the intervening event was substantial (and not simply an event resulting in price increases). We deduce that courts will make every effort to preserve contractual continuity upon an introduction of a new fixing methodology for LIBOR. However, as the GBP Legal Analysis Report illustrates, this does not appear to be the case with European law. Given the immense breadth and depth of the use of USD LIBOR internationally, contract frustration must continue to be considered a significant risk.

With respect to protocols, The ISDA documentation architecture and amendment of ISDA definitions booklets could set forth any newly published rates or address any new screen or page locations for the electronic venues that publish LIBOR rates. Protocols could also help ensure minimal market disruptions in the wholesale market, but may not be effective in averting any disruption in the retail and consumer markets.

Additional preliminary recommendations include:

4. **Appropriate announcement of changes and associated processes:** Sufficient time for a transition period is necessary to allow parties to clarify any changes and associated processes with their counterparties and to provide adequate notice of upcoming changes. Potential arguments of frustration could be mitigated if there is widespread opportunity to educate and discuss with market participants the consequences of any reference rate change. Furthermore, the process through which changes are announced and introduced should be carefully constructed and involve the appropriate parties across a wide range of activities.
5. **Legacy Contract Frustration Risk:** An understanding of the legal profile of all relevant products and specifically (a) how they reference USD LIBOR and (b) provide for any arrangements for a long-term replacement of the benchmark, is required as a basis to a full legal analysis of the potential scale and probability of success of contract frustration claims in US jurisdictions.
6. In the event that the legacy benchmark rate is discontinued and a transition to a new benchmark is envisaged, the following should be considered:
 - **"Switching off the Faucet":** Contracts that are entered into during a transition period and which reference an outgoing benchmark should have adequate provisions and mechanisms to allow for a switch to the new benchmark without triggering frustration claims. These provisions should allow for the possibility that the definition and rate determination methodology for the new benchmark may not have been finalized when the contract is made.
 - **Benchmark Definitions to Provide Flexibility for Modifications:** Definitional reforms to USD LIBOR and/or the definitions of new benchmarks should provide for flexibility to make further determination changes, for example in fixing methods, to reduce contract risk in products referencing the benchmark.
7. **Facilitating Future Changes through Additional Contract and Benchmark Definition Flexibility:** New contracts, including those that are based solely on a new benchmark, could allow for future reference rate changes. Additionally, consideration should be given to revising benchmark definitions to allow for similar changes while minimizing legal risks and operational costs. Ensuring flexibility within contracts and benchmark definitions could minimize the need to consider extensive legal risks when making beneficial changes to benchmarks in the future.

USD Transition Design

The Transitions Workstream provides a taxonomy which outlines a framework for analyzing transition options. Type I transitions comprise reforms or modifications to existing benchmarks to improve their integrity and robustness. Such transitions would be specifically designed to minimize legal contract risks and market disruption. Moving to a "hybrid"

determination of LIBOR based on a combination of quotes and transaction data, or other revised fixing methods, might fall into this category. Type II transitions are those for which one or more new benchmarks are introduced and where the existing benchmark will ultimately be discontinued. Transitions combining Types I and II could also be envisaged. For example, a reformed LIBOR (Type I) might continue in use for balance sheet/funding oriented products, while derivatives activities might migrate to new benchmarks such as OIS (Type II).

Possible transition processes include a hard cut-over, which involves the discontinuation of a legacy benchmark rate at a specified date, a seamless transition, and a market-led transition with no cut-over date. Each process has benefits and disadvantages depending on the transition type envisaged. Under a Type I scenario, where a change is made to either the definition or the rate determination methodology, a seamless transition is preferable. If the new benchmark is published on the same page by the same administrator throughout the transition period, and the official sector is supportive of the updated benchmark, there may be low risk of contract frustration. Furthermore, this transition would likely require the least amount of new infrastructure development and does not pose a significant risk of market disruption.

If a Type II benchmark transition is envisaged, then a parallel transition period is recommended to handle the increased infrastructure needs, potentially higher costs for financial institutions, and the need for a longer time-horizon for contracts referencing a legacy benchmark. Additionally, the transition period is critical as it allows the market to handle any operational and legal challenges associated with a new benchmark well in advance of the adoption of the new benchmark. A parallel with hard cut-over path is further recommended if the Type II transition involves a well-defined alternative benchmark. An announced discontinuation date associated with the transition to a defined benchmark will give the market sufficient advance notice and impetus to begin making operational, legal, and infrastructure adjustments during the transition period.

A market-led transition is preferable for a Type II transition involving multiple benchmarks varying across products and currencies. A market-led transition is preferable in this situation as it allows market participants to determine the best proxy for interest rate benchmarks for particular product classes, such as OIS for OTC derivatives and LIBOR+ for balance sheet/funding oriented products. A scenario in which market participants choose a respective benchmark through increased adoption also decreases the dependency on any official sector impetus that may be needed in other transition scenarios.

The USD Transitions Report further details transitions considerations and process recommendations for certain high-risk product classes including retail/consumer loans, securitized and structured credit products, non-linear products, exchange traded derivatives, and OTC derivatives.

A successful transition design will consider and appropriately incorporate the following elements:

- **Infrastructure Requirements:** Development of new or re-purposed market utility infrastructure, particularly trade data repositories, may be needed to support transaction-driven approaches for determining a reformed LIBOR or for determining a newly defined rate benchmark. For USD markets, there may be potential to leverage existing utilities such as DTCC or proposed public sector facilities such as a Federal

Reserve “2420” data repository. Data contributors to new or modified benchmarks may need to implement or build systems for transmission of trade or rate data. This will be a particular consideration if benchmark determination is based off a wider contributor pool, including for example, corporate treasuries. Additionally, internal systems at financial institutions may need to be modified to incorporate new benchmark rates for valuation and risk models.

- **Maintaining LIBOR During Transition:** Certain transition scenarios envisage a protracted period when both the current LIBOR and the new benchmark need to be produced. In this case, legacy USD LIBOR should be continued during the full transition period, with a “clean-up” mechanism for maintaining contracts at the end of the period. Consideration should be given to who is responsible for maintaining legacy LIBOR, the method for determining legacy LIBOR, and the length of period for which legacy LIBOR may be required.
- **Role of Benchmark Administrators:** Benchmark administrators should be consulted early in the design and execution of the benchmark transition. Benchmark administrators will be critical to any transition, particularly with regard to infrastructure requirements, fixing rate methodology implementation, and coordination across the market.
- **Role of Official Sector:** The official sector – government, regulators, and corresponding international public sector bodies – may play a number of roles in supporting and reducing the risks associated with a transition program. As with other transition considerations, the nature and extent of these roles will vary according to the type of transition envisaged. The potential role of the official sector may range from support of benchmark transitions to development of market utilities, international coordination of regulatory mandates and implementation requirements, and providing guidance on regulatory capital, tax, and accounting rules impacted by a benchmark change.

Suggestions for Further Analysis

A number of analyses should be undertaken or completed to provide a more complete basis for recommendations specific to USD. These include:

- **Fixing Methodology Analysis** should be continued and leverage incremental databases which can provide valuable information to help refine current models and validate variable assumptions.
- **Legal Footprint Analysis** should be refined to help define the scope of legal risks involved. Key characteristics of or differences in contract structure and benchmark references by product will provide valuable information for developing recommendations that are both comprehensive and provide for successful long-term benchmark transitions. This analysis is particularly critical for retail and consumer products.
- **Full Legal Assessment of Contract Risk in US Jurisdictions.** This assessment would be driven by the Legal Footprint Analysis described above and provide a comprehensive view of how various products may be affected by the various transition type proposals for the US jurisdiction. This includes legal analysis of the impact of a divergence in the

use of rates across different products, given the interconnectedness of the markets and its participants.

1. Market Footprint

1.1. Approach

The US dollar (USD) Market Footprint analysis aims to quantify the volumes and estimate the projected maturities of key classes of financial instruments that reference USD-LIBOR and T-Bill rates by asset class and tenor.¹² This information is intended to inform the MPG Workstreams tasked with choosing reference rate menus and designing transition strategies.

Wherever possible, volume and maturity data was taken from official public sources. However, public data is not sufficient to provide a complete picture and so this was complemented with a combination of private data and opinions of market participants³ gathered through the outreach exercise and a series of bilateral discussions. Wherever possible, attempts were made to corroborate non-official data by making use of multiple sources such as reports by market analysts, news reports and bank websites.

The main data sources used are summarized in the table below:

Table 1 Key data sources

| | Key data sources |
|----------------------------------|---|
| Syndicated Loans | <ul style="list-style-type: none"> • Dealogic, Bloomberg, Thomson Reuters, S&P LCD • Input from market participants |
| Retail and Business Loans | <ul style="list-style-type: none"> • Federal Reserve (Z1 statistics & research papers) • Input from market participants |
| Bonds | <ul style="list-style-type: none"> • Dealogic • BIS Statistics |
| Securitized products | <ul style="list-style-type: none"> • SIFMA • Dealogic |
| Derivatives | <ul style="list-style-type: none"> • BIS derivatives statistics • DTCC • CME |
| Deposits | <ul style="list-style-type: none"> • Federal Reserve (Z1 statistics) • Input from market participants |

¹ Outstanding volumes were estimated as of Year-end 2012. Where data was not available at this date, the most recent data available was used

² The analysis of USD-LIBOR indexed loans and deposits issued outside the US was covered by the 'Emerging Markets (EM) Market Footprints' sub-workstream, and are therefore detailed in that section.

³ Due to confidentiality obligations, all non-public input from market participants is cited as "Input from market participants".

A number of early versions of these results were circulated to members of the MPG for comment and to feed into their respective analysis. All feedback from MPG members was incorporated into the final version of this analysis.

1.2. Summary of Findings

The notional volume of outstanding financial contracts indexed to USD-LIBOR is estimated to be greater than \$160 TN. The main types of contracts indexed to USD-LIBOR include Over-the-Counter (OTC) and exchange traded derivatives, corporate loans, retail mortgages, floating rate bonds and securitized products. 1-month and 3-month are the most commonly referenced tenors across all product groups, with 6-month used across a subset of products and the 12-month tenor used only in a limited number of cases. Other USD-LIBOR tenors are rarely used. The Constant Maturity Treasuries (CMT) rate is used as a reference rate for some retail mortgages. Outside of mortgages, the use of T-Bills as a reference rate is limited.

It is important to note that in addition to the above analysis of financial contracts which directly reference USD-LIBOR, there is also a range of other important applications where LIBOR is used. These include:

- Late payment clauses in commercial contracts often refer to LIBOR as an interest rate
- LIBOR is often used as a discount rate for valuation purposes - although less so for cleared OTC derivatives, where OIS rates are primarily used
- LIBOR is sometimes used as a performance benchmark for money market funds and other asset managers.

Although it is difficult to estimate the volume of contracts involved, the 'Impact on Corporates' Workstream provides a view of the various uses of interest rate benchmarks based on Market Outreach.

An overview of the Market Footprint findings is presented in Figure 1 and 2 below. Detailed sources and assumptions can be found in the appendix.

Figure 1: USD-LIBOR Market Footprint overview

| Asset class | | Overall volume (\$ BN) | % non-domestic | % LIBOR-related | O/n | 1w | 1m | 2m | 3m | 6m | 12m | % T-Bill related | |
|--------------------------------|---|-----------------------------|----------------|-----------------|-----|----|--------|-----|--------|--------|-----|------------------|-----|
| Level 1 | Level 2 | | | | | | | | | | | | |
| Loans | Syndicated loans ¹ | ~3,400 | 30% | 97% | | | High | | High | Medium | | 0% | |
| | Corporate business loans ¹ (bilateral) | 1,650 | Low | 30–50% | | | Medium | | Medium | Low | | <2% | |
| | Noncorporate business loans | 1,252 | Low | 30–50% | | | Medium | | Medium | TBC | | <2% | |
| | CRE/Commercial mortgages | 3,583 | Low | 30–50% | | | Medium | | Medium | TBC | | <2% | |
| | Retail mortgages | 9,608 | Low | 15% | | | Low | | Low | High | Low | 5% | |
| | Credit cards | 846 | Low | Low | | | Low | | Low | | | Low | |
| | Auto loans | 810 | Low | Low | | | Low | | Low | | | Low | |
| | Consumer loans | 139 | Low | Low | | | Low | | Low | | | Low | |
| | Student loans | 1,131 | Low | 7% | | | Low | | Low | | | 1% | |
| Bonds | Floating/Variable Rate Notes | 1,470 | 24% | 84% | | | Medium | | Medium | Low | Low | 0.1% | |
| Securitisation | RMBS | ~7,500 | 2% | 24% | | | High | | Medium | | | 0% | |
| | CMBS | ~636 | 1% | 4% | | | Low | | Low | | | 0% | |
| | ABS | ~1,400 | 6% | 37% | | | Medium | | Low | | | 0% | |
| | CLO | ~300 | 5% | 71% | | | Low | | Medium | | | 0% | |
| OTC | IR Swaps | 106,681 | Low | 65% | | | High | | High | Medium | | | |
| Derivatives | FRAs | 29,044 | Low | 65% | | | High | | High | Medium | | | |
| | IR Options | 12,950 | Low | 65% | | | High | | Medium | Low | | | |
| | X-currency swaps | 22,471 | Low | 65% | | | High | | High | High | | | |
| | ETD | IR Options | 20,600 | Low | 98% | | | Low | | High | Low | | Low |
| Derivatives | IR Futures | 12,297 | Low | 82% | | | Low | | High | Low | | Low | |
| | Deposits | Retail deposits | 7,110 | Low | Low | | | TBC | | TBC | | | Low |
| | | Corporate business deposits | 948 | Low | TBC | | | TBC | | TBC | | | Low |
| Noncorporate business deposits | | 908 | Low | TBC | | | TBC | | TBC | | | Low | |
| Mutual funds | Money market funds | 2,650 | | Indirect | | | | | | | | | |
| | Bank loan funds | High | | Indirect | | | | | | | | | |
| Non-financial contracts | Late payment terms | High | TBC | | | | | | TBC | TBC | | | |
| | Discount rates | | | | | | | | | | | | |

 Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Some overlap exists between Syndicated loans and Corporate business loans

Figure 2: Projected roll-off of LIBOR linked contracts

| Asset class | | Outstanding volume (\$ BN) | % LIBOR-related | % Callable | % roll-off after x years | | | | | | | |
|-----------------------------------|---------------------------------------|----------------------------|-----------------|------------|--------------------------|-----|------|------|------|------|------|------|
| | | | | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| Level 1 | Level 2 | | | | | | | | | | | |
| Loans | Syndicated loans ¹ | ~3,400 | 97% | | 19% | 36% | 62% | 90% | 96% | 97% | 98% | 99% |
| | Corporate business loans ¹ | 1,650 | 30–50% | | | | | | | | | |
| | Noncorporate business loans | 1,252 | 30–50% | | | | | | | | | |
| | CRE/Commercial mortgages | 3,583 | 30–50% | | | | | | | | | |
| | Retail mortgages | 9,608 | 15% | | | | | | | | | |
| | Credit cards | 846 | Low | | | | | | | | | |
| | Auto loans | 810 | Low | | | | | | | | | |
| | Consumer loans | 139 | Low | | | | | | | | | |
| | Student loans | 1,131 | 7% | | | | | | | | | |
| Bonds | Floating/Variable Rate Notes | 1,470 | 84% | 6% | 29% | 47% | 62% | 73% | 74% | 76% | 80% | 81% |
| Securitisation² | RMBS | ~7,500 | 24% | 47% | 0% | 1% | 2% | 3% | 5% | 6% | 18% | 86% |
| | CMBS | ~636 | 4% | 17% | 1% | 6% | 8% | 12% | 23% | 65% | 80% | 89% |
| | ABS | ~1,400 | 37% | 42% | 3% | 6% | 9% | 15% | 20% | 25% | 39% | 88% |
| | CLO | ~300 | 71% | | | | | | | | | |
| OTC derivatives | IR Swaps | 106,681 | 65% | | 18% | 31% | 42% | 65% | 75% | 83% | 95% | 99% |
| | FRAs | 29,044 | 65% | | 94% | 99% | 100% | 100% | 100% | 100% | 100% | 100% |
| | IR Options | 12,950 | 65% | | 45% | 59% | 66% | 74% | 77% | 79% | 81% | 81% |
| | X-currency swaps | 22,471 | 65% | | 29% | 46% | 60% | 76% | 83% | 88% | 95% | 99% |
| ETD | IR Options | 20,600 | 98% | | 77% | 94% | 100% | 100% | 100% | 100% | 100% | 100% |
| | IR Futures | 12,297 | 82% | | 33% | 67% | 88% | 99% | 100% | 100% | 100% | 100% |
| Deposits | Retail deposits | 7,110 | Low | | | | | | | | | |
| | Corporate business deposits | 948 | TBC | | | | | | | | | |
| | Noncorporate business deposits | 908 | TBC | | | | | | | | | |
| Mutual funds | Money market funds | 2,650 | Indirect | | | | | | | | | |
| | Bank loan funds | High | Indirect | | | | | | | | | |
| Non-financial contracts | Late payment terms | High | | | | | | | | | | |
| | Discount rates | | | | | | | | | | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

- Some overlap exists between Syndicated loans and Corporate business loans
- Roll-off rates in this draft represent contractual maturity, actual roll-off is expected to be significantly faster due to prepayment

Outstanding volumes of USD syndicated loans in the US market are estimated at \$2.5TN, based on Bloomberg and Thomson Reuters data, and a further estimated \$0.9 TN are outstanding outside the US market. Nearly all USD syndicated loans reference LIBOR, mostly at the 1- and 3-month tenors, but with ~10% referencing 6-month. Few syndicated loans reference other LIBOR tenors. 90% of current outstanding loans are expected to roll off within 5 years.

Domestic US retail and business loan and deposit volumes are taken from the Federal Reserve Financial Statements of the United States. The relation to LIBOR for business loans is based on proprietary data from market participants. The data shows that larger exposures are more likely to be linked to LIBOR, with ~30% of exposures smaller than \$1 MM and 50% of exposures larger than \$1 MM indexed to LIBOR. The main tenors used are 1-month and 3-months.⁴

Outside of the US, there is an estimated further \$1.2 TN of loans indexed to LIBOR and a similar figure for Deposits. The main tenors referenced are 3-month and 6-month. These figures are not included in the table above as they are detailed in the 'EM Market Footprints' section.

Of the \$10 TN outstanding Retail mortgages in the US, approximately \$2.1 TN (~22%) are Adjustable Rate Mortgages (ARMs). Of these, \$1.4 TN is indexed to LIBOR and \$0.5 TN are indexed to T-Bills. ARMs are primarily indexed to 6-month LIBOR rates or 12-month Constant Maturity Treasury (CMT) rates. Variable rate private student loans are often indexed to 1-month or 3-month LIBOR, other retail lending (e.g., Credit card, Auto) is generally not indexed to LIBOR⁵.

Floating and Variable rate notes issuance data was extracted from Dealogic. Over 80% of these notes are indexed to LIBOR, 98% of which are in 3-month and 1-month tenors. 73% of these contracts are expected to mature within a 5-7 year period. Outstanding volumes of securitized products were taken from SIFMA. The relation to LIBOR is based on issuance data from Dealogic. The contractual maturity of many of these contracts is very long (30 year+), although actual realized maturity is expected to be significantly shorter due to the prevalence of call options.

Exchange traded and OTC derivatives are by far the largest class of contract linked to LIBOR. Derivatives linked to LIBOR include Futures, Interest Rate Swaps and Options, Forward rate agreements and cross currency swaps. Data from the DTCC Global Trade Repository (GTR) shows \$118 TN of notional contract outstanding linked to USD-LIBOR. Of these, 90% (\$106 TN) are linked to 3-month LIBOR, 9% (\$11Tn) to 1-month and 1% (\$1 TN) to 6-month. The volume of outstanding contracts linked to 12-month LIBOR is \$5 BN. On CME, the main venue for trading USD-Libor futures and options, almost all of the ~\$30 TN notional outstanding LIBOR contracts reference the 3-month tenor. Maturities data on OTC derivatives is from DTCC, ETD maturities data is from CME.

⁴ Some double-counting is expected between corporate business loans and syndicated loans.

⁵ Although government sponsored student loans are not linked to Libor, ~\$290 TN of FFELP loans have a government guarantee to the lender that is linked to Libor

2. Reference Rate Menu

2.1. Introduction and Approach

This section of the MPG report summarizes the U.S. Dollar (USD) reference rates that we recommend as feasible and viable. In addition to the overnight rates described in Section 2.2, we recommend three classes of term reference rates, based respectively on overnight index swaps (OIS), U.S. Treasury bills, and unsecured bank debt.

The available data suggest that it is feasible to fix at least 1-month and 3-month USD LIBOR based on transactions involving unsecured bank debt. It remains an open question whether there is significant legal risk associated with changing the fixing methodology for 6-month USD LIBOR to one that is entirely based on transactions.

Other than official central-bank overnight rates, our recommended USD reference rates would be fixed directly from quantitative formulas whose inputs are market transactions data or executable quotes. None are based, in any respect, on opinion-based submissions. These fixings are outlined briefly here and described in more depth in other sections of the MPG report treating USD Fixing Methods and Derivatives Fixing Methods. Subject to the go-live criteria for OIS rates that are also provided in Appendix E to the Cross-currency report - 'Fixing Methodology for OIS Reference Rates', we believe that all of these reference rates are viable benchmark choices and would likely be judged by regulators to be IOSCO-compliant.

In order to arrive at these recommendations, the MPG's USD subgroup had extensive discussions, involving numerous phone calls and email exchanges, of the costs and benefits of alternative reference rates and fixing methods. These discussions were informed by the preferences of market participants, statistical and other supporting quantitative analysis, Market Footprint studies of the use of LIBOR and T-bill rates as contractual reference rates, the potential legal risks associated with contract frustration, and the potential disruption associated with legacy contracts referencing USD LIBOR.

2.2. Overnight Rates

Overnight reference rates that are set or fixed by the U.S. Federal Reserve System ("the Fed") play a significant role in the U.S. economy and more broadly. Official central bank rates are deemed to be compliant with IOSCO reference rate principles. Because of their important current or potential benchmark applications, we recommend as reference rates the Federal Funds Effective Rate (FFER), Interest on Excess Reserves (IOER), and the rate set by the Federal Reserve on reverse repos conducted through its reverse repurchase (RRP) facility. We have concerns, described below, about the long-term viability and feasibility of FFER. In order to mitigate the transition risk associated with potential future changes in the Federal Reserve's monetary policy framework, we also recommend as feasible and viable a benchmark one-day general-collateral repo rate, which could be fixed based on a broad set of wholesale market transactions collateralized by U.S. treasuries.

2.2.1. Interest on Excess Reserves

U.S. central bank deposits are known as federal funds. IOER is the interest rate paid by the Fed to any designated financial institution on the portion of its federal funds that exceeds its reserve requirements.⁶ This rate is set by the Fed and is therefore perfectly robust to manipulation and measured without noise. IOER is paid on large discretionary federal funds deposits by numerous banks, and is therefore a liquid transactions rate. Although IOER is not currently used as a contractual reference rate, it is clearly feasible and could in principle become a popular reference rate, for example if FFER is at some point discontinued or becomes inactive or otherwise ineffective due to a change in the Fed's monetary policy. Because IOER changes relatively infrequently, it also has potential as a reference rate for contractual floating-rate payments at monthly or perhaps even quarterly frequency.

2.2.2. Federal Funds Effective Rate

The Federal Funds Effective Rate (FFER) is fixed by the Fed itself based on interbank overnight unsecured market transactions.⁷ FFER is viable as a reference rate, being used for the settlement of a large volume of futures contracts traded on the Chicago Mercantile Exchange, and of a smaller but still significant quantity of overnight indexed swaps (OIS), which are described in the next section.

Currently, FFER is near the near-zero target for it that is set by the Fed. As a result, large U.S. banks are unwilling to lend to other banks at rates near the FFER given the option to lend to the Fed at IOER, which is a higher rate. FFER is therefore heavily influenced by the rates at which certain U.S. federal agencies (which are not paid interest on their federal funds) lend to banks. Thus, FFER is currently based on a relatively narrow set of transactions and could be quite sensitive to changes in institutional market structure or the Fed's monetary policy approach.

Given these disadvantages, the MPG would hesitate to recommend FFER as a reference rate without the prospect of an improved fixing. The Fed has recently approved a transactions data repository⁸ to be based on submissions by banks of the "Report of Selected Money Market Rates" (Agency form FR 2420). These "2420 data" will cover a range of wholesale unsecured bank borrowings. The 2420 data will not include commercial paper (CP); however benchmark administrators may have access to other potential sources for CP transactions data, such as issuing and paying agents (IPAs). According to Fed H.15 data and other sources available to the MPG, there is an extremely large aggregate amount of these

⁶ <http://www.federalreserve.gov/monetarypolicy/regresbalances.htm>

⁷ <http://research.stlouisfed.org/fred2/series/FEDFUNDS>

⁸The abstract provided in the Federal Register states that "The FR 2420 would be a transaction-based report that collects daily liability data on federal funds, Eurodollar transactions, and certificates of deposits (CDs) from (1) domestically chartered commercial banks and thrifts that have \$26 billion or more in total assets and (2) U.S. branches and agencies of foreign banks with total third-party assets of \$900 million or more. The FR 2420 data would be used to support a range of functions including the daily implementation of monetary policy and the analysis of broad money market conditions." The CD data collected would be for transactions of \$1 million or more. See <http://www.gpo.gov/fdsys/pkg/FR-2013-12-16/pdf/2013-29773.pdf>

overnight unsecured transactions, allowing a robust fixing of FFER as a “broad-based unsecured dollar rate” should the Fed choose to use 2420 data for this purpose. If the Fed does not take this route, the private sector (for example the LIBOR benchmark administrator) could in principle fix and publish a similarly based wholesale unsecured overnight bank borrowing rate, provided that it has access to the necessary data.

2.2.3. Federal Reserve Reverse Repo (RRP) Fixed Rate

The Fed recently introduced a reverse repurchase facility that allows a wide range of market participants to enter overnight repurchase agreements with the Fed at a rate, which “will be announced with at least one business day prior notice on the New York Fed’s public website.”⁹ The latest announced fixed rate is a suitable reference rate if and when this facility becomes a regular program of the Federal Reserve. Because the RRP rate is set by the Fed, it can be measured without noise and is robust to manipulation by market participants. Some further advantages of the RRP rate as a benchmark, relative to FFER, are discussed in the appendix of a recent policy paper by Gagnon and Sack (2014).¹⁰

2.2.4. Overnight General Collateral Repo Rate

We also recommend as feasible and viable a potential new overnight benchmark rate, to be called for working purposes the Overnight General Collateral Repo Rate (ONGCR). This rate could at some point be used as a new foundation for the USD OIS market and for relevant futures contracts, in order to cover the contingency that the Fed Funds Effective Rate is eventually discontinued or becomes so untethered from true market financing conditions that it ceases to be an effective benchmark.

The Fed’s Reverse Repo Rate, discussed above, could also serve this purpose, but has two slight disadvantages. First, while the RRP rate is likely to set a floor on general collateral repo rates, it may not always be identical to the “market clearing” rate, at which marginal cash investors and marginal providers of collateral are indifferent to making additional trades. In general, market participants prefer benchmarks that have low basis risk with respect to the rates at which they conduct discretionary transactions. Second, one may wish to look ahead to some future era, perhaps 15 or 30 years from the present, when the Fed might wish to change the operational framework for its monetary policy. If by that time the OIS market is much bigger and relies on the RRP rate, a change in the Fed’s monetary policy approach could present a new and potentially disruptive transition situation. A relative advantage of the RRP rate is that it is set by the Fed, thus perfectly robust to measurement noise and to manipulation by market participants. That said, it can be anticipated that, far into the future, there will be significant volumes of transactions in overnight repo transactions backed by high quality collateral such as US treasuries. Generally, manipulation is relatively difficult with such a high volume of transactions.

⁹ http://www.newyorkfed.org/markets/rrp_counterparties.html

¹⁰ See “Monetary Policy with Abundant Liquidity: A New Operating Framework for the Federal Reserve,” Joseph E. Gagnon and Brian Sack, Peterson Institute Number PB14-4, January, 2014, at <http://www.iie.com/publications/pb/pb14-4.pdf>

The Overnight General Collateral Repo Rate could be fixed as a weighted average or median transaction rate on representative general collateral overnight repos backed by U.S. treasuries, using a method and data to be determined by the benchmark administrator or by its designated successor. The fixing need not be legally limited to transactions between specified sets of cash investors and providers of collateral. Rather, the pool of transactions underlying the fixing could be adjusted over time as institutional features of money markets change, so as to always capture a large and representative sample of well secured overnight transactions.

For the foreseeable future, it would be natural to include arms-length tri-party repos (perhaps therefore excluding intra-firm repos) that are backed predominantly by treasuries and cash. Some members of the Treasury Borrowing Advisory Committee suggested such a benchmark to the U.S. Treasury as a potential index underlying Treasury Floating Rate Notes.¹¹ This suggested Treasury GC Rate is *not* the General Collateral Finance (GCF) Repo rate, which is fixed by DTCC based on a brokered subset of tri-party repos between dealers.

Some issues concerning fixing-method design are: whether to include transactions based on non-treasury (e.g. U.S. agency) collateral, and whether to include some subset of general collateral bilateral (DvP) repos, or the brokered transactions underlying the GCF Repo Rate, or repos conducted by the Fed in its new RRP facility. These questions could be decided by the benchmark administrator, case by case, based on data availability, the legal definition of the benchmark, an index design that is most robust and useful to market participants based on the current institutional features of the market, including the potential impact of changes in the Fed's monetary policy operational framework.

The legal definition of the benchmark should be flexible enough to accommodate some natural changes over time in fixing method without triggering significant legal risk, so long as these changes have the intent of continuing to get a representative measure of well-secured overnight financing rates for major participants in USD money markets. An overarching objective is a benchmark that would be robust, transparent, and appealing to those market participants who are interested in contracting based on a rate that does not include a significant credit risk component.

¹¹ The Department of the Treasury stated, before ultimately choosing the Treasury Bill rate as its FRN index: "The other Index Rate we are considering for our floating rate securities program is a Treasury General Collateral (GC) Rate. Currently, approximately \$650 billion of Treasury securities are used as collateral in tri-party overnight loans each day. Money is lent to borrowers, collateralized by Treasury securities, at the overnight Treasury GC Rate. This rate represents transactions in a highly liquid market. While a Treasury GC Rate representing all tri-party repurchase agreement (repo) transactions currently is not published, the Depository Trust & Clearing Corporation (DTCC) publishes the Treasury General Collateral Finance (GCF) rate, which represents a subset of tri-party Treasury GC repo transactions. "See, DEPARTMENT OF THE TREASURY, Fiscal Service, 31 CFR Part 356 [Docket No. BPD-2012-0002] "Sale and Issue of Marketable Book- Entry Treasury Bills, Notes, and Bonds," December 5, 2012, at <https://www.treasurydirect.gov/instit/statreg/auctreg/ANPR2012.pdf>

2.3. Overnight Index Swaps (OIS)

Overnight index swaps (OIS) are over-the-counter derivative contracts. We illustrate with the terms of a 3-month OIS contract. At the end of the contract period, one counterparty pays the 3-month OIS term rate that was negotiated at the inception of the swap, in exchange for the rate computed by compounding a referenced overnight rate each day during the contract period, from the inception of the swap to the end of the 3-month term. In USD, the underlying overnight rate is currently FFER.

For benchmark applications in which there is no need or desire for the reference rate to include a term credit premium, the OIS rate is a viable choice. On average, OIS rates include a credit risk premium for unsecured bank exposure of only one day. The alternative low-risk rate on our recommended menu of reference rates, the T-bill rate, has advantages and disadvantages relative to OIS that we discuss in the section on T-bill rates.

Some members of the MPG view OIS as an important benchmark and believe that the OIS market could grow substantially given the opportunity. In the absence of LIBOR, for example, the OIS market could substitute for a significant fraction of the extremely large market for LIBOR-based interest rate swaps. Provided that OIS is robustly fixed, no MPG member has expressed a negative view concerning the usefulness of OIS term rates as benchmarks.

As explained in Section 2.2.2, we are concerned about the robustness of FFER, which underlies both OIR and FFER futures contracts. If the Fed decides to pursue the option of a more robust fixing of FFER based on its "2420" transactions data repository, this concern can be eliminated. Failing that, we would probably recommend the choice of a different overnight rate to underlie OIS, not to mention FFER futures contracts. The suitable potential alternatives include the GC repo rate discussed in Section 2.2.4. At this stage, it is too speculative to recommend such a switch, given the associated disruption of significant amounts of existing OIS and futures contracts and given our uncertainty about the Fed's intentions regarding a new fixing for FFER or the introduction of new official overnight rates.

We also recommend the establishment of a benchmark administrator for OIS fixings.

2.3.1. Term OIS Rates

Because OTC derivatives portfolios are increasingly collateralized on a daily basis, the term OIS rate is now widely used by derivatives dealers as a discount rate for the purposes of valuation and risk management of OTC derivatives portfolios.

As described in the Fixing Methods chapter, the primary method that we recommend for fixing the term OIS rate is based on executable quotes in recognized swap execution facilities (SEFs). The recommended backup fixing would be interpolated from transactions prices (for various delivery-date contracts) on the Chicago Mercantile Exchange 30-day Federal Funds Futures market.¹² A recommended futures-interpolation method is described

¹² http://www.cmegroup.com/trading/interest-rates/stir/30-day-federal-fund_contract_specifications.html

in the Appendix of the MPG report. This appendix provides empirical evidence that the futures-implied backup fixing would normally be a close approximation of the term OIS rate, although there have been some outliers, especially during the financial crisis of 2007-2009.

The primary fixing method, based on executable quotes, would be used only when SEF-based transactions volume and market depth have continually met stated quantitative criteria for a stated period of time. The application of these “go-live” criteria would mitigate frequent switches back and forth between primary and secondary fixing methods. These go-live criteria, provided in the OIS Fixing Methods section, are unlikely to be met by the time that the final MPG report is released. We recommend that the term OIS rate be considered as a feasible and viable reference rate for tenors of 1 month, 3 months, and 6 months, once the SEF market meets these go-live criteria, tenor by tenor.

2.3.2. Compounded Overnight Index Rate (OIR)

We also recommend as feasible and viable the “backward looking” compounded OIS rate (OIR), the compounded overnight rate paid on the floating side of overnight index swaps. Although the calculation of this rate is relatively obvious, we recommend that a daily fixing be published by the OIS benchmark administrator for each key tenor (1 month, 3 months, and 6 months).

Because this backward-looking compounded overnight rate is not observable until the end of the associated contract period, we recommend that contracts referencing this rate use the 2-day settlement convention currently used in the OIS market to accommodate the timely preparation of payments.¹³

Once the underlying overnight rates are determined, the fixing method for OIR rates is purely mechanical and therefore not subject to manipulation. Thus no backup fixing method is necessary, assuming that the underlying overnight rate has its own backup. As suggested by our previous discussion, the OIR rate could be based on other overnight rates, such as a new GC repo benchmark, should FFER become unavailable or become viewed as an inferior overnight reference rate.

2.4. U.S. Treasury Bills

We recommend as reference rates the money-market (actual/360) interest rates associated with secondary market transactions prices for U.S. Treasury bills (T-bills). We recommend T-bill reference rates at tenors of 1 month, 3 months, 6 months, and one year. With minor reporting changes, these rates could be fixed as reported daily by the U.S. Treasury Department,¹⁴ eliminating the need for a private-sector benchmark administrator.

¹³ For example, suppose the last day of the referenced contract period is a Tuesday. FFER is set at the end of the day (after all trades for the day are tallied). Most bank systems will have already commenced their end-of-day (EOD). It is therefore impractical for the Tuesday FFER fixing information be included in settlements for Wednesday. The final (Tuesday) FFER is therefore entered on Wednesday, run as part of the Wednesday EOD, and settlements are posted for Thursday payment.

¹⁴ <http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=billrates>

Because the secondary market for U.S. Treasury bills is as active and deep as that of any traded debt instrument, we believe that T-bill rate fixings would be robust to manipulation, a major advantage as a benchmark.

One-year T-bill rates are referenced by a substantial quantity of adjustable rate residential mortgage contracts,¹⁵ a sign of their viability as a benchmark. MPG members do not anticipate heavy additional contractual referencing of T-bill rates unless the corresponding-tenor LIBOR rates cease to be available as a benchmark.

Like an OIS rate, a T-bill rate is a viable choice in benchmark applications for which there is no need or desire for a reference rate that includes a significant credit risk premium. The U.S. Treasury is among the most credit-worthy borrowers in the world. Because of this safety and their extremely deep and liquid markets, T-bills are exceptionally desirable as collateral. T-bill prices therefore reflect an extra liquidity premium, akin to that of money, as well as a premium for specialness in repo markets.¹⁶ At times of severe market stress, whether domestically or internationally, T-bill rates also reflect a temporary “safe-haven” effect. These liquidity, specialness, and safe-haven effects vary over time, changing the spread between T-bills and other low risk rates. For most benchmark applications, there is no need or desire for a reference rate that includes these special price effects, because other market borrowing rates do not exhibit these effects. This could slightly lessen the desirability of T-bills as a contractual reference rate, other things equal. This factor is to be weighed against the superior robustness and transparency of T-bill rate fixings.

Some MPG members are firmly of the view that T-bill rates are unsuitable reference rates for interest-rate swaps.

2.5. Term Unsecured Bank Borrowing Rates (LIBOR+)

Historically, LIBOR arose as a loan-pricing benchmark that allowed banks in London to hedge their costs of funds with their floating-rate loan revenues. LIBOR is still popular for this application around the world. Based largely on the same advantages, MPG members prefer that LIBOR or some reasonably close substitute continue to be available as reference rate. T-bill rates and OIS rates are not viewed by them as sufficiently close substitutes for this application. For example, at times when the 3-month cost of unsecured bank funds has risen sharply due to market-wide credit stress, the spread between 3-month LIBOR and 3-month T-bill rates has widened significantly, sometimes increasing by well over a hundred basis points for significant periods of time, as illustrated in Figure 1. Changes in T-bill rates are negatively correlated with changes in LIBOR during significant stress periods.

All MPG members and all market participants surveyed by the MPG believe that market participants would benefit from access to a benchmark that is based on a term unsecured

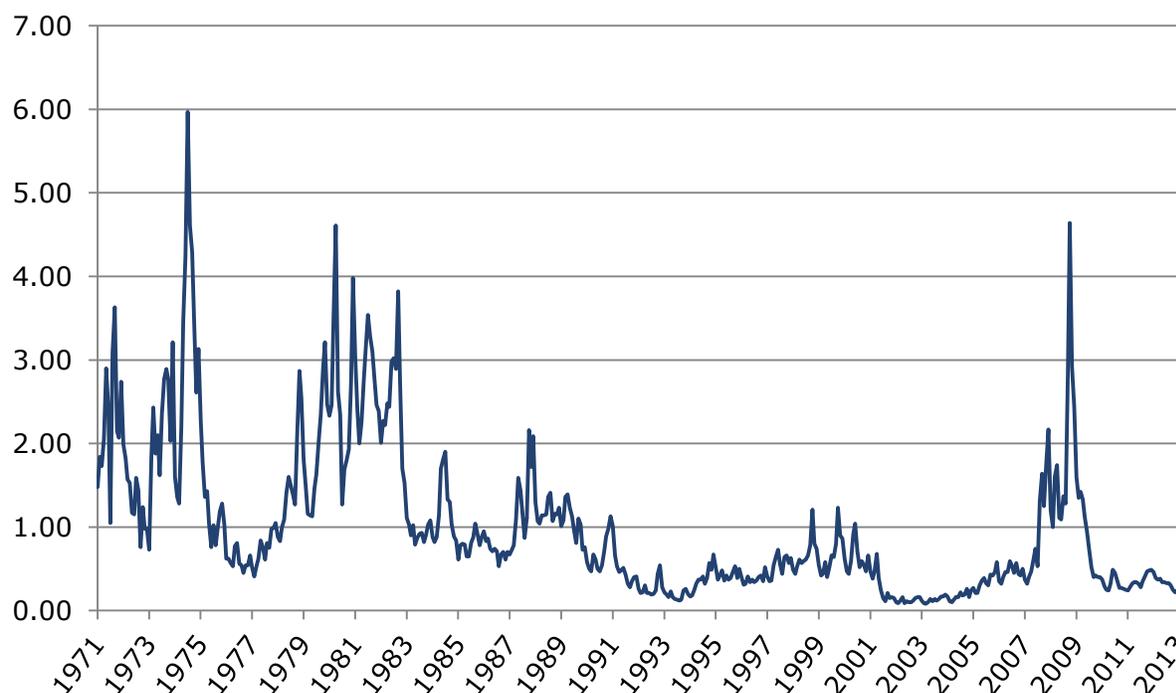
¹⁵ Our information suggests that the aggregate principle amount of residential mortgages referencing T-bill rates is in the hundreds of billions of dollars. The most popular tenor is one year.

¹⁶ When a financial instrument is highly desired as collateral but not sufficiently easily found, those who wish it as collateral are willing to lend at below market rates in order to obtain the specific collateral. The collateral is then said to be “on special.” The associated reduction in repo rate, the “specialness,” is a form of extra dividend to the owner of the collateral.

bank borrowing rate. Many market participants, including non-MPG members, have also expressed concern over the potentially disruptive cost of a discontinuation of BBA LIBOR, at least without some close replacement, given the large quantity of legacy-LIBOR contracts. These views are represented in the MPG's Outreach and Corporate Impact workstream reports.

After considering the costs and benefits, MPG members recommend the feasibility and viability of USD reference rates based on the wholesale unsecured cost of funds of banks at tenors of one month, three months, and six months. These reference rates, which we call "LIBOR+" for the purpose of this report, are estimates of term interbank borrowing rates. This in principle allows LIBOR+ to be used as a new fixing for BBA LIBOR wherever the approximation is close enough to avoid legal contract frustration, and of course if the benchmark administrator cooperates.

Figure 3: Libor - T-bill spread (3 months)



Our preliminary statistical analysis, discussed in the USD Fixing Methods report, suggests that LIBOR+ can indeed fixed as a reasonable approximation, on average, of BBA LIBOR for at least the one month and three month tenors. Any reasonably current IOSCO-compliant fixing, however, would be more volatile than a poll-based fixing such as that currently used for BBA LIBOR. Pending further legal analysis, and contingent on careful designs for fixing and transition, we believe that transitioning to LIBOR+ as a fixing for BBA LIBOR would nevertheless be unlikely to raise significant litigation challenges for at least the one-month and three-month tenors, where the degree of match between legacy BBA LIBOR and LIBOR+ is relatively high. The 3-month tenor of USD LIBOR is extremely heavily embedded in legacy contracts. Avoiding large transition costs is an added incentive to continue 3-month USD LIBOR with a new transactions-based fixing.

We are uncertain of the ultimate quality of the LIBOR+/BBA LIBOR match at the 6-month tenor, and the associated legal risks. We believe that some market participants would benefit substantially from the existence of a benchmark 6-month unsecured bank borrowing rate for at least a significant period of time.

Possible fixing methods for one-month, three-month, and six-month LIBOR+ are provided in the report of the USD Fixing Methods workstream. At the one-month and three-month tenors, we recommend fixings that closely match BBA LIBOR, historically and at the point of transition. These fixings are estimates of the rates on large interbank loans, tenor by tenor, based on data from transactions involving interbank deposits, bank commercial paper (CP), and "wholesale" certificates of deposit (CDs). The benchmark administrator could request access from the Fed to aggregate measures of rates and volumes for CDs and interbank term deposits, based on 2420 data. Combining these data with CP data that may be available through calculation agents is likely to allow reasonable estimates of interbank deposit rates at these two tenors. Backups can be based on extending the sampling window to include more lagged transactions,¹⁷ and extending the range of maturities at which transaction rates would be used for interpolation purposes.

For six-month LIBOR+, the USD Fixing Methods report discusses both the above method as well as an alternative approach that would first interpolate an estimated 6-month bank credit spread from observed credit spreads on transactions involving unsecured bank debt instruments across a wide spectrum of maturities, possibly ranging from 1 month to 2 years, as needed based on the thinness of market transactions at maturities closer to 6 months. These underlying debt instruments would include unsecured wholesale money-market instruments (interbank loans, CP, and CDs) as well as bank notes and bonds with short remaining maturities. Transactions data for notes and bonds would be obtained from TRACE. Once the 6-month interpolated credit spread is obtained, it would be added to an underlying low-risk benchmark such as the six-month T-bill rate to obtain the resulting fixing.

Despite its likely robustness, the complexity of this fixing approach for 6-month LIBOR+ may discourage its use as a reference rate in new contracts. In the future, the volatility of 6-month LIBOR+, whatever its fixing method, may encourage some market participants who had in the past referenced 6-month LIBOR to enter new contracts that reference some other benchmark such as the 6-month Treasury bill rate, the 6-month OIS rate (term or in-arrears), or 3-month LIBOR. There is also some risk that the volatility of the fixings of 1-month and 3-month LIBOR+ could discourage some market participants from referencing these rates in new contracts over the long run. In that case, there would be some degree of substitution toward other benchmark reference rates.

¹⁷ For empirical evidence regarding the the reduction in sampling noise permitted by the use of lagged interbank loan transactions data, see "[A Sampling-Window Approach to Transactions-Based LIBOR Fixing](#)" by Darrell Duffie, David Skeie, and James Vickery, Federal Reserve Bank of New York Staff Report Number 513, February 2013.

3. Fixing Methodology

3.1. Overview - Building a market-based USD Libor

As its name suggests, LIBOR is intended to reflect interbank lending rates. Historically, a panel of prime banks has submitted daily estimates of interest rates reflecting where each bank could borrow in institutional size for specified maturities. Although there are well known pitfalls to this estimation process, the lack of volume and transparency in the interbank market makes it difficult to construct a transaction-based Libor substitute.

However, many prime banks regularly borrow in institutional size, and in various maturities, from non-bank lenders via the US money markets. Unsecured money market instruments such as commercial paper and negotiable certificates of deposits are close substitutes for the interbank lending intended to be captured by LIBOR. Here too, market transparency is a challenge. But unlike the interbank market, a substantial amount of money market trade data exists, although it is not publicly available.

In the US, CP and CD issuers rely on Issuing and Paying Agents (IPAs) to help settle transactions and pay investors. As part of their normal operations, IPAs capture basic trade information for each instrument issued by each issuer. This information includes settlement and maturity dates, yield and trade size. Both US and foreign-based banks make use of IPAs in settling their money market transactions. In addition to the IPAs, we believe similar information is also captured by the Depository Trust & Clearing Corporation (DTCC), although it is also non-public. If this information can be made available to an index administrator, we believe it would support the calculation of a Libor-like, transaction based index (Libor+).

Exhibit 1: IPA money market data

| | | Number of Trades | | | | | Number of Issuers | | | | | Volume (\$mn) | | | | |
|-----------|------|------------------|-----|-----|-----|-----|-------------------|----|----|----|----|---------------|--------|-------|-------|-------|
| | | O/N | 1W | 1M | 3M | 6M | O/N | 1W | 1M | 3M | 6M | O/N | 1W | 1M | 3M | 6M |
| Daily Avg | 2014 | 468 | 74 | 21 | 19 | 18 | 15 | 9 | 7 | 8 | 7 | 20,223 | 3,204 | 888 | 706 | 718 |
| | 2013 | 511 | 95 | 18 | 25 | 13 | 16 | 9 | 6 | 8 | 6 | 22,312 | 4,157 | 702 | 1,006 | 474 |
| | 2012 | 344 | 62 | 24 | 31 | 13 | 17 | 10 | 8 | 9 | 5 | 14,889 | 2,637 | 888 | 1,211 | 452 |
| | 2011 | 435 | 79 | 38 | 34 | 18 | 21 | 15 | 14 | 11 | 5 | 18,945 | 3,356 | 1,407 | 1,331 | 706 |
| Daily Max | 2014 | 538 | 127 | 42 | 45 | 40 | 17 | 13 | 10 | 12 | 11 | 23,853 | 5,460 | 1,869 | 1,903 | 1,861 |
| | 2013 | 878 | 280 | 78 | 126 | 76 | 20 | 18 | 13 | 17 | 15 | 39,722 | 13,043 | 3,479 | 5,904 | 2,892 |
| | 2012 | 521 | 225 | 80 | 112 | 55 | 24 | 20 | 19 | 19 | 13 | 22,985 | 10,007 | 3,613 | 4,539 | 2,140 |
| | 2011 | 666 | 263 | 113 | 107 | 112 | 27 | 25 | 32 | 24 | 15 | 30,015 | 11,686 | 4,982 | 4,642 | 4,985 |
| Daily Min | 2014 | 406 | 31 | 3 | 8 | 2 | 14 | 5 | 3 | 4 | 2 | 16,998 | 1,279 | 77 | 222 | 50 |
| | 2013 | 187 | 7 | 1 | 1 | 1 | 13 | 3 | 1 | 1 | 1 | 6,910 | 204 | 5 | 1 | 1 |
| | 2012 | 33 | 4 | 0 | 2 | 0 | 7 | 2 | 0 | 1 | 0 | 1,399 | 124 | 0 | 64 | 0 |
| | 2011 | 235 | 10 | 3 | 3 | 0 | 17 | 4 | 1 | 1 | 0 | 9,608 | 242 | 75 | 24 | 0 |

Note: Maturity buckets are defined as follows: O/N=1d to 4d, 1W=6d to 8d, 1M=28d to 32d, 3M=85d to 95d, 6M=175d to 185d.

A unit of J.P. Morgan Chase (JPMC) is a major provider of IPA services, with a company-estimated 40-45% market share. Under the condition of issuer client anonymity, JPMC provided daily bank and financial CP and CD data from 2011 through January 2014. We

believe this data is generally representative of the US money markets with respect to maturities, yields and relative scale.

Exhibit 1 contains daily issuance averages based on the data provided by JPMC. The exhibit shows that most of the transactions are very short-dated, essentially overnight, with the number of transactions decreasing as maturity extends. While the data indicates a marginally lower number of contributing issuers in the 6m sector, relative to the 1m and 3m buckets, we believe that, should this proposal be adopted, the remainder of the market transactions not captured by JPMC (estimated 55-60% market share) should provide for adequate volumes at all maturities.

However, in the event that this is not the case, it is possible to amplify the statistical power of the 6m point by combining money market data with trade observations from the bond market. In particular, we can use index-eligible (investment-grade senior bank issues with an issue size of at least \$300mn) bank debt issues traded in the secondary market and posted to the publicly available TRACE database.

3.2. Methodology for Constructing LIBOR

The proposed methodology uses money market transactions to fix overnight (O/N), 1-week (1w), 1-month (1m), 3-month (3m) and 6-month (6m) USD Libor. In a different section we also offer an alternate fixing methodology for the 6m point in the event that all available IPA transactional data is found to be inadequate. Highlights of the proposed methodology are as follows:

- We use transactional data from the money markets with a Tier 1 short-term rating, i.e. a level 1 rating from all three rating agencies. This filter was introduced to achieve short-term credit homogeneity in the data set and includes 94% of all transactions.
- In order to remove the influence of variations in the risk-free rate from our analysis, all traded yields are combined with the corresponding matched-maturity Treasury yield to arrive at a spread-to-Treasury yield.
- All transactions are then grouped into one of five maturity buckets: O/N=1d to 4d, 1w=6d to 8d, 1m=28d to 32d, 3m=85d to 95d, 6m=175d to 185d. This bucketing scheme implies that transactions falling outside the maturity windows are excluded from the Libor+ calculation (effectively 15% of all transactions). However, the inclusion of this filter is necessary to achieve maturity homogeneity in the contributing data set. Attempting to include all transactions into one of the five benchmark maturities invariably results in excess volatility as the average maturity in a given bucket can fluctuate considerably.
- Each trading day we identify all debt by a given issuer in a given maturity bucket and calculate the average spread, thus producing one contribution to our Libor panel. This procedure is designed to give each issuer the same weight regardless of the number and volume of trades.
- For days when a given issuer (in a given maturity bucket) does not trade, we use the last valid average spread as its contribution. The key to our proposal lies in a weighting function that gives a lower weight to contributors whose last issuance occurred on a prior day, where the weight decreases with the number of days since issuance.

Contributors who issued today, by contrast, are given a weight of one in the calculation of the cross-sectional average. This methodology is designed to address the idiosyncratic nature of market trading, where not every issuer will come to the market every single day in every single maturity, causing a large amount of daily variation in the contributing panel. By utilizing the last available quote, and weighting it by age, we create continuity in the panel and thus remove any systematic volatility that might arise from normal daily fluctuations.

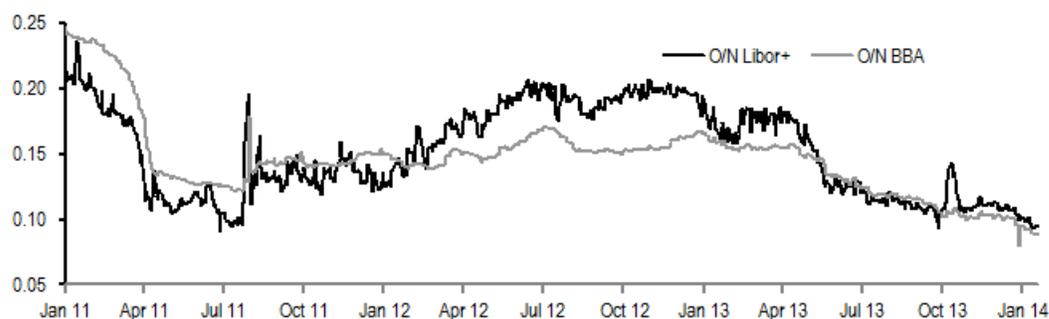
- Within each bucket, we then calculate a trimmed weighted average spread, where the weight is calculated as described above and applied cross-sectionally. The trimming mechanism is applied to remove outliers, much in the same way as it is used in the current benchmark construction. In particular, we remove the top and bottom quartiles in the average spread for each maturity.
- Finally, we add back the Treasury rate to each maturity (we use a fitted Treasury par yield) to compute an estimated Libor proxy rate for each tenor.

Exhibit 2: Comparison of Libor+ to BBA Libor

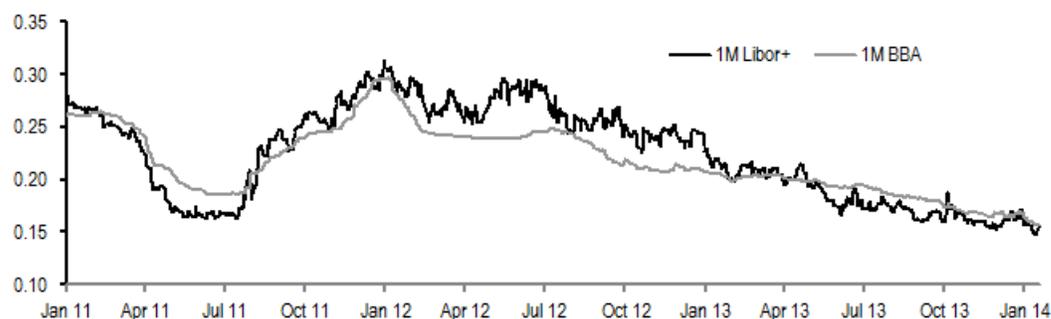
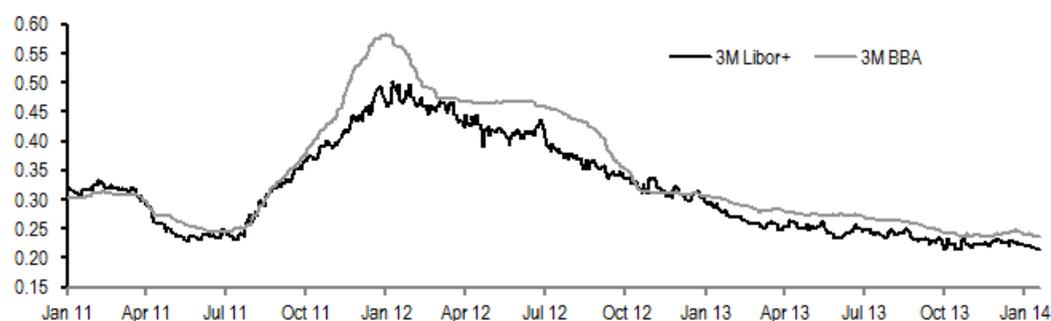
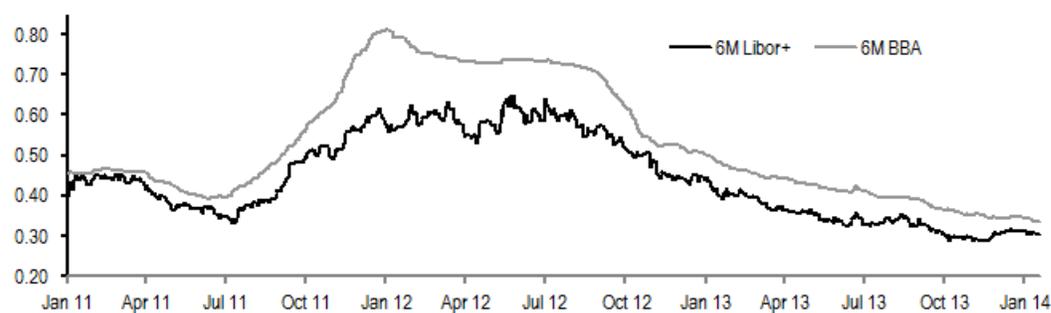
| Tenor | BBA | | | Libor+ | | | Diff | | | OIS | | |
|-------|------|-------------|-------------|--------|-------------|-------------|------|-------------|-------------|------|-------------|-------------|
| | Avg | Ann Std Dev | Dly Std Dev | Avg | Ann Std Dev | Dly Std Dev | Avg | Ann Std Dev | Dly Std Dev | Avg | Ann Std Dev | Dly Std Dev |
| O/N | 0.15 | 4.1 | 0.26 | 0.15 | 9.9 | 0.63 | 0.5 | 5.8 | 0.4 | 0.12 | 6.4 | 0.41 |
| 1W | 0.18 | 2.4 | 0.15 | 0.17 | 7.8 | 0.50 | -0.5 | 5.4 | 0.3 | 0.12 | 5.8 | 0.37 |
| 1M | 0.22 | 1.9 | 0.12 | 0.22 | 8.3 | 0.52 | 0.7 | 6.3 | 0.4 | 0.12 | 5.3 | 0.33 |
| 3M | 0.34 | 3.2 | 0.20 | 0.32 | 9.0 | 0.57 | -2.6 | 5.8 | 0.4 | 0.12 | 5.1 | 0.32 |
| 6M | 0.53 | 4.0 | 0.25 | 0.45 | 13.3 | 0.84 | -8.6 | 9.3 | 0.6 | 0.13 | 5.8 | 0.37 |

Exhibit 2 provides a comparison of Libor+ to BBA Libor using daily observations from January 2011-January 2014. The period includes a sub-period of stress in the money markets during 2H11 when the sovereign debt crisis in Europe caused significant widening in money market spreads.

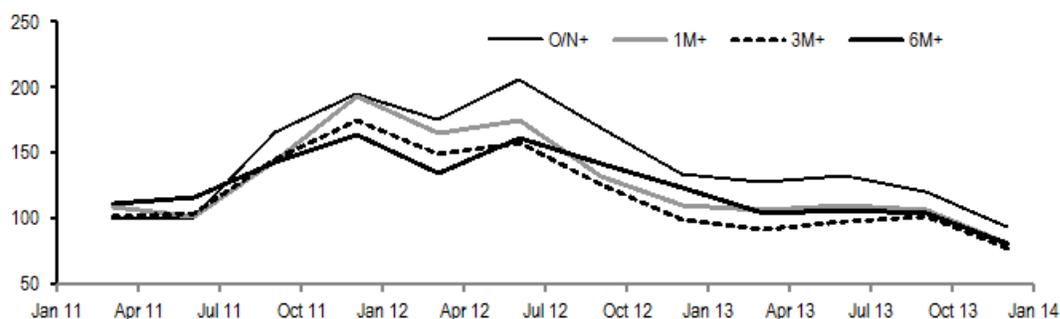
Exhibit 3: Comparison of O/N Libor+ to O/N BBA Libor



In all tenors up to 3 months, Libor+ tracks BBA Libor reasonably well. The average spread between Libor+ and BBA Libor over the period is 0.5, -0.5, 0.7 and -2.6 bp for O/N, 1w, 1m and 3m, respectively (a positive number means Libor+ is higher). The observed standard deviation of daily changes is also reasonable when compared against the corresponding values of OIS (we should expect Libor+ to be at least as volatile as OIS, a behavior that BBA Libor does not exhibit).

Exhibit 4: Comparison of 1M Libor+ to 1M BBA Libor**Exhibit 5: Comparison of 3M Libor+ to 3M BBA Libor****Exhibit 6: Comparison of 6M Libor+ to 6M BBA Libor**

In the 6m sector, on the other hand, and to a lesser extent also in the 3m sector, Libor+ is noticeably lower than BBA Libor. This behavior cannot be attributed to an inadequate availability of data in the sector, since Exhibit 12 in the Technical Appendix shows that the number of effective contributions is largely comparable to that observed in lower maturities. This behavior is actually a consequence of the credit composition of issuers across maturities. Only higher quality borrowers have access to longer term borrowings and this bias is more pronounced the longer the term and the higher the stress in the market. This effect can be seen in Exhibit 7, which shows the weighted average CDS of the issuers contributing to Libor+ in each maturity bucket, averaged over each quarter since 2011 (the weighting factors are the same that are used to produce the Libor+ estimate). In this sense, Libor+ better tracks the credit quality of issuers who are actually funding in the money markets in each maturity sector.

Exhibit 7: Weighted average CDS**3.3. Alternate Method for 6M Libor+**

There is a possibility that even if the methodology presented earlier can access the entire set of money market transactional data, it may still be found inadequate for the calculation of the 6m point, especially in times of stress. In this section we outline an alternate method that makes use of trade observations from the bond market to amplify the statistical power of the 6m estimate. Highlights of the proposed methodology are as follows:

- We use index-eligible (investment-grade senior bank issues with an issue size of at least \$300mn) bank debt issues traded in the secondary market and posted to the publicly available TRACE database.
- As before, in order to remove the influence of variations in the risk-free rate from our analysis, all traded yields are combined with the corresponding matched-maturity Treasury yield to arrive at a spread-to-Treasury yield.
- We consider only transactions with a final maturity in a 90-day range around the 500 day point. The reason behind this particular choice is to select a maturity range as close as possible to the 6-month point we are trying to estimate while at the same time making sure there is enough data available in it. Since index-eligibility requires a final maturity of at least 1 year, there are relatively few trades at the 365 day point and we are thus forced to move out the term structure.
- Each trading day we identify all debt by a given corporate name and calculate the average spread. For days when a given name does not trade, we use the last valid average spread as its contribution.
- We then calculate a trimmed weighted average spread, where the weight is calculated as described above and applied cross-sectionally. The trimming mechanism is applied to remove outliers, much in the same way as it is used in the current benchmark construction. In particular, we remove the top and bottom quartiles in the average spread for each maturity.
- Through this point, we have arrived at an estimate of the Libor+ spread-to-Treasury for a maturity around 500 days. To produce an estimate for 6M Libor+ we then linearly interpolate between this value and the 3M Libor+ spread-to-Treasury estimate obtained earlier.

- Our final estimate is produced by computing the average of this value and the 6M Libor+ spread-to-Treasury obtained using money market data only, and adding back the Treasury rate. Exhibit 8 shows a comparison to BBA Libor.
- This alternative estimate also tracks BBA Libor quite closely, with Libor+ 3.3 basis points below BBA Libor, on average since 2011.

Exhibit 8: Comparison of an alternate 6M Libor+ to 6M BBA Libor

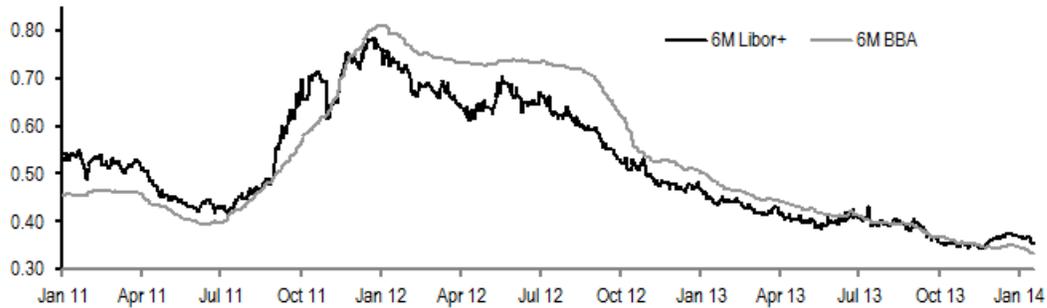
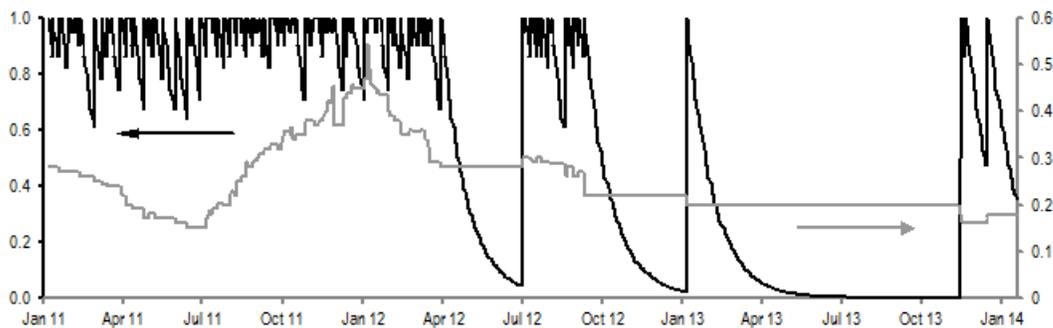


Exhibit 9: Illustration of the weighting methodology

Weighting factor (left) versus last valid issuance yield (right)



4. Transitions

4.1. Overview

The goal of this report is to identify issues, consider solutions and provide initial recommendations for transitioning USD cash and derivatives products from the current LIBOR framework to an alternative reference rate framework proposed by the MPG. This report should be read in conjunction with other draft workstream reports, including those on “Benchmark Transitions for Derivatives Markets”, “USD Fixing Methodology” and “Reference Rate Menu – USD”.

The USD markets cover a wide range of products that reference USD LIBOR in both the wholesale and consumer sectors. The depth, global extent and complexity of products in the USD markets make the potential transition from USD LIBOR to a new set of benchmark rates arguably the most challenging of all such transitions being contemplated by the MPG. While interest rate derivatives represent the largest USD volume by notional principal amount, there are a very significant absolute number of contracts across multiple product areas and with long maturity dates referencing USD LIBOR. A transition to a new benchmark therefore requires extensive consideration of the legal, operational and infrastructure risks across a broad range of markets and users, as well as the potential persistence of these risks over a potentially lengthy transition period. Transition issues related to USD derivative markets are comprehensively discussed in the parallel USD derivative report.

The report is organized as follows:

- Section 4.2 provides a **classification scheme for potential transitions** in order of increasing risk and complexity. This paper adopts the overall transition taxonomy framework described in the Transitions Cross-currency Summary. Type I transitions comprise reforms or modifications to existing benchmarks to improve their integrity and robustness, minimizing legal contract risks and market disruption. Type II transitions are those for which a new benchmark is introduced and where the existing benchmark will ultimately be discontinued.
- Section 4.3 summarizes the relevant considerations for transition by product from the USD **Market Footprint** workstream.
- Section 4.4 outlines **considerations, and high level recommendations where appropriate**, with respect to transitions for USD LIBOR products. Many of these considerations apply to other currencies also.

Summary recommendations are described in the table below. These recommendations and associated considerations are discussed in detail in the respective report sections.

| Theme | Recommendation |
|--|---|
| USD Market Footprint | <ul style="list-style-type: none"> The maturity distribution of contracts across product segments is a significant input into the length of time for which a current benchmark is maintained in parallel to a new benchmark. Initial market footprint analysis in USD indicates that benchmark administrators should continue to produce LIBOR for a medium term period of up to 5-7 years to allow for legacy contracts to mature, depending on the transition type contemplated. |
| Legal | <ul style="list-style-type: none"> As part of the transition process, new or revised benchmark definitions and the product contracts that reference them should be constructed going forward to provide flexibility for modifications to benchmarks or reference rates in the future. |
| Infrastructure | <ul style="list-style-type: none"> As part of transition planning, consideration needs to be given to developing new market utility infrastructure such as trade data depositories, the building of new systems for the transmission of trade or rate data, the adjusting of internal systems to incorporate new benchmark rates for pricing, valuation and risk models, and potentially the establishment of infrastructure to support the parallel running of the old and new benchmark. Benchmark administrators, trade associations and the official sectors should be consulted in the early stages of transition to ensure that all infrastructure requirements and issues are addressed before any proposed change-over dates. |
| Maintaining LIBOR During Transition | <ul style="list-style-type: none"> For transitions to a new benchmark (Type II), legacy USD LIBOR should be continued during the full transition period, with a “clean-up” mechanism for maintaining contracts at the end of the period. The transition process will need to include means to incentivize existing IBOR administrators and panel bank data contributors to continue to provide the legacy benchmarks (reformed as planned) during the transition period. If a transition path is chosen such that it is necessary to maintain LIBOR, consideration should be given to who is responsible for maintaining the legacy rate, whether the method for determining the legacy rate should change and the length of period for which the rate should be maintained. The possibility of fixing a conversion at the end of the transition period between the new benchmark and legacy LIBOR should be explored, as an aid to resolving legacy contract issues. |
| Role of the Benchmark Administrator | <ul style="list-style-type: none"> Current benchmark administrators should be consulted early in the design and execution of the benchmark transition. |
| Transition Process | <ul style="list-style-type: none"> Under a Type I (a) transition type scenario, an immediate cut-over is preferable; whereas a hard cut-over with a transition period is recommended for a Type I (b) transition. Under a Type II transition type scenario, a market-led transition or a hard cut-over with a transition period is best structured to handle the increased infrastructure needs, potential high costs for financial institutions, and the need for a longer time-horizon. |
| Role of the Official Sector | <ul style="list-style-type: none"> Support the development and operation of market utilities through which benchmark determinations are made. Consider legislation or regulation to support the robustness of enhanced or new benchmarks. Provide support to markets referencing new or modified benchmarks. Consider undertaking a review of regulatory capital, tax, and accounting rules that could discourage market participants from transitioning to a new benchmark. |

4.2. Transition Taxonomy

The risks and potential impacts of benchmark transition depend significantly on the contemplated benchmark reforms. As such, it is important to articulate the various reform and transition options that may be implemented when developing a transition plan. The Transition Taxonomy described in the Transitions Executive Summary presents a framework for analyzing transition options.

Type I transitions comprise reforms or modifications to existing benchmarks to improve their integrity and robustness. Such transitions would be specifically designed to minimize legal contract risks and market disruption. Moving to a “hybrid” determination of LIBOR based on a combination of quotes and transaction data, or other revised fixing methods, might fall into this category. Type II transitions are those for which one or more new benchmarks are introduced and where the existing benchmark will ultimately be discontinued. Transitions combining Types I and II could also be envisaged. For example, a reformed LIBOR (Type I) might continue in use for balance sheet/funding oriented products, while derivatives activities might migrate to new benchmarks such as OIS (Type II). The considerations and recommendations discussed in Section 4.4 below need to be tailored according to the transition type contemplated.

4.3. Transition Considerations of USD Market Footprint

A full analysis of the usage of USD LIBOR in financial contracts is given in the USD Market Footprint Analysis. That section describes the distribution of contractual maturities of products referencing USD LIBOR and the distribution of USD LIBOR tenors used by product.

The distribution by contract maturity is relevant to considerations of the length of transition period that may be needed, particularly under a Type II transition to new benchmarks. To the extent that the bulk of legacy contracts mature within the medium term of say, five years, it may be preferable to continue to produce LIBOR for at least that period, in parallel with any new benchmark, to reduce the volume of legacy positions that have to be ultimately transitioned. This would serve to reduce both the operational burden of contract changes and the legal risks in discontinuing LIBOR.

The distribution by LIBOR tenor is relevant to both Type I and Type II transitions. Volumes in the interbank market represented by the current USD LIBOR are limited beyond 3 months. For Type I redesigns of the current LIBOR or Type II transitions to new benchmarks, consideration needs to be given to either discontinuing the longer tenors or to finding viable alternative determination methods (Type I) or replacement rates at these tenors (Type II).

Specific recommendations include:

- Continuing the publication of LIBOR for a period of 5-7 years should be sufficient to allow for the majority of legacy contracts to mature during a transition period.
- Consider replacing the fixing methods for longer-term tenors where liquidity is low with a hybrid model based on a wider mix of bank financial instruments with maturities up to 3 years.

4.4. Transition Considerations and Recommendations

4.4.1. Transition Precedents

Lessons can be learned from historical precedents of benchmark transitions. However, there appear to be only limited examples of precedents involving fundamental changes to financial benchmarks which are specific to USD-denominated products and certainly none of the scale involved for a transition away from USD LIBOR.

- The most relevant precedent, which is similar in potential size, scope, and impact, of a benchmark transition is that of the transition to the Euro, with respect to both currencies and interest rates.
- Key lessons learned include:
 - In many successful benchmark transitions, there was a long consultative process, with key roles were played by members of the official sector and trade associations. In the case of the Euro transition, the use of official sector legislation and regulatory supervision served to reduce legal risk. A transition should be preceded by a consultation process involving all major stakeholders. This includes the official sector, trade associations and benchmark administrators.
 - Simultaneous transitions of different products and currencies are critical to ensure that there is no market disruption, particularly of hedges.
 - Market protocols, such as those sponsored by ISDA, are very useful for derivatives and other wholesale products. However, market protocols may not be effective in the consumer product markets.
 - Type II transitions have been most successful when both the old and new benchmarks were run in parallel for an extended period. Parallel runs have allowed market participants to react freely to the implementation of a new benchmark and to effectively develop infrastructures that allow for full transition after a set period of time.

4.4.2. Legal Recommendations

Transition arrangements will need to include provisions to reduce legal and documentation risks. Details regarding legal considerations and recommendations can be found in the USD Currency Report Executive Summary and Legal Analysis section. The USD Legal Analysis section includes a survey of the “legal footprint” of contractual characteristics of the products discussed in the market footprint analysis. This survey should continue to be developed in consultation with relevant stakeholders.

As part of the transition process, new or revised benchmark definitions and the product contracts that reference them should be constructed going forward to provide flexibility for modifications to benchmarks or reference rates in the future.

4.4.3. Infrastructure Requirements

The requirements for new infrastructure and/or modifications to existing infrastructure are highly dependent on the type of transition and the determination methods for new or modified benchmarks.

Specific considerations and recommendations include:

1. Development of new or re-purposed market utility infrastructure, particularly trade data repositories, may be needed to support transaction-driven approaches for determining a reformed LIBOR or for determining a newly defined rate benchmark. Both updates to existing repositories or the development of new repositories may be necessary, depending on the chosen reference rate. Such repositories will need to meet high standards of reliability, data protection and confidentiality. For USD markets, there may be potential to leverage existing utilities such as DTCC or proposed public sector facilities such as a Federal Reserve “2420” data repository. Please refer to section 2 – USD Reference Rate Menu for details on proposed public sector facilities.

When implementing the transition process, strategic decisions will need to be made on how the costs of such utilities will be covered and on the role of public versus private sector providers of such utilities. Given that USD benchmarks are global in nature, consideration will also have to be given to cross-border data transmission and data privacy issues for data contributors based in jurisdictions other than where the repositories are located.

2. Data contributors to new or modified benchmarks may need to implement or build systems for transmission of trade or rate data. This will be a particular consideration if benchmark determination is based off a wider contributor pool, including for example, corporate treasuries.
3. Internal systems at financial institutions may need to be modified to incorporate new benchmark rates for valuation and risk models. Although many existing standard derivative platforms will have the required flexibility, core systems used in retail and commercial banking segments may require more significant modifications. Bespoke systems used for structured products may also require careful analysis and upgrades.
4. For transitions involving a period of parallel use of current LIBOR and new benchmark rates, dual infrastructure to support the old and new benchmarks may be necessary.
5. Benchmark administrators, trade associations, and the official sectors should be consulted in the early stages of transition to ensure that all infrastructure requirements and issues are addressed before any proposed change-over dates.

4.4.4. Maintaining LIBOR During Transition

Type II transitions, where a specific change-over date from legacy benchmark to a new benchmark (hard cut-over) is not envisaged, may entail a protracted period when both the current LIBOR and the new reference benchmark(s) need to be produced. In this case, legacy USD LIBOR should be continued during the full transition period, with a “clean-up”

mechanism for maintaining contracts at the end of the period. The associated considerations and recommendations, though not specific to USD LIBOR, include:

- **Responsibility for maintaining legacy LIBOR:** Incentives may have to be offered to the LIBOR administrator to continue to produce the legacy rate, as the commercial proposition to do so may not be attractive in the light of declining licensing volumes and ultimate termination. This will particularly be the case if the LIBOR administrator will not be the administrator of the replacement benchmark. Similarly, panel banks may need to be incentivized (or compelled under the UK legislation applicable to USD LIBOR) to continue their contributions to the legacy rate.
- **Method for determination of legacy LIBOR:** Maintaining the current panel bank approach (reformed as planned) would offer the lowest legal contract frustration risk. However, this may not be feasible, for the reasons just described, nor desirable if a more transaction-oriented approach could be developed even for the current rate. Similarly, if an active basis market develops between old and new rates, it might be possible to base LIBOR determination off of a combination of the new rate (assuming that it is robustly supported) and the basis market.
- **Length of period for which legacy LIBOR is required:** Obviously the legacy rate will be required at least until the end of the formal transition. However, even after the new benchmark is the sole reference for new contracts and the majority of legacy market contracts have been converted or matured, there may still be a very long-tail rump group of contracts that cannot be readily converted. Moreover, if a basis market develops between old and new benchmarks, the associated market-makers may require a clean-up provision at the end of the formal transition for any outstanding basis trades. In both cases, it may be necessary to provide some, possibly mechanically derived, version of LIBOR for the long term, for example, by establishing a fixed basis conversion against the new benchmark.

4.4.5. Role of Benchmark Administrators

Benchmark administrators will be critical to any transition, particularly with regard to infrastructure requirements, fixing rate methodology implementation, and coordination across the market. Specific considerations and recommendations relating to the role of benchmark administrators include:

- The Administrators will be key to implementing and communicating any transition process and assuring that any new or modified benchmark meets regulatory standards, including the IOSCO Principles. The Benchmark Administrator will be also responsible for maintaining the integrity of the benchmark and coordinating with the official sector as appropriate.
- Benchmark administrators should be consulted early in the design and execution of the benchmark transition.

4.4.6. Transition Processes

Four possible transition processes are outlined below, followed by an assessment of their applicability to Type I or Type II transitions. The transition processes described below are not mutually-exclusive and may be applied in combination to induce different product classes to migrate naturally to different benchmarks.

1. **Seamless:** Revise the benchmark's definition (what the benchmark is intended to represent) and/or develop a methodology for generating a new benchmark from transactions or executable markets. This revised methodology would need to generate very similar results in back-tests. The definition change would occur such that it is in line with the new benchmark methodology but allow banks to keep providing quote submissions (1998 LIBOR definitional changes or the Wheatley Review changes may provide precedents here). The final step would involve changing the determination of LIBOR from bank submissions to a transactions-based approach.
2. **Successor Rate:** Terminate LIBOR after a notice period (12-18 months) and transition all contracts to the new reference rate.
3. **Parallel with Hard Cut-Over:** Launch new reference rate, run rates in parallel during transition period (5-7 years), and then discontinue LIBOR after transition period.
4. **Market-Led:** Launch new reference rate while retaining LIBOR, and allow the market to decide which is preferable.

The table below evaluates each transition process according to three criteria: (i) Whether a fixed transition date is proposed; (ii) Whether the current benchmark must be maintained; and (iii) Whether the transition is mandatory or discretionary. A mandatory transition is one in which the legacy benchmark will not be published beyond a specified cut-off date (this does not preclude the legacy benchmark being published during the transition period as in (3.)).

| Transition Path | Fixed Transition Date? | Maintenance of Current Benchmark? | Discretionary Transition or Mandatory? |
|------------------------------------|------------------------|-----------------------------------|--|
| Seamless | Yes | No | Mandatory |
| Successor Rate | Yes | No | Mandatory |
| Parallel with Hard Cut-Over | Yes | Yes | Mandatory |
| Market-Led | No | Yes | Discretionary |

The table below evaluates the feasibility of each transition process, given the type of transition and benchmark reform that is contemplated.

| Transition Type | Transition Process | | | | |
|-----------------|--|----------------|-----------------------------|------------|----|
| | Seamless | Successor Rate | Parallel with Hard Cut-Over | Market-Led | |
| Type I | <u>Type I (a)</u> – Administrative Reforms to LIBOR | ✓✓ | X | ✓ | X |
| | <u>Type I (b)</u> – Limited definition change and rate determination methodology change to LIBOR | ✓ | X | ✓✓ | ✓ |
| Type II | <u>Type II (a)</u> – Replace with a single different, existing benchmark | X | ✓ | ✓✓ | ✓ |
| | <u>Type II (b)</u> – Replace with a single, completely new benchmark | X | X | ✓✓ | ✓ |
| | <u>Type II (c)</u> – Replace with a range of new benchmarks, varying by product and currency | X | X | ✓ | ✓✓ |

✓✓ – Recommended Transition Process ✓ – Feasible Transition Process X – Not recommended transition process

In order to address such considerations, as mentioned before, a potential transition solution may incorporate one or more transition types and processes. Providing an IBOR+ (Type I Transition) as well as urging use of an existing benchmark, such as OIS, for certain products could allow for an effective transition which minimizes the problems that arise when attempted to craft or implement a transaction-based benchmark.

Under a Type I scenario where a change is made to either the definition or the rate determination methodology, a seamless transition is preferable. If the new benchmark is published on the same page by the same administrator throughout the transition period, and the official sector is supportive of the updated benchmark, there may be low risk of contract frustration. Furthermore, this transition would likely require the least amount of new infrastructure development and does not pose a significant risk of market disruption. Under this scenario, it is possible that rate contributors may decide to suspend their participation depending on the development of any new requirements of participating institutions, which may be mitigated by official sector involvement as described in Section 4.4.7. While a hard cut-over with a parallel transition period is certainly feasible for a Type I transition type, as shown in the table above, it is unlikely that a prolonged transition period will be needed if fundamental changes to benchmark references in product contracts are not necessary. However, under a Type I (b) transition, the transition period would be beneficial to allow the market to become comfortable with the new fixing methodology and also deal with any operational issues, resulting from a new methodology.

If a Type II benchmark transition is envisaged, then a parallel transition period is recommended to handle the increased infrastructure needs, potentially higher costs for financial institutions, and the need for a longer time-horizon for contracts referencing a legacy benchmark. Additionally, the transition period is critical as it allows the market to handle any operational and legal challenges associated with a new benchmark well in advance of the adoption of the new benchmark. A hard cut-over is further recommended if the Type II transition involves a well-defined alternative benchmark. An announced discontinuation date associated with the transition to a defined benchmark will give the market sufficient advance notice and impetus to begin making operational, legal, and infrastructure adjustments during the transition period. During this transition period, new contracts referencing the outgoing benchmarks would be prohibited or restricted, further reducing the market inertia of the outgoing benchmark.

A market-led transition would be suitable for a Type II transition involving multiple benchmarks varying across products and currencies. A market-led transition is preferable in this situation as it allows market participants to determine the best proxy for interest rate benchmarks for particular product classes, such as OIS for OTC derivatives and IBOR+ for balance sheet/funding oriented products. A scenario in which market participants choose a respective benchmark through increased adoption also decreases the dependency on any official sector impetus that may be needed in other transition scenarios. However, it is important to note that a market-led transition is also susceptible to failure if the new benchmark rate does not achieve sufficient liquidity to provide sustainable.

It is important to note that because both the old and new benchmark will be running in parallel during a transition period, a basis market may need to be developed for this particular transition path.

Consideration also needs to be given to whether and how to discourage the use of legacy LIBOR during the transition to a new benchmark. Market makers, particularly those providing basis hedging products to end users, will need to retain the flexibility to write new contracts based on the legacy rates, as well as to have access to hedging products against legacy rate exposures. An outright prohibition on the use of legacy rates therefore does not appear feasible without disruptive consequences, even in jurisdictions where such a prohibition could be legally enforced. In this regard, particular care will have to be taken in jurisdictions where the use of benchmarks which are determined not to be compliant with the IOSCO Principles are prohibited from being used in products traded or listed on regulated venues.

Below is a discussion of transition considerations and process recommendations for product classes which pose the highest risk to a smooth, non-disruptive transition:

Retail/Consumer Loans

Given the diverse nature of retail loan customers and associated contracts, there are high operational and legal risks associated with the transition of this product class to an updated benchmark.

Based on a review of mortgage contracts and consultation with industry experts, it is understood that there is variation of benchmark references across lender mortgage contracts. It is, however, also a common practice for the loan agreement or note to provide

for a substitute index at the discretion of the lender if the original index becomes unavailable. Provided that consumer interests are protected through the transition period and, in particular, that the provisions of the Truth in Lending Act are upheld, it may be possible to gain the support of consumer market regulators to a transition program.

Securitized and Structured Credit Products

This category of products includes “vanilla” securitizations of consumer assets such as mortgages, credit cards, auto loans and student loans, as well as more bespoke securitized structures such as CMOs, CLOs and CDOs. Consumer product securitizations tend to reference the 1-month tenor, while CLOs and CDOs tend to reference the 3-month tenor.

There are three broad challenges to undertaking benchmark transition for securitized products referencing LIBOR.

1. Security documentation is not standardized, particularly for the more bespoke products. Specifically, the way LIBOR is referenced and fallback arrangements will need to be treated on a case-by-case basis.
2. Trustees may neither be empowered nor willing to recommend changes to bond structures or documentation in order to undertake a change in rate references. Trustees will have an obligation to their bondholders to ensure that the bondholders are not disadvantaged as a result of a transition affecting the benchmark reference. It is expected that Trustees could not unilaterally alter documentation or mandate the use of an alternative rate in the event of an introduction of a Type II benchmark. Instead, Trustees would have to obtain the consent of investors for any such changes.
3. Finally, securitized products may have a number of embedded instruments and hedges referencing LIBOR and for which simultaneous changes would have to be made.

It is likely that a combination of approaches may be needed to address these transition challenges. In the case of the more standardized securitized products, there may be scope for a market protocol that would facilitate trustee action. Regulatory support and/or legislation may also be desirable in this regard. Moreover, the fact that the majority of securitized products are linked to the more liquid 1 month and 3 month tenors may serve to assist transition as the substitute benchmark may have similar level and volatility characteristics to the current LIBOR. Nevertheless, much of the transition work for securitized products is likely to have to be pursued on a case-by-case basis.

Non-Linear Products

The added complexity in addressing non-linear products is largely related to valuation and pricing issues. These considerations are discussed in the Benchmark Transitions – Derivative Markets section of the Cross-currency Report.

Exchange Traded Derivatives

USD LIBOR exchange traded derivatives, consisting primarily of Eurodollar futures and their associated options, should be considered carefully during the transition phase. It is important to note that the heavy concentration of futures “open interest” lies in the first

three years, however, they are listed up to 10 years. There are typically *de minimis* amounts in volume at the longer maturities. Additionally, these longer maturity contracts will be mostly held by wholesale trading institutions. A transition period which lasts five to seven years will allow much of the heavy open interest to roll off. Furthermore, the economic impact of the longer-term maturity contracts will be lessened to a certain extent because of the daily margin/mark-to-market nature of exchange traded products. Contracts which reference a new benchmark will also likely be introduced, thus creating an opportunity for a basis market to be readily developed. Exchange entities do, however, need to be consulted early in the transition process so that transition protocols and new contracts can be designed to minimize disruption. Contracts expiring beyond 5 years comprise less than 1% of the open interest in CME Eurodollar futures, the main USD STIR future complex referencing USD LIBOR.

OTC Derivatives

Considerations and recommendations relating to benchmark transitions in derivative markets are discussed in a dedicated section in the MPG Cross-currency Report (Section 5). That report also discusses how central counterparty clearing houses may respond to the discontinuation of legacy benchmarks, including the invoking of emergency powers to promote orderly transitions.

4.4.7. Role of Official Sector

The official sector – government, regulators, and corresponding international public sector bodies – may play a number of roles in supporting and reducing the risks associated with a transition program. As with other transition considerations, the nature and extent of these roles will vary according to the type of transition envisaged. Specific to USD however, given the global nature of USD markets, a very high degree of international coordination will be necessary across central banks and market regulators, and, of course, in turn, with industry stakeholders.

Specific recommendations include:

- Consider legislative provisions to protect against contract frustration claims for products referencing LIBOR, especially in product segments where market protocols may not be feasible or effective. The jurisdictional coverage of such legislation, specifically whether it is pursued at the US federal or state levels, would need to match the jurisdictions under which the majority of the corresponding contracts were affected.
- Support the development and/or operation of market utilities through which benchmark determinations are made. In USD specifically, the cross-border infrastructure aspects of such utilities may require inter-governmental protocols to be established, particularly covering cross-border data sharing.

- Provide support to markets referencing new or modified benchmarks, by using such benchmarks in official transactions.¹⁸ For example, the recent announcement of floating rate US Treasury issuance indexed to 3-month T-bill rates would be supportive of further product developments based on these rates. Similarly, the use of a new benchmark rate in official FRB monetary operations could assist in promoting use of such a benchmark. However, government agencies may have to consider whether such a role, which might be perceived as picking “winners” among competing alternative benchmarks, is appropriate.
- In order to maintain sufficient liquidity in markets impacted by the adoption of revised or new benchmarks across associated tenors, it is critical to ensure coordination between transition designs and implementation processes and regulatory capital and liquidity management rules.
- Introduce legislation or regulation to support the robustness of enhanced or new benchmarks, with a particular focus on compliance with IOSCO Principles. While aspects of such regulation may not be uniformly welcomed across the marketplace, such regulation may be needed to ensure the continuity of systemic interest rate benchmarks during times of market stress. For example, even if a new transaction-based LIBOR is introduced, fall back provisions based on a mandatory contribution approach, may be needed. LIBOR reform was supported by UK legislation and the EU is currently considering a Regulation on benchmarks. However, there have been no specific similar legislative initiatives in the US as yet.
- Consider conducting a review of regulatory capital, tax and accounting rules that could discourage market participants from transitioning to a new benchmark. Furthermore, the issuance of public sector guidance on these matters early in a transition process would mitigate considerably the uncertainties and risks faced by the private sector in adopting the new benchmark.

¹⁸ See the BIS Paper: “Towards better reference rate practices: a central bank perspective - A report by a Working Group established by the BIS Economic Consultative Committee (ECC)”, March 2013, for further discussion of this topic.

5. Legal Analysis

5.1. Introduction and Approach

5.1.1. Background and Objectives

The legal analysis of the U.S. Dollar workstream identifies possible legal risks and considerations for contracts that incorporate market standard terms and that refer to LIBOR. The majority of commercial contracts are likely to be governed by New York law. For retail contracts, however, there could be a variety of governing state laws that apply and that have not been examined in this report.

In the preparation of this report, research was conducted by several in-house attorneys at various financial institutions or industry trade associations. It should be noted that this report has been prepared without the opportunity to engage a law firm to conduct more extensive research and to interview market experts in various commercial and retail products.

5.1.2. Overview

This report addresses two sources of legal risk that may arise in relation to contracts that reference LIBOR. The first is a discontinuation of a particular LIBOR, such as 6-month USD LIBOR. The second is the risk of contract frustration related to an attempt to substitute a new reference rate or a new fixing of a LIBOR such as that underlying LIBOR+, as discussed in Section 2 – USD Reference Rate Menu. Some implications and mitigants of these legal risks are addressed in this report by instrument type. Aside from the economic, operational and other practical issues involved in any modification to or move away from the current LIBOR framework, there are a number of overarching legal issues which potentially could have far-reaching ramifications and where it will be important to develop close liaisons between the regulatory authorities and the private sector.

As detailed in the USD Reference Rate Menu report, LIBOR+ would very likely serve as suitable fixing of LIBOR at all heavily used tenors, thus allowing a “seamless transition,” with the possible exception of 6-month LIBOR. Even for the 6-month tenor, LIBOR+ is described in the Reference Rate Report as a potential fixing of 6-month LIBOR. Nevertheless, the risk of contract frustration arising from this potential change in fixing methodology should not be entirely ignored, given the information available at the time of this report.

5.1.3. Summary

For most commercial contracts that reference LIBOR, the initial conclusion is that there is very modest risk that legacy contracts would terminate upon the disappearance of the prior rate reference. Rather, many commercial contracts have experienced this type of event before and industry trade associations could be engaged to develop protocols or other multilateral amendment mechanisms to handle a transition in the LIBOR reference rate. In addition, the industry standard contracts for various commercial products contain provisions that offer a fallback approach in the event the reference rate disappears. While these fallback solutions are not suitable as a long-term solution, it is likely that as a short-term

measure, they would serve the purpose of allowing the contract to continue to function for a period of time.

Additionally, any potential arguments of frustration of contract could be mitigated if there is widespread opportunity to educate and to discuss with market participants the consequences of any such LIBOR reference rate change. Efforts to develop a uniform approach to the transition to the new reference rate will be aided by the utilization of a protocol type mechanic in those products well-suited to the mechanic, as discussed below.

5.2. Research Methodology

The authors of this Legal Analysis report conducted limited research given the time constraints involved in the production of the report. However, a broad group of attorneys with expertise in a number of commercial products were consulted, albeit no law firm was engaged to provide more substantive and detailed research. The International Swaps and Derivatives Association (“ISDA”), the Loan Syndication Trading Association (“LSTA”) and the Securities Industry and Financial Markets Association (“SIFMA”) were consulted. It should be noted, however, that it was felt that there could be potential limitations on the analysis that is provided given the lack of information available on the contractual relationships and provisions of any agreements between the relevant parties previously or currently engaged in the LIBOR methodology and production, and that information could potentially be informative.

5.3. Legal risk profile for legacy contracts

5.3.1. Doctrinal features of governing law

Contractual construction and fallback

As noted above, industry standard agreements for commercial products typically have fallback provisions that will apply in the event a reference rate is no longer available. For example, a variety of ISDA definitions booklets contain these provisions and most credit agreements contain these types of provisions as well. However, it should be emphasized that reliance on the fallback provisions is not envisioned to be sustainable; it simply provides a mechanism to allow contracts to continue without immediate termination.

It is the preliminary view of this working group that under New York law, a court could view the inclusion of a standard fallback provision as an intentional effort by the parties to a contract to mitigate the risk of termination when a reference rate disappears. This could be helpful if a party alleged a frustration of purpose claim.

Frustration of purpose

The doctrine of frustration of purpose under New York law traces its heritage to an English case, *Krell v. Henry*¹⁹ (often referred to as the “coronation case”). Here, the defendant contractually agreed to rent an apartment in order to witness King Edward VII’s coronation in 1902. When King Edward VII fell ill, the defendant refused to pay the plaintiff for renting the apartment. The Court of Appeals in England held that the defendant was excused from his contractual obligation because the purpose of the contract was the rental of a room for viewing the coronation, and once the coronation was cancelled, the purpose of the contract became frustrated. In 1956, the English court in *Davis Contractors Ltd. v Fareham Urban District Council* held that a party’s ability to perform under a contract, if “radically different” following the intervening event, could serve to discharge the obligations of the parties. In essence, English jurisprudence has permitted the obligations of the contract to be discharged if events occurred after the formation of the contract that effectively frustrated the commercial purpose of the contract or made the performance of such contract impossible.

New York law, as well as case law in the United States more broadly, takes a more narrow approach than English law and limits the frustration of purpose claims to instances in which a “cataclysmic, unforeseeable event renders the contract valueless to one party.”²⁰ In essence, one or both parties may be able to perform their respective contractual obligations but an intervening event has occurred which obviates the purpose of the parties’ contract.²¹ There are several factors that a New York court will consider in frustration of purpose claims, including: (i) the foreseeability of the event occurring; (ii) the party who has failed to perform did not take steps to prevent the event from occurring; and (iii) the severity or lack thereof of the event. The Restatement (Second) of Contracts at Chapter 11, Section 265, states that after a contract is agreed, if a party’s “principal purpose is substantially frustrated without his fault or by the occurrence of an event, the non-occurrence of which was a basic assumption on which the contract was made, his remaining duties to render a performance are discharged”, unless the language or the circumstances indicate to the contrary.

In fact, a comment to Section 265 to the Restatement (Second) of Contracts stated:

First, the purpose that is frustrated must have been a principal purpose of that party in making the contract. It is not enough that he had in mind some specific object without which he would not have made the contract. The object must be so completely the basis of the contract that, as both parties understand, without it the transaction would make little sense. Second, the frustration must be substantial. It is not enough that the

¹⁹ *Krell v. Henry*, [1903] 2 K.B. 740.

²⁰ *Noble Americas Corp. v. CT Group/Equipment*, No. 602269/2009. slip op. at 4 (Sup. Ct. N.Y. Co. Dec. 4, 2009), cited by George Bundy Smith and Thomas J. Hall, “The Frustration of Purpose Doctrine is Alive and Well”, *New York Law Journal*, v. 246, no. 78 (Oct. 21, 2011).

²¹ Smith and Hall note that the doctrine of impossibility is closely related to frustration of purpose but under impossibility, the parties experience an unforeseen event which makes performance impossible, whereas under frustration of contract, performance is still possible, but the purpose of the contract no longer exists.

transaction has become less profitable for the affected party or even that he will sustain a loss. The frustration must be so severe that it is not fairly to be regarded as within the risks that he assumed under the contract. Third, the non-occurrence of the frustrating event must have been a basic assumption on which the contract was made.

Underpinning many U.S. cases, it seems that there must be objective, rather than subjective, frustration of purpose. In addition, in some cases, there was an absence of a mechanism for performance.²² However, U.S. courts distinguish frustration of purpose from impracticability or impossibility of performance. For example, there is a line of cases which address price impracticability because one party is experiencing a significant loss under the contract. This strand of cases tends to involve an adjustment to a pricing mechanism and that mechanism at some point does not track prevailing market prices. In these cases, the courts tend to hold that one or both parties should have foreseen the risk of changes in market prices and therefore the court denies the claim of frustration of purpose.²³

However, there has been one decision, *Aluminum Co. of America v. Essex Group, Inc.*, (referred to as the "ALCOA" case) which seems to go against the grain of most U.S. decisions. In fact, the decision appears to be an outlier and in fact has been criticized by a number of U.S. courts.²⁴ Here, the court held that the modification of a pricing index which resulted in one party incurring significant loss in supplying aluminum under the contract required judicial modification of the pricing source to minimize the party's losses.

Continuity of legacy contracts or outstanding financial instruments

The precise manner in which any change or modification in existing pricing sources is introduced is key since the objective must be to achieve as a matter of law or contract the continuity of outstanding agreements and financial instruments and legally enforceable equivalence between any new price source and any pre-existing price source that it may replace. The main issue is whether as a matter of law, and without the wish of the parties, a change to a pricing source would lead to the relevant contract terminating automatically or entitle one or more of the parties to terminate or materially alter the terms of the contract. The question will be whether the applicable law will recognize the new or adjusted price source as replacing the existing price source and treat the contract or instrument as non-revocable, subject to the individual terms of the contract. Based on research completed to date and assuming adequate preparatory work, the vast majority of U.S. dollar financial contracts and instruments will not be discontinued because of any adjustment to LIBOR reference rates. Many such contracts include a fallback clause which designates a methodology for substituting the original reference rate as detailed above for over-the-counter derivatives and cross-currency swaps. Moreover it can be expected that, with sufficient notice, most parties will agree on the replacement of a reference rate if it is a

²² T. Ward Chapman, Comment, Contracts – Frustration of Purpose, 59 Mich. L. Rev. 98, 106 (1960).

²³ *United States v. Southwestern Electric Coop., Inc.*, 869 F.2d 310 (7th Cir. 1989); *Waegemann v. Montgomery Ward & Co.*, 713 F. 2d 452 (9th Cir. 1983). Cases cited by Nicholas R. Weiskopf, "Frustration of Contractual Purpose – Doctrine or Myth?", St. John's Law Review, v. 70, issue 2 (Spring 1996).

²⁴ 499 F. Supp. 53 (W.D. Pa. 1980). Various courts have disagreed with the decision and are cited in footnote 2 of the Weiskopf article.

close substitute, and there have been tested means for affecting such changes into legacy contracts at least in the case of standard form long-term relational agreements used in the wholesale markets. For other situations, a number of factors may be relevant. Set forth below is a summary of some of those factors.

Foreseeability

Under the law of many states of the U.S. (as in many other jurisdictions), there will be concerns about the foreseeability of the change, the possibility of commercial frustration as a result of it and of termination as a matter of law or force majeure clauses. Appendix B provides a fuller discussion of relevant U.S. law governing continuity or frustration of contracts.

Official Action

It is safe to assume that the existing legal framework for the U.S. dollar does not expressly address all the issues to which the disappearance or replacement of LIBOR might give rise. This is in part because of the diversity of existing reference rates and contractual formulations. It is particularly difficult to assess the scope for effective official action when plans are uncertain and in advance of knowing the nature of any changes that will be made. As a result, providing a single legislative solution will be problematic at best, although statutory support for the principle of contract continuity was thought to be helpful when the Euro was introduced and similar issues arose. Key states (among them New York, Illinois and California) adopted specific legislation then. The EU also covered the point in regulation.

Third Country Legislation

The issue of continuity is also not just a matter of the national or regional law governing the currency (e.g., U.S. federal law for U.S. dollar denominated trading or instruments) but also extends to state or third country jurisdictions (e.g., English law) under which relevant contracts may be drawn up.

Relevance of Market Action

As noted above, when the Euro was introduced, European regulation was adopted to indicate clearly that the introduction of the new currency and resulting disappearance of legacy price sources should not have the effect of discharging any legal instrument. A number of U.S. states also enacted legislation to similar effect. However, it was recognized at the time that these regulations and statutory reforms could not realistically be expected to deal with the detailed and specific legal issues relating to continuity which affect the wholesale markets. Accordingly, market working groups were established to look in detail at particular sections of the financial markets and the provisions in the various kinds of contract which those markets used. The intention was to identify specific situations where a problem of continuity might arise, to subject them to further legal analysis and thereafter to make recommendations and seek a consensus on how the markets should solve them. These market working groups were over time supported by other professional bodies and bar associations, which were also helpful in ensuring that suitable official action could be identified to bolster the market-inspired initiatives.

Price Source Sponsors

Sponsors of relevant price sources can play a very helpful role in ensuring that continuity-of-contract issues are avoided. The work stream recommends that sponsors of relevant price sources consider announcing within a relevant notice period their intentions regarding any change or modification to the formulation of the pricing they quote. This would then allow screen service providers, sponsors of standard agreements and, eventually, individual firms to make necessary revisions to documentation and systems before those changes go into effect.

Screen Providers

Screen providers cannot determine conventions. However, screen providers require sufficient time to prepare for a transition and therefore need guidance on: (i) changes in methodologies; (ii) the extent of any consequent changes in, for example, price histories and analytics; and (iii) the timetable for implementing the changes. By way of illustration, ISDA Master Agreements refer to prices which are defined in the relevant ISDA Definitions by reference to screen pages. Screen service providers therefore have a vital role in ensuring continuity, although they will follow the market consensus on what price sources should be going forward. One possible way forward would be for screen providers to present 'straw' screen pages as a basis for market comment. The regulators may wish to facilitate a meeting of screen providers to ensure a measure of harmonization of approach and information and transparency for the markets.

Tax

There are continuity concerns arising from the fact that, for tax characterization purposes, replacing one LIBOR pricing source with another pricing source may be viewed as extinguishing an old contract and replacing it with a new one. Clarification from the relevant taxing authorities could do much to assuage such concerns. This issue is raised in more depth by the 'Impact of Benchmark Reform on Corporates' workstream in their report²⁵.

Increased cost clauses

Increased cost clauses in contracts (often found in credit agreements) typically allow the lender to pass on increased costs associated with the loan. It depends on the wording of these clauses and on the particular circumstances which might happen in the course of LIBOR pricing changes as to whether such clauses might be triggered. Increased cost clauses, which refer to changes in liquidity, reserve or similar legal requirements, will probably not be triggered by LIBOR pricing changes. If, on the other hand, there were costs or losses as a result of a lender terminating, liquidating, obtaining or re-establishing any hedge, the increased costs of replacing those hedges could, depending on the terms of the contract, be passed on to the borrower. The same reasoning applies to rights given to the borrower unilaterally to terminate a contract when interest rates have moved significantly (but only if the adjustment would be viewed as significant).

²⁵ See Section 8 of the Cross-currency Report

Risk to guarantee or other credit support

A full survey of legacy contract frustration risk will also wish to examine the risk that, if a change to LIBOR were construed as a material (i.e., not insubstantial) change to the underlying agreement, then that change might be relied upon by a guarantor or other credit support provider seeking to be released from liability in respect of the relevant transaction or transactions. Here again it may be that market practice and preparedness (including harmonized procedures for giving notice of and obtaining consent to the change), supported by official action and support, may help mitigate or contain the risk. However, it has to be noted that forms of guarantee and credit support are less likely to be standardized than industry sponsored documentation for underlying transactions, and once again it is difficult to assume 'one size fits all' solutions.

5.3.2. Risk factors for material change by product

The paragraphs below describe risk factors by product as it relates to a material change in the reference rate.

Over-the-Counter Derivatives

A significant proportion of over-the-counter derivative transactions are interest rates swaps that have a floating leg reference to LIBOR reference rates. Typically, these transactions are documented under an ISDA Master Agreement. The vast majority of ISDA Master Agreements globally are subject to either English law or New York law. The trade-specific confirmation will incorporate the relevant ISDA product booklet, in this case, the 2006 ISDA Definitions (the "Definitions"). The Definitions serve as the principal document for the reference and definition of LIBOR rates in the over-the-counter derivatives market. The Definitions take the approach of referring to a particular screen or page of major electronic venues such as Bloomberg or Reuters to define LIBOR. The Definitions also provide that if a rate is not published, the Calculation Agent in the transaction (usually the dealer) may poll "Reference Banks" to determine the applicable rate.

The ISDA documentation architecture permits the amendment of ISDA definitions booklets through the publication of a Supplement. A Supplement to the Definitions could set forth any newly published rates or address any new screen or page locations for the electronic venues that publish LIBOR rates.

In addition, ISDA has relied on the Protocol as a mechanism to allow market participants to multi-laterally amend ISDA documentation such as the Definitions. Protocols are voluntary so absent some regulatory or statutory requirement to compel market participants to adhere (or agree) to the terms of a Protocol, the industry relies on ISDA to develop an inclusive and well-understood process in order to adopt amendments to ISDA documentation. Typically, Protocols will be open for market participants to adhere to for a lengthy period of time. This is an important component of the process and ensures minimal to no market disruptions. ISDA has relied on the Protocol mechanism to address many market-wide events that necessitated amending underlying contractual documentation, commencing with its 1998 EMU Protocol. A critical component of that original Protocol and each of the over 100 Protocols since that date is that market participants had sufficient time

for consultation, input and operational transition periods before any Protocol closed for adherence.

As ISDA noted in its September 2012 letter to the Wheatley Review, the greater the changes to LIBOR rates, the more likely it is that one or more market participants could claim that their contract is frustrated. To counter that possibility, as stated above, it will be imperative that consultation and a lengthy transition period are available.

Apart from the ALCOA case, a brief survey of cases and academic analysis leads one to conclude that United States courts have demonstrated reluctance to support a claim of frustration of purpose, apart from a finding that the intervening event was substantial (and not simply an event resulting in price increases), the principal purpose of the contract was thwarted and the parties did not anticipate the possibility of the occurrence of such an intervening event. Indeed, it is possible that a court might consider the inclusion of the force majeure provision in Section 5(b) of the 2002 ISDA Master Agreement and various other fallback provisions in ISDA documentation to be a contractual reflection of the parties' foresight in risk mitigation, thereby undermining a frustration of purpose claim. The force majeure termination event in Section 5(b) of the 2002 ISDA Master Agreement states that such an event could trigger the termination of the contract if the affected party is unable to overcome the event "after using all reasonable efforts". Moreover, the recommendation that an undertaking by ISDA, for example, to utilize a Protocol mechanism to address changes in LIBOR methodology that necessitate contractual amendments will counter claims of lack of foresight if sufficient allocations of time are made to provide market participants with an opportunity to understand and plan for a transition that affects LIBOR and corresponding contractual arrangements.

Syndicated Loans

A reference rate change in LIBOR for syndicated loans is unlikely to result in frustration of contract claims. Most credit agreements, including the LSTA's Model Credit Agreement (last published in 2011), refer to the rate on the Reuters Screen page and there are standard fallback provisions for successor or substitute pages of service or substitutions for that service which provides a comparable rate quotation.²⁶ We also understand from market

²⁶ We sourced an agreement that is believed to have representative fallback provisions, reading as follows. "(ii) if such rate is not available at such time for any reason, the rate per annum determined by the Administrative Agent to be the rate at which deposits in Dollars for delivery on the date of determination in same day funds in the approximate amount of the Base Rate Loan being made or maintained and with a term equal to one month would be offered by the Administrative Agent's London Branch to major banks in the London interbank Eurodollar market at their request at the date and time of determination. [NOTE: PRONG (b) OF THIS DEFINITION FEEDS INTO THE DEFINITION OF ABR, WHICH IS A RATE EQUAL TO THE HIGHEST OF (1) FED FUNDS RATE PLUS 0.5%, (2) THE AGENT' S "PRIME RATE" AND (3) THE EURODOLLAR RATE PLUS 1.0%.]" and as follows: "Section [] Inability to Determine Rates. If the Required Lenders determine that for any reason in connection with any request for a Eurodollar Rate Loan or a conversion to or continuation thereof that (a) Dollar deposits are not being offered to banks in the London interbank Eurodollar market for the applicable amount and Interest Period of such Eurodollar Rate Loan or (b) by reason of any changes arising on or after the Closing Date affecting the London interbank Eurodollar market, adequate and reasonable means do not exist for determining the Eurodollar Rate for any requested Interest Period with respect to a proposed Eurodollar Rate Loan or in connection with an existing or proposed Base Rate Loan, the Administrative Agent will promptly so notify the Borrower Representative and each Lender. Thereafter, (x) the obligation of the Lenders to make or maintain Eurodollar Rate Loans shall be suspended

participants that typical syndicated loan agreements include an option to change from one floating rate index to another among a stated menu of alternatives. For example, the floating rate index could be “toggled” at the option of the borrower from 6-month LIBOR to 3-month LIBOR. It is extremely unlikely that all of the reference rates listed in the loan agreement would be discontinued or undergo material and unacceptable changes in fixing method, to the point of significant risk of contract frustration.

However, it is worth noting that while a change to the LIBOR methodology and its publication source would not create any anticipated impact on the loan market in the U.S., a change from a LIBOR reference rate to a new reference rate (e.g., a Treasury bill rate) would be more complicated. Unlike ISDA which has relied on Protocols to achieve industry wide agreement on standard documentation amendments for the over-the-counter derivatives market, the LSTA has not relied on the Protocol mechanic. Rather, here any revisions to a credit agreement will typically require a “Required Lender” vote and each credit agreement is unique to that particular group of parties and lending relationship. Moreover, many credit agreements require that a percentage of the borrower’s debt be hedged so that the total of its floating rate debt is capped at a percentage of overall debt. Hence, it would be critical for the loan market that any change in LIBOR be uniform across all markets.

Residential Mortgages and Other Retail Credit Products

In the US, residential housing is a key determinant in the economy’s health. Historically, two government agencies issued the vast majority of securities backing residential mortgage portfolios. In September 2008, Federal legislation made Fannie Mae and Freddie Mac subject to government conservatorship. The two agencies received \$187 billion in taxpayer funds but given strong 2013 performance, but those taxpayer funds have now been repaid to the US Treasury in full.

While there are new requirements that apply to the loans backed by the two government agencies that took effect on January 1, 2014, the majority of the agencies’ loan portfolios contain residential mortgages with fixed rate terms of either 15 or 30 years. References to LIBOR are embedded in the underlying home owner’s mortgage documentation.

Unlike other products noted in this report, no industry wide association for US homeowners to be consulted on with respect to changes in the LIBOR methodology is available. Hence, it is critical that any modifications be disseminated well in advance of any actual shift.

and (y) in the event of a determination described in the preceding sentence with respect to the Eurodollar Rate component of the Base Rate, the utilization of the Eurodollar Rate component in determining the Base Rate shall be suspended, in each case until the Administrative Agent (upon the instruction of the Required Lenders) revokes such notice. Upon receipt of such notice, the Borrower Representative may revoke any pending request for a Borrowing of, conversion to or continuation of Eurodollar Rate Loans or, failing that, will be deemed to have converted such request into a request for a Borrowing of Base Rate Loans in the amount specified therein. NOTE: LIBOR LOANS ARE ALSO SUBJECT TO YIELD PROTECTION AND REIMBURSEMENT FOR BREAKAGE, IN EACH CASE FOR THE BENEFIT OF LENDERS.”

Fortunately, residential mortgages and other retail credit agreements such as home equity loans and student loans typically allow the lender to “choose a new index based on comparable information”.²⁷ As a result, we view the risk of contract frustration as extremely remote. Creditors are nevertheless restricted by relevant consumer finance protection rules such as Truth in Lending under the Dodd Frank Act.

Structured Credit Products

Structured credit products present a special challenge, in that the trustees of the special purpose vehicles (SPVs) that issue these securities generally have limited ability or incentive to renegotiate the terms of the securities held by SPVs as collateralizing assets or the securities issued by SPVs. The same concern applies to derivatives held by SPVs, which often enter interest rate swaps as hedges. Any changes in LIBOR that are not synchronized across all of these financial instruments could in principle create a concern.

One potential aide is that for those transactions that are based on ISDA documentation, there are fallback provisions to accommodate what results if LIBOR is not available for example. However, there are other products that an interest rate swap will have the ISDA fallback approach, but that swap will link to another security that has a dependency on LIBOR but is documented without a fallback.

Fortunately, according to the information currently available to us, a relatively small proportion of US structured credit products are linked to 6-month LIBOR, the only LIBOR tenor that is indicated in the Reference Rate Menus section to have a material risk of being unable to achieve a seamless transition through a change in fixing methodology to that of LIBOR+.

We recommend significant further analysis of the legal transition risk presented by structured credit products of various types, including collateralized loan obligations, collateralized debt obligations backed by residential and commercial mortgages and asset backed securities of various types.

Exchange-traded derivatives

In the US, one of the largest exchange-traded derivatives market impacted by possible changes in the LIBOR methodology are Eurodollar futures contracts. The instrument, developed in 1981, is tied to deposits denominated in US dollars that are with non-US banks outside the United States. These financial futures contracts, similar to a forward rate agreement in the over-the-counter space, relate to the rate of interest paid on those bank deposits and are traded, for example, on the Chicago Mercantile Exchange (CME). The CME Eurodollar futures prices are based on a three month LIBOR rate on the date of settlement.

²⁷ All of the retail credit agreements that we examined include language provided by the lender to the borrower of the following type: “The 'Index' is the average of interbank offered rates for one-year U.S. dollar-denominated deposits in the London market (“LIBOR”) as published in the Wall Street Journal. If the index is no longer available, we may choose a new index which is based on comparable information. You will be given notice of any change of index.”

The fallback settlement price, in the event that LIBOR is unavailable, is left to executive decisions of the CME.²⁸

Changing the LIBOR methodology could be accomplished by amending the standard form agreements that the CME publishes for the Eurodollar futures contracts, subject to the same constraints and challenges noted for other products.

Cross-Currency Swaps

Cross-currency swaps are essentially interest rate swaps in which the cash flows are in different currencies. Typically, cross-currency swaps are documented by reliance upon the 2006 ISDA Definitions. As with other products, a frustration of purpose claim is not likely to be successful if there is no intervening event that obviates the purpose of the parties' transaction or that the adjustment to the methodology in the contract has resulted in an unforeseen change to the pricing index. It is, however, possible that if the new methodology estimates the relevant interbank borrowing rate by using transactions that include large loans to banks from lenders that are not banks themselves and that process produces a rate that significantly deviates from the rate that would have been produced under the preceding methodology, then a frustration of purpose claim may be slightly more likely on the basis that there is an unforeseen change to the pricing index. The severity of the dislocation and whether such intervening event was objectively considered "foreseeable" would be factors that a court would consider.

As noted above, as it relates to the rate disappearing from the Reuters screen page, the 2006 ISDA Definitions provide for a fallback to the Reference Banks rate. The selection and/or affirmation of this fallback could be effected through a Protocol. The only challenge is that such a protocol would be voluntary and if uneven adherence to the Protocol occurs, it would create basis risk.

Repurchase Transactions

Transactions in the repo and reverse repo market in the United States are generally documented under a Master Repurchase Agreement ("MRA") that is published by SIFMA. The standard form of the MRA does not reference LIBOR in the body of the agreement and rates for individual transactions are determined through arms' length negotiation and generally do not use a reference rate for determining the Pricing Rate (the Pricing Rate is a defined term in the MRA and it is essentially the interest rate for the cash supplied in a repo or reverse repo transaction). It should be noted, though, that Annex III of the MRA (International Transactions) does refer to LIBOR (Annex III, Paragraph 1(b)) but its only

²⁸ CME documentation provides that "Certain products, as described in the applicable product chapters, have procedures for establishing a final settlement price that are distinct from the procedures for establishing the daily settlement price for the product on the last day of trading. For such products, if a final settlement price is unable to be determined or if the applicable procedures result in a clearly aberrant final settlement price inconsistent with market value and alternative settlement procedures are not otherwise specified in the relevant product chapter, then the Chief Executive Officer, President or Chief Operating Officer, or their delegate, may establish a final settlement price that reflects the true market value at the time of final settlement."

use is as a default market rate that would be applied to amounts owed by a defaulting party after default and close-out (Paragraph 11(h) of the MRA). If LIBOR were phased out or replaced as a reference rate, it should be relatively straight forward to amend existing contracts through a Protocol or otherwise. The majority of transactions entered into pursuant to MRAs are short-term in nature, with most being overnight, so any transition would likely have limited impact on transactions outstanding so long as sufficient lead time for a change in the reference rate is given. Further, we anticipate no material risk of discontinuation of USD LIBOR at the short tenors that would have any effect on repurchase transactions.

SIFMA also publishes (with the International Capital Market Association) the Global Master Repurchase Agreement (“GMRA”). Similar to the MRA, the GMRA refers to LIBOR for default interest in limited circumstances (see Paragraph 10(f)). Again, with sufficient lead time the GMRAs could be amended through a Protocol or otherwise and should not result in claims for frustration of contract.

Finally, LIBOR may be occasionally used as a reference rate for floating rate repos and reverse repos, but those products are limited in terms of volume.

Market-led solutions

As detailed in the Executive Summary – Legal Analyses Workstream, the utilization of an industry developed protocol is an efficient and effective tool for addressing the transition risks presented by a change in the reference rate as it relates to the over-the-counter derivatives and cross-currency swaps market. However, the U.S. syndicated loans and US residential mortgage markets likely could not leverage such an approach as in the former, industry documentation typically requires lenders to approve such a revision to the credit agreement, and in the latter, each mortgage would need to be amended through adequate and effective notice. It is not clear how retail products would address these issues.

5.4. Conclusion

Potential mitigants to legal risks presented by LIBOR transition include: (i) legal decisions, regulatory guidance, professional legal guidance, and market guidance; (ii) “successor language”; (iii) the doctrine of implied terms; (iv) parallel tracking of alternative reference rates; and (v) legislation. Items (i), (ii), and (iii) could assist in reducing the risk of legal challenges (such as contract frustration) to a new fixing of LIBOR such as LIBOR+ or where transition to a successor rate is proposed.

Guidance should be published on market standard terms by groups such as LSTA, SIFMA and ISDA. A successor rate clause—referring, for example, to “LIBOR or any such other successor”—could mitigate legal risk in a transition to a successor rate, although this may have limited benefit. Some contracts may already have such language embedded in their respective terms.

Guidance should also be sought from professional bodies such as relevant bar association committees and law reform institutions, including the Uniform Law Commission.

Legal risks can be reduced or avoided if market participants make alternative arrangements for their contracts, such as termination or renegotiation. Transition can be managed through access to alternative benchmarks such as OIS, T-bill rates or LIBOR+ (in the event that LIBOR+ is judged to be a different rate at some tenor). These alternative rates may be available alongside the old benchmark (LIBOR) for a period of years, as discussed in the Transitions section of this report. Market participants may be given regulatory incentives and informational guidance to change their contracts with the assistance of market protocols, before a hard cut-over (if any) is finally required. With a sufficient period of transition time, most legacy contracts will have matured, eliminating the need to amend contracts.

At any given tenor, LIBOR+ should be made available in parallel with LIBOR only if it is clearly presented to the market as an alternative rate, rather than as a new fixing of LIBOR or a successor rate. Otherwise, legal risks are raised.

Legislation might also prove useful in supporting contractual continuity. We recommend further analysis and consultation regarding legislative options, especially at the state level. The Uniform Law Commission may be able to provide advice on the desirability of legislation.

Many parties will wish to clarify with their counterparties, before any change to LIBOR methodology takes effect, what the agreed successor price source will be. We strongly recommend the allowance of sufficient time for this, as discussed in the Transitions section of this report. ISDA and other documentation sponsors are likely to include provisions to enhance certainty on this point in a multilateral Protocol, which will have the effect of amending outstanding bilateral agreements among adhering parties. For a period of time, it may make sense for rate resets and payment advices to refer explicitly to the successor pricing source to mitigate the risk of surprise or misunderstanding. Testing and contingency planning should be organized to ensure that there are no systems disruptions that might upset markets when any conversion takes place. In short, relevant market experience together with official support should make a difference; broad consultation, adequate notice and careful preparation can do much to mitigate residual risk.

6. Outreach to Market Participants

6.1. Outreach approach

During the months of September and October 2013, the USD MPG Working Group sent a questionnaire to 22 institutions covering banks, asset managers, and insurance companies. We also had three trade associations [Securities Industry and Financial Markets Association (SIFMA), the Financial Services Roundtable (FSR), and the Managed Funds Association (MFA)] send the questionnaire to member organizations. To date, ten responses [eight banks, one insurance company, and one asset manager] have been received.

The questionnaire asked respondents to provide a list of benchmarks and tenors that their organization uses and products that use each benchmark. We asked for ideas on potential replacements and other data/instruments in the markets that could serve as potential benchmarks in the future. We also asked about potential transition issues that will arise in transitioning from each legacy benchmark to a replacement benchmark. Lastly, we asked respondents to consider whether a transition should be mandatory or voluntary.

The survey results indicated that there is a wealth of products that reference LIBOR. Given the number of impacted products, respondents raised many concerns regarding a transition to a new benchmark, with the majority of concerns surrounding altering existing contracts and potential impact on legacy positions. Respondents indicated that a transition would need to be long enough to accommodate re-writing of existing contracts. In addition, there would need to be a deep and liquid market for any new benchmark at all of the relevant tenors.

Unfortunately, a number of banks (primarily those who were submitters to the BBA LIBOR panel) declined to respond to the survey for compliance reasons. A number of respondents also expressed concern regarding the lack of anonymity of their responses. Though we did offer to conduct the survey on an anonymous basis with those who were concerned, it appeared they were still not comfortable as they ultimately declined to participate. Additionally, though the trades we contacted did send the survey to their relevant members, members either responded from contact with us directly, did not respond because of the existing inquiries or may have concluded that others would respond so they would not have to invest the time.

6.2. Benchmark usage by outreach contributors

6.2.1. Banks

Eight banks responded to the questionnaire.

The bank respondents reported using a variety of benchmarks. Please see the chart below for a list of benchmarks that banks reported using and the products they impact:

| Benchmark | Impacted Products | Tenors Used |
|-----------------------------------|--|---|
| LIBOR | <ul style="list-style-type: none"> • See discussion below | <ul style="list-style-type: none"> • See discussion below |
| Fed Funds Effective Rate | <ul style="list-style-type: none"> • Fed Funds sold/purchased • Fed funds futures • Fed funds swap • Swaps • Swaptions • Caps • Floors • OIS swaps • Short term funding contracts • OTC derivatives margin • Commercial loans • Foreign office deposits • Time deposits sold • Personal and commercial loans (incl. real estate) • Global custody deposits • TT&L deposits • Agency notes | <ul style="list-style-type: none"> • 1-day • 1-month • 3-months • 6-months • 12 months |
| Overnight Index Swap (OIS) | <ul style="list-style-type: none"> • Interest rate swaps | <ul style="list-style-type: none"> • 1-day |
| Prime Rate | <ul style="list-style-type: none"> • Commercial and personal loans (incl. real estate) • Home equity loans • Credit card loan assets • Long term funding • MBS securities • Agency notes • Overdrafts • Agency SBA securities • Prime swap | <ul style="list-style-type: none"> • 1-day • 1-month • 3-months • 6-months |
| US Treasury | <ul style="list-style-type: none"> • Commercial and personal loans (incl. real estate) • Home equity loans • Mortgage loans • ABS • Private label CMOs • Treasury bills and notes • Agency notes • CMBS • Corporates • Munis | <ul style="list-style-type: none"> • Across curve out to 10 years |

| Benchmark | Impacted Products | Tenors Used |
|--|--|---|
| Constant Maturity Swap (CMS) | <ul style="list-style-type: none"> • CMS swaps • CMS caps • CMS floors • Interest rate swaps • Interest rate swaptions • Interest rate options | <ul style="list-style-type: none"> • 1-year • 2-years • 5-years • 7-years • 10-years • 30-years |
| Constant Maturity Treasury (CMT) | <ul style="list-style-type: none"> • Hybrids | <ul style="list-style-type: none"> • 1-year |
| Commercial Paper Index | <ul style="list-style-type: none"> • Commercial loans • Student loans | <ul style="list-style-type: none"> • Across curve out to 90 days |
| Muni curve | <ul style="list-style-type: none"> • Munis | <ul style="list-style-type: none"> • Across curve out to 240 months |
| S&P | <ul style="list-style-type: none"> • Swaps • Options | <ul style="list-style-type: none"> • Across curve from 3 months to 15 years |
| Nasdaq | <ul style="list-style-type: none"> • Swaps • Options | <ul style="list-style-type: none"> • Across curve from 3 months to 15 years |
| SIFMA | <ul style="list-style-type: none"> • Commercial loans • Interest rate swaps • Interest rate swaptions • Interest rate options | <ul style="list-style-type: none"> • Not specified |
| LIBOR +/- spread | <ul style="list-style-type: none"> • Structured debt | <ul style="list-style-type: none"> • Across curve from 18 months out to 40 years |
| MTA | <ul style="list-style-type: none"> • Option ARMs | <ul style="list-style-type: none"> • 1-year |
| USD Swap Curve (30/360) | <ul style="list-style-type: none"> • CMBS | <ul style="list-style-type: none"> • Across curve from 2 years to 10 years |
| Euro Dollar Synthetic Forward (E) Curve | <ul style="list-style-type: none"> • Fixed Consumer / Commercial ABS | <ul style="list-style-type: none"> • Across curve out to 2 years |
| LIBOR swap (N) curve | <ul style="list-style-type: none"> • Fixed Consumer / Commercial ABS | <ul style="list-style-type: none"> • 2+ years |
| CPI | <ul style="list-style-type: none"> • Inflation swaps • Inflation caps • Inflation floors | <ul style="list-style-type: none"> • 1-month |
| CODI, COSI, COFI | <ul style="list-style-type: none"> • Mortgage loans in a run-off portfolio | <ul style="list-style-type: none"> • Not specified |
| BMA | <ul style="list-style-type: none"> • BMA swaps • BMA caps • BMA floors • Munis | <ul style="list-style-type: none"> • 1-week |
| Contract, LAMA, FHLB | <ul style="list-style-type: none"> • Structured products | <ul style="list-style-type: none"> • Not specified |

With respect to LIBOR, banks reported using a wide range of tenors across the curve with a number of products referencing LIBOR. See below for a list of impacted products that reference LIBOR:

- **Loans**
 - Commercial loans
 - Commercial real estate loans
 - Mortgage loans
 - Credit card loan assets
 - Personal loans
 - Personal real estate loans
 - Home equity loans
 - FHLB advances
- **Structured Products**
 - ABS
 - MBS
 - CMBS
 - CLOs
 - CMOs
 - Hybrids
- **Derivatives**
 - Interest rate swaps
 - Interest rate options
 - Swaptions
 - Caps
 - Floors
 - Eurodollar futures
 - Cancellable swaps
 - Swap futures
- **Consumer Liquidity Products**
 - Time deposits
 - Checking accounts
 - Money market deposit accounts
 - Demand deposit products
 - CDs
- **Bonds / Other**
 - Auction rate securities
 - Agency notes
 - Exim bonds
 - Non-US government bonds
 - Affordable housing bonds
 - Trust preferred securities
 - Covered bonds
 - Commercial leases
 - Subordinate debt
 - Senior notes
 - Capital leases
 - Repo
 - Reverse repo

6.2.2. Investors

One asset manager and one insurance company responded to the questionnaire.

The respondents reported using the following benchmarks:

| Benchmark | Impacted Products | Tenors Used |
|--|---|--|
| LIBOR | <ul style="list-style-type: none"> • See discussion below | <ul style="list-style-type: none"> • See discussion below |
| Fed Funds | <ul style="list-style-type: none"> • Securities lending • Repo | <ul style="list-style-type: none"> • <90 days |
| Prime | <ul style="list-style-type: none"> • Yankee CDs • CP • MTNs (Corporate, Agency) | <ul style="list-style-type: none"> • Across curve from 13 months to 2 years |
| Constant Maturity Swap (CMS) | <ul style="list-style-type: none"> • Exotic options • CMS caps • CMS floors | <ul style="list-style-type: none"> • Across curve from 1 year to 30-years |
| Constant Maturity Treasury (CMT) | <ul style="list-style-type: none"> • CMT caps • CMT floors • Structured finance securities | <ul style="list-style-type: none"> • 2-years • 5-years • 10-years • 30-years |
| Treasury Reverse Repo Overnight Index | <ul style="list-style-type: none"> • Securities lending | <ul style="list-style-type: none"> • <1 month |
| 3-month T-bills | <ul style="list-style-type: none"> • Agency FRNs • T-Bill FRNs (to be issued in Jan. 2014) | <ul style="list-style-type: none"> • Across curve from 13 months to 2 years |

Investors reported using 1-month, 3-month, 6-month, and 12-month LIBOR.

See below for a list of impacted products that reference LIBOR:

- **Derivatives**
 - Interest rate swaps
 - Derivatives used to hedge interest rate swaptions
 - Caps
 - Floors
 - Total return swaps
- **Institutional Loan Market**
 - Floating rate notes
 - Term loan market
 - Leverage facilities
 - CLO liabilities
 - Agricultural loans
 - Commercial mortgages
- **Short Term Products**
 - Yankee CDs
 - Commercial paper
 - Medium-term notes (MTNs) [corporate, agency]
 - Repo
- **Other**
 - Structured products
 - Securities lending
 - FA-backed notes
 - FA-backed commercial paper
 - Direct Fund Agreements
 - Federal Home Loan Bank advances
 - Farmer Mac Transactions
 - Agency notes

6.3. Potential alternative reference rates

6.3.1. Banks

The below is a synopsis of alternatives to LIBOR suggested by the bank respondents.

For US-dollar denominated derivatives contracts, the majority of respondents cited OIS as a potential alternative. One respondent explained that OIS “rates provide an accurate reflection of interest rate expectations and would be supported by a generally deep and liquid underlying market. This means that OIS rates are also likely to be transparent and robust.”

With respect to loans, one respondent wrote: “for commercial loans, consider credit default swaps or government swap rates. For personal loans, consider Prime, Fed Funds or applicable treasury rate as these are already accepted in the market”. Another respondent cited the commercial paper index because it reflects interbank borrowings and could be derived from daily auctions of commercial paper from panel banks.

Another respondent who reported that LIBOR impacted its structured products indicated that central bank target rates could be an alternative.

Other alternatives to LIBOR noted were:

- Repo index, could be an index derived from sampling rates from repo market;
- T-Bill index, comprised of market observable T-Bill rates;
- GCF Repo Index; and
- Fed Funds Effective Rate

Banks also provided some thoughts on data that exists in the market that could potentially be used as benchmarks in the future. One respondent wrote "We believe that committed, live bid-offer quotes sourced from relevant Swap Execution Facilities (SEFs) in the U.S. and Multilateral Trading Facilities (MTFs) in Europe can provide an appropriate source of data for how risk is being priced in the respective markets. Transaction data can also be beneficial; however, it should not be assumed that data on executed transactions is necessarily preferable to committed quotes. So long as the quotes are actionable, they provide an indication of risk perceptions and hence interest rate expectations, regardless of the volume of transactions actually undertaken. Live quotes have the added advantage of being constantly updated; whereas, transactional data may become stale quite quickly (for example, the price of a swap that was transacted two days ago may no longer be relevant for valuation purposes). The latter concern will be particularly relevant in markets where volumes are sporadic or low, but where quotes are nevertheless, in general, continuously available."

Others suggested looking at data for commercial paper and IG corporates as well as other securities for shorter-dated securities, though they noted that this data may not be sufficiently robust at present.

6.3.2. Investors

The below is a synopsis of alternatives to LIBOR suggested by the investor respondents.

The asset manager who responded indicated that OIS is the best alternative to LIBOR for the swaps market because OIS is based on treasury rates and is the basis for discounting treasury-based collateral. The respondent noted that OIS could become the default discounting curve for swaps but that the Eurodollar strip, representing forwards on LIBOR, would still be the benchmark index for LIBOR caps and floors. With respect to the institutional loan market, the asset management respondent indicated that in addition to OIS, fixing LIBOR itself and basing it on actual interbank loans could be another alternative.

Both the insurance company and the asset management respondent indicated that a composite of CP or CD rates could be used. An example of a Bloomberg CP composite is DCPB030D Index (a composite of offered levels for A1/P1/F1 rated US CP programs). The insurance company also suggested that the trade-weighted average of actual LIBOR loan transactions could be a potential alternative to LIBOR.

6.4. Transitions

6.4.1. Banks

The below is a synopsis of transition issues associated with LIBOR that were raised by the bank respondents.

Multiple respondents indicated that a transition to another benchmark should not be mandatory and that a multiple-year transition period would be required to make the necessary changes. One respondent wrote that "Legacy benchmarks in long tenor transactions should be allowed to roll off naturally to minimize market disruption."

Further, many respondents indicated that significant work would need to be done to re-negotiate legacy contracts. One respondent wrote, "Even in the most optimistic of transition scenarios, it is unlikely to be practical to transition every long-dated contract to a new rate. There will therefore be a substantial minority of contracts that will remain outstanding post-transition. It is likely, therefore, that 'legacy' rates will need to be maintained for a number of years."

The respondents raised additional concerns that would need to be addressed during a transition, including dealing with customer perceptions/unfamiliarity with a new benchmark. There would also need to be a deep and liquid market for any new benchmark to allow market participants to deal with legacy positions.

One respondent wrote that "Regulators could help to facilitate the transition by ensuring that the broader regulatory framework is optimal for the purposes of transition, for example by ensuring that hedge accounting does not require or incentivize the use of certain rates, such as Libor."

Finally, one respondent opined on the specifics of a transition from LIBOR to OIS.

- Overnight reset: Currently only an overnight reset is available and 1, 3, and 6 month fixings are not actively traded or available in cleared form. Overnight fixings are operationally intensive and will likely be met with resistance from many end-users. Overnight fixings may also be problematic for cash instruments that require swap market hedges.
- "Transparency of OIS pricing across term structure: Fixings for at least 1, 3 and 6 months will need to be developed using a more appropriate, market-based, methodology. More price transparency across the entire yield curve out to 30 years will also be very helpful in building market confidence and end-user acceptance."
- "Operationally intensive trade conversion process for legacy trades: Currently, conversions must be bilaterally negotiated and documented trade by trade. We will need to consider whether a clearinghouse approach for trade conversion and compression could be developed to facilitate the process."

- “End users who accrual accounting may crystallize profit or loss on conversion: We need to understand the IFRS accounting ramifications of transition, how significant these may be as an obstacle, and whether/how these can be mitigated.”
- “End users may trigger tax liabilities on conversion: We need to consider tax treatment for relevant jurisdictions and whether/how tax impacts can be mitigated.”
- “Transition to OIS discounting requires a significant investment in risk and valuation systems: Many large market participants have already made the transition so should, in principle, welcome transition. ”
- “Pension funds may not benefit from capital relief with OIS based hedges: Where pension liabilities are discounted on a non-OIS curve, OIS hedges may not be effective.”

6.4.2. Investors

The below is a synopsis of transition issues associated with LIBOR that were raised by the investor respondents.

With respect to loans, the asset manager responded that a transition away from LIBOR could take 2 main forms for assets: 1) working to amend all existing Credit Agreements to reflect the new benchmark and remove LIBOR, or 2) over time inserting the new benchmark into new deal documents such that, over time, the changes are implemented. The first option would be very challenging, so the second option may be more practical. Further, loans are levered in 3 main ways: Total Return Swaps, leverage lines, and via CLO liability financing. All 3 utilize LIBOR benchmarks, in order to ensure that the assets and liabilities are matched. Therefore, any changes to the asset side would mean follow-on changes to the liability side as well. As a result, a similar amendment process for liabilities would need to occur and/or new financing agreements would need to include different language.

For the swaps market, both respondents indicated that preparing for the legal and operational challenges associated with a transition were a concern and that work on dealing with these challenges would need to start immediately. The first step in this process is re-writing ISDA agreements. The asset management respondent indicated that work on re-writing ISDA agreements needs to start now in order to ensure an orderly transition in the future.

The asset management respondent also had a number of concerns regarding liquidity issues that could be associated with a transition to OIS or another benchmark. Specifically with respect to a transition to OIS, liquidity in the current OIS marketplace would need to be taken into consideration as part of a transition plan, though the respondent believes that the transition itself would likely bring additional liquidity to many points across the OIS curve. The asset management respondent was also concerned about liquidity issues that a transition could present for cash management portfolios. In particular, the respondent explained that reduced liquidity of existing products benchmarked to a particular legacy Libor index could persist for cash management portfolios for as long as three years (typical max tenor of FRNs in cash portfolios).

Further, a transition to a new benchmark could present NRSRO issues for money market funds (MMFs). For example S&P requires rated MMFs to transact in indices that are 95% correlated with Fed Funds. Alternate indices may lack such correlation. The respondent also indicated that the transition should be voluntary given that the tenor of cash investments is relatively short.

Finally, both the insurance company respondent and the asset management respondent were concerned that a move to a new benchmark could interfere with the economics of existing transactions.

6.5. Other feedback

6.5.1. Banks

The majority of bank respondents indicated that they would prefer that LIBOR remain intact, given the many difficulties (operational, accounting, tax, legacy positions, etc.) that would likely be associated with a mandatory move away from LIBOR. Respondents suggested that LIBOR could be maintained with improved governance and oversight or with a different method for determining rates. One respondent suggested that an auction process could be used.

With respect to next steps for the MPG, respondents suggested that the MPG consider the willingness of the official sector, accounting and tax officials to make laws and provide interpretation in order to accommodate a move to a new benchmark. One respondent also suggested that the MPG create a survey that includes a list of possible alternative benchmarks and poll participants who work with each impacted product on which benchmarks would be appropriate alternatives.

6.5.2. Investors

The asset management respondent encouraged MPG to consider the availability of information on new benchmarks. They also urged the MPG to consider the size of legacy positions and the costs associated with any transition to a new benchmark in its analysis.

For the institutional loan market, the asset management respondent wrote that “participants want a transparent benchmark that floats with short term interest rates. Floating-rate institutional loans are a product investors utilize to take credit risk without taking duration risk; and as such, the benchmark needs to operate as designed.”

Lastly, while the survey focused on USD benchmarks, the asset management respondent underscored the importance of a globally consistent solution taking into consideration external non-US funding markets as there are some exotic securities that are cross-market where, for example, LIBOR/EURIBOR or OIS/EONIA pairings are important.

Market Participants Group on Reforming Interest Rate Benchmarks

USD Currency Report Appendix

March 2014

Appendix A. Fixing Methodology - Technical Appendix

The weighting factor for each contribution, W , is defined as

$$W = \lambda^n,$$

where n is the age of the last valid quote in trading days and λ is defined as

$$\lambda = \exp(\log(0.5) / \text{half-life}),$$

where *half-life* is the number of days it takes to reduce the weight of a contribution to 0.5. Exhibit 9 shows an illustration of this weighting scheme for a particular issuer that became substantially less active after 2Q12. In this proposal, we set *half-life*=8 days, which follows from the average issuance frequency observed across maturities, as seen in Exhibit 10.

Exhibit 10: Average issuance frequency

Average number of trading days between trades for a given issuer in each maturity bucket

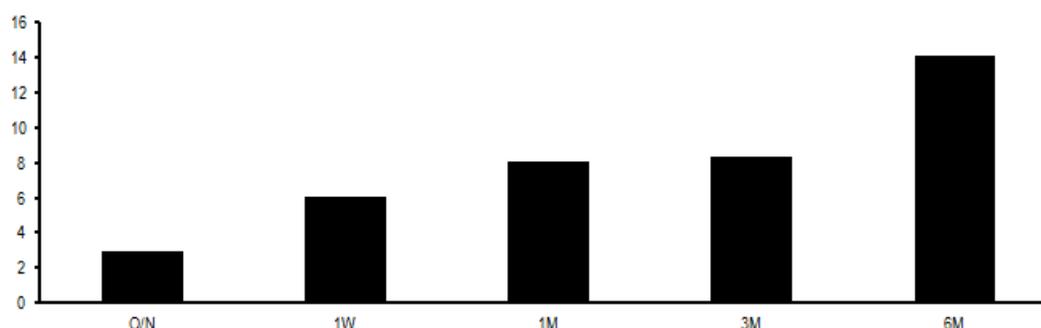


Exhibit 11 also illustrates that the mean value of Libor+ is not sensitive to the choice of the parameter *half-life*, whereas the standard deviation of daily changes in the estimate is. That is, the shorter the half-life of the last valid issuance yield, the more quickly the effective panel changes over time resulting in an increase in volatility.

Exhibit 11: Comparison of Libor+ for different choices of half-life

| Tenor | Average | | | Ann Std Dev | | |
|-------|---------|------|------|-------------|------|------|
| | 3d | 8d | 14d | 3d | 8d | 14d |
| O/N | 0.15 | 0.15 | 0.15 | 10.4 | 9.9 | 9.6 |
| 1W | 0.18 | 0.17 | 0.17 | 9.6 | 7.8 | 7.2 |
| 1M | 0.23 | 0.22 | 0.22 | 11.4 | 8.3 | 7.4 |
| 3M | 0.32 | 0.32 | 0.32 | 14.3 | 9.0 | 7.5 |
| 6M | 0.44 | 0.45 | 0.45 | 23.0 | 13.3 | 10.9 |

Exhibit 12: Effect of the weighting methodology on the size of the panel

| | | Number of Issuers | | | | | Effective Contributing Issuers | | | | |
|-----------|------|-------------------|----|----|----|----|--------------------------------|----|----|----|----|
| | | O/N | 1W | 1M | 3M | 6M | O/N | 1W | 1M | 3M | 6M |
| Daily Avg | 2014 | 15 | 9 | 7 | 8 | 7 | 18 | 17 | 20 | 24 | 24 |
| | 2013 | 16 | 9 | 6 | 8 | 6 | 18 | 19 | 21 | 27 | 21 |
| | 2012 | 17 | 10 | 8 | 9 | 5 | 20 | 21 | 27 | 28 | 20 |
| | 2011 | 21 | 15 | 14 | 11 | 5 | 26 | 32 | 39 | 36 | 22 |
| Daily Max | 2014 | 17 | 13 | 10 | 12 | 11 | 19 | 19 | 22 | 27 | 28 |
| | 2013 | 20 | 18 | 13 | 17 | 15 | 21 | 24 | 29 | 36 | 31 |
| | 2012 | 24 | 20 | 19 | 19 | 13 | 29 | 31 | 38 | 36 | 28 |
| | 2011 | 27 | 25 | 32 | 24 | 15 | 32 | 41 | 50 | 49 | 35 |
| Daily Min | 2014 | 14 | 5 | 3 | 4 | 2 | 17 | 14 | 18 | 21 | 20 |
| | 2013 | 13 | 3 | 1 | 1 | 1 | 16 | 14 | 11 | 19 | 11 |
| | 2012 | 7 | 2 | 0 | 1 | 0 | 15 | 14 | 16 | 20 | 10 |
| | 2011 | 17 | 4 | 1 | 1 | 0 | 17 | 19 | 16 | 17 | 6 |

Effective Contributing Issuers are defined to be those with $W > 0.5$.

As we have suggested earlier, the effect of this weighting factor is to create continuity in the panel across time. Effectively, this weighting factor expands the size of the contributing panel on a given day by a multiple, therefore also amplifying the statistical power of the estimate. Exhibit 12 shows this effect by comparing the number of unique issuers on a given day (with a weight of 1) versus the number of effective contributions, which are all those with a weight of 0.5 or more.

Appendix B. Legal Appendix

B.1. Legal Analysis of Contract Risk in US Jurisdictions

Frustration of Purpose Claims in New York

The doctrine of frustration of purpose under New York law traces its heritage to an English case, *Krell v. Henry*²⁹ (often referred to as the “coronation case”). Here, the defendant contractually agreed to rent an apartment in order to witness King Edward VII’s coronation in 1902. When King Edward VII fell ill, the defendant refused to pay the plaintiff for renting the apartment. The Court of Appeals in England held that the defendant was excused from his contractual obligation because the purpose of the contract was the rental of a room for viewing the coronation, and once the coronation was cancelled, the purpose of the contract became frustrated. In 1956, the English court in *Davis Contractors Ltd. v Fareham Urban District Council* held that a party’s ability to perform under a contract, if “radically different” following the intervening event, could serve to discharge the obligations of the parties. In essence, English jurisprudence has permitted the obligations of the contract to be discharged if events occurred after the formation of the contract that effectively frustrated the commercial purpose of the contract or made the performance of such contract impossible.

New York law, as well as case law in the United States, takes a more narrow approach than English law and limits the frustration of purpose claims to instances in which a “cataclysmic, unforeseeable event renders the contract valueless to one party.”³⁰ In essence, one or both parties may be able to perform their respective contractual obligations but an intervening event has occurred which obviates the purpose of the parties’ contract.³¹ There are several factors that a New York court will consider in frustration of purpose claims, including: (i) the foreseeability of the event occurring; (ii) the party who has failed to perform did not take steps to prevent the event from occurring; and (iii) the severity or lack thereof of the event. The Restatement (Second) of Contracts at Chapter 11, Section 265, states that after a contract is agreed, if a party’s “principal purpose is substantially frustrated without his fault or by the occurrence of an event, the non-occurrence of which was a basic assumption on which the contract was made, his remaining duties to render a performance are discharged”, unless the language or the circumstances indicate to the contrary.

In fact, a comment to Section 265 to the Restatement (Second) of Contracts stated:

First, the purpose that is frustrated must have been a principal purpose of that party in making the contract. It is not enough that he had in mind some specific object without which he would not have made the contract. The object must be so completely the basis of the contract that, as both parties understand, without it the transaction would

²⁹ *Krell v. Henry*, [1903] 2 K.B. 740.

³⁰ *Noble Americas Corp. v. CT Group/Equipment*, No. 602269/2009. slip op. at 4 (Sup. Ct. N.Y. Co. Dec. 4, 2009), cited by George Bundy Smith and Thomas J. Hall, “The Frustration of Purpose Doctrine is Alive and Well”, *New York Law Journal*, v. 246, no. 78 (Oct. 21, 2011).

³¹ Smith and Hall note that the doctrine of impossibility is closely related to frustration of purpose but under impossibility, the parties experience an unforeseen event which makes performance impossible, whereas under frustration of contract, performance is still possible, but the purpose of the contract no longer exists.

make little sense. Second, the frustration must be substantial. It is not enough that the transaction has become less profitable for the affected party or even that he will sustain a loss. The frustration must be so severe that it is not fairly to be regarded as within the risks that he assumed under the contract. Third, the non-occurrence of the frustrating event must have been a basic assumption on which the contract was made.

Underpinning many U.S. cases, it seems that there must be objective, rather than subjective, frustration of purpose. In addition, in some cases, there was an absence of a *mechanism* for performance.³² However, U.S. courts distinguish frustration of purpose from impracticability or impossibility of performance. For example, there is a line of cases which address price impracticability because one party is experiencing a significant loss under the contract. This strand of cases tends to involve an adjustment to a pricing mechanism and that mechanism at some point does not track prevailing market prices. In these cases, the courts tend to hold that one or both parties should have foreseen the risk of changes in market prices and therefore the court denies the claim of frustration of purpose.³³

However, there has been one decision, *Aluminum Co. of America v. Essex Group, Inc.*, (referred to as the "ALCOA" case) which seems to go against the grain of most decisions. In fact, the decision appears to be an outlier and in fact has been criticized by a number of courts.³⁴ Here, the court held that the modification of a pricing index which resulted in one party incurring significant loss in supplying aluminum under the contract required judicial modification of the pricing source to minimize the party's losses.

Libor

A significant proportion of over-the-counter derivative transactions are interest rates swaps that have a floating leg reference to Libor rates. Typically, these transactions are documented under an ISDA Master Agreement. The vast majority of ISDA Master Agreements globally are subject to either English law or New York law. The trade-specific confirmation will include incorporate the relevant ISDA product booklet, in this case, the 2006 ISDA Definitions (the "Definitions"). The Definitions serve as the principal document for the reference and definition of Libor rates in the over-the-counter derivatives market. The Definitions take the approach of referring to a particular screen or page of major electronic venues such as Bloomberg or Reuters to define Libor. The Definitions also provide that if a rate is not published, the Calculation Agent in the transaction (usually the dealer) may poll "Reference Banks" to determine the applicable rate.

The ISDA documentation architecture permits the amendment of ISDA definitions booklets through the publication of a Supplement. A Supplement to the Definitions could set forth any newly published rates or address any new screen or page locations for the electronic venues that publish Libor rates.

³² T. Ward Chapman, Comment, Contracts – Frustration of Purpose, 59 Mich. L. Rev. 98, 106 (1960).

³³ *United States v. Southwestern Electric Coop., Inc.*, 869 F.2d 310 (7th Cir. 1989); *Waegemann v. Montgomery Ward & Co.*, 713 F. 2d 452 (9th Cir. 1983). Cases cited by Nicholas R. Weiskopf, "Frustration of Contractual Purpose – Doctrine or Myth?", St. John's Law Review, v. 70, issue 2 (Spring 1996).

³⁴ 499 F. Supp. 53 (W.D. Pa. 1980). Various courts have disagreed with the decision and are cited in footnote 2 of the Weiskopf article.

In addition, ISDA has relied on the Protocol as a mechanism to allow market participants to multi-laterally amend ISDA documentation such as the Definitions. Protocols are voluntary so absent some regulatory or statutory requirement to compel market participants to adhere (or agree) to the terms of a Protocol, the industry relies on ISDA to develop an inclusive and well-understood process in order to adopt amendments to ISDA documentation. Typically, Protocols will be open for market participants to adhere to for a lengthy period of time. This is an important component of the process and ensures minimal to no market disruptions. ISDA has relied on the Protocol mechanism to address many market-wide events that necessitated amending underlying contractual documentation, commencing with its 1998 EMU Protocol. A critical component of that original Protocol and each of the over 100 Protocols since that date is that market participants had sufficient time for consultation, input and operational transition periods before any Protocol closed for adherence.

As ISDA noted in its September 2012 letter to the Wheatley Review, the greater the changes to Libor rates, the more likely it is that one or more market participants could claim that their contract is frustrated. To counter that possibility, as stated above, it will be imperative that consultation and a lengthy transition period are available.

Conclusion

Apart from the ALCOA case, a brief survey of cases and academic analysis leads one to conclude that United States courts have demonstrated reluctance to support a claim of frustration of purpose, apart from a finding that the intervening event was substantial (and not simply an event resulting in price increases), the principal purpose of the contract was thwarted and the parties did not anticipate the possibility of the occurrence of such an intervening event. Indeed, it is possible that a court might consider the inclusion of the force majeure provision in Section 5(b) of the 2002 ISDA Master Agreement and various other fall-back provisions in ISDA documentation to be a contractual reflection of the parties' foresight in risk mitigation, thereby undermining a frustration of purpose claim. The force majeure termination event in the ISDA Master Agreement states that such an event could trigger the termination of the contract if the affected party is unable to overcome the event "after using all reasonable efforts". Moreover, the recommendation that an undertaking by ISDA, for example, to utilize a Protocol mechanism to address changes in Libor methodology that necessitate contractual amendments will counter claims of lack of foresight if sufficient allocations of time are made to provide market participants with an opportunity to understand and plan for a transition that affects Libor and corresponding contractual arrangements.

Appendix C. Outreach Appendix

C.1. List of participants

Table 2 – List of Outreach Participants

| Segment | Outreach participant |
|----------------|---|
| Banks | <ul style="list-style-type: none">• PNC Financial Services Group, Inc.• Capital One Financial• Northern Trust• Goldman Sachs• Wells Fargo• State Street Bank• Morgan Stanley• BNY Mellon |
| Asset managers | <ul style="list-style-type: none">• BlackRock |
| Other | <ul style="list-style-type: none">• MetLife |

C.2. Full questionnaire

QUESTIONS FOR MARKET PARTICIPANTS

Dear Market Participant:

The Financial Stability Board (FSB) has established a high-level Official Sector Steering Group (OSSG) of regulators and central banks, with responsibility for coordinating reviews of existing interest rate benchmarks. The OSSG has established a Market Participants Group (MPG) charged with examining the feasibility and viability of adopting additional reference rates and potential transition issues.

For more information about these efforts and the membership of the OSSG and MPG, please see: http://www.financialstabilityboard.org/publications/r_130829f.pdf

The MPG has concluded its recommendations to the OSSG would benefit from direct outreach to a diverse set of market participants, organized by region. We ask that you respond to the questions in this short questionnaire to help inform the MPG about the views of market users on additional reference rates and potential transition issues.

In completing this questionnaire, please refer to the IOSCO Principles for Benchmarks <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf> and, in particular, Principle 7 summarized in the footnote.³⁵

We appreciate your response to the questionnaire no later than October 8, 2013 as your answers will be used to inform the MPG activities in several other work streams. The MPG has committed to deliver its draft recommendations to the OSSG in December. The OSSG has asked that we retain a record of our outreach efforts so please be sure to indicate the name of your institution at the end of the form. Also, we ask for a contact person in the event follow-up is needed.

³⁵ *The IOSCO study states in Principle 7 that data used to construct a Benchmark should be based on prices, rates, indices or values that have been formed by the competitive forces of supply and demand (i.e., in an active market) and be anchored by observable transactions entered into at arm's length between buyers and sellers in the market for the Interest the Benchmark measures. Principle 7 does not mean that every individual Benchmark determination must be constructed solely from transaction data, and provided that an active market exists, conditions in the market on any given day might require the Benchmark administrator to rely on different forms of data tied to observable market data as an adjunct or supplement to transactions.*

QUESTION 1

Please list the USD Benchmarks (i.e. LIBOR) currently used by your organization and for what products and what tenor (if applicable). This list should be as complete as possible and for complex institutions will likely include multiple Benchmarks as used by different businesses (e.g., commercial loans, mortgage loans, student loans and other consumer loans originated by the bank, swap transactions by the dealer desk, margin loans by the broker/dealer, etc).

| Benchmark Name (please list 1 benchmark per row) | Tenors Used (please list where applicable) | Impacted Products (please list) |
|--|--|---|
| | | |

QUESTION 2

Using the list you provided in your answer to Question 1, please identify potential candidates for replacement Benchmarks for each of the existing Benchmarks by product. If there are multiple potential replacement Benchmarks for a given product, please list each.

| Benchmark Name (please list 1 benchmark per row) | Potential Replacement for each Impacted Product (please list for each impacted product and explain) |
|--|---|
| | |

QUESTION 3

What else exists in the markets today that could serve as potential Benchmarks in the future? Consider in this response whether imputed rates in traded adjacencies (investment grade bonds, CP, etc) may provide transaction information that could be utilized to create a Benchmark for certain tenors that meets IOSCO Principle 7. Please specify the potential Benchmark and data source, its product use and what market evolution or action would need to occur.

QUESTION 4

Using the list you provided in response to Questions 1 and 2, please indicate what issues will arise (in order of priority) in transitioning from a legacy Benchmark to a replacement Benchmark. If there will be different issues (for example, the time needed to transition may differ due to the use of a legacy Benchmark). Please consider in this response whether transition should be mandatory or voluntary, the economics of a transition (and how those costs would be apportioned) and how best to accommodate legacy Benchmarks contained in long tenor transactions. Responses may differ depending on the Benchmark and/or the product.

| Benchmark Name (please list 1 benchmark per row) | Potential Transition Issues (please list in order of priority) |
|--|--|
| | |

QUESTION 5

From a market participant perspective is there information that your firm believes should be considered by the MPG in making its recommendations to the OSSG as to possible replacement Benchmarks and necessary transition periods and actions?

ADDITIONAL SPACE

Should you require additional space to respond to any of the above questions, please continue your comments here. Please reference the applicable question number.

(NAME OF ORGANIZATION)

(CONTACT PERSON)

(EMAIL AND TELEPHONE OF CONTACT PERSON)

Appendix D. Market Footprint Sources and Assumptions

[See below]

Section 1

USD Reference Rates Market
Footprint overview

USD LIBOR Market Footprint by asset class and tenor

| Asset class | | Overall volume (\$ BN) | % non-domestic | % LIBOR-related | O/n | 1w | 1m | 2m | 3m | 6m | 12m | % T-Bill related |
|--------------------------------|---|------------------------|----------------|-----------------|-----|----|--------|----|--------|--------|-----|------------------|
| Level 1 | Level 2 | | | | | | | | | | | |
| Loans | Syndicated loans ¹ | ~3,400 | 30% | 97% | | | High | | High | Medium | | 0% |
| | Corporate business loans ¹ (bilateral) | 1,650 | Low | 30–50% | | | Medium | | Medium | Low | | <2% |
| | Noncorporate business loans | 1,252 | Low | 30–50% | | | Medium | | Medium | TBC | | <2% |
| | CRE/Commercial mortgages | 3,583 | Low | 30–50% | | | Medium | | Medium | TBC | | <2% |
| | Retail mortgages | 9,608 | Low | 15% | | | Low | | Low | High | Low | 5% |
| | Credit cards | 846 | Low | Low | | | Low | | Low | | | Low |
| | Auto loans | 810 | Low | Low | | | Low | | Low | | | Low |
| | Consumer loans | 139 | Low | Low | | | Low | | Low | | | Low |
| | Student loans | 1,131 | Low | 7% | | | Low | | Low | | | 1% |
| Bonds | Floating/Variable Rate Notes | 1,470 | 24% | 84% | | | Medium | | Medium | Low | Low | 0.1% |
| Securitisation | RMBS | ~7,500 | 2% | 24% | | | High | | Medium | | | 0% |
| | CMBS | ~636 | 1% | 4% | | | Low | | Low | | | 0% |
| | ABS | ~1,400 | 6% | 37% | | | Medium | | Low | | | 0% |
| | CLO | ~300 | 5% | 71% | | | Low | | Medium | | | 0% |
| OTC Derivatives | IR Swaps | 106,681 | Low | 65% | | | High | | High | Medium | | |
| | FRAs | 29,044 | Low | 65% | | | High | | High | Medium | | |
| | IR Options | 12,950 | Low | 65% | | | High | | Medium | Low | | |
| | X-currency swaps | 22,471 | Low | 65% | | | High | | High | High | | |
| ETD Derivatives | IR Options | 20,600 | Low | 98% | | | Low | | High | Low | | Low |
| | IR Futures | 12,297 | Low | 82% | | | Low | | High | Low | | Low |
| Deposits | Retail deposits | 7,110 | Low | Low | | | TBC | | TBC | | | Low |
| | Corporate business deposits | 948 | Low | TBC | | | TBC | | TBC | | | Low |
| | Noncorporate business deposits | 908 | Low | TBC | | | TBC | | TBC | | | Low |
| Mutual funds | Money market funds | 2,650 | | Indirect | | | | | | | | |
| | Bank loan funds | High | | Indirect | | | | | | | | |
| Non-financial contracts | Late payment terms | | | | | | | | | | | |
| | Discount rates | High | TBC | | | | | | TBC | TBC | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Some overlap exists between Syndicated loans and Corporate business loans

USD LIBOR contract maturity by asset class

| Asset class | | Outstanding volume (\$ BN) | % LIBOR-related | % Callable | % roll-of after x years | | | | | | | |
|-----------------------------------|---------------------------------------|----------------------------|-----------------|------------|-------------------------|-----|------|------|------|------|------|------|
| Level 1 | Level 2 | | | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| Loans | Syndicated loans ¹ | ~3,400 | 97% | | 19% | 36% | 62% | 90% | 96% | 97% | 98% | 99% |
| | Corporate business loans ¹ | 1,650 | 30–50% | | | | | | | | | |
| | Noncorporate business loans | 1,252 | 30–50% | | | | | | | | | |
| | CRE/Commercial mortgages | 3,583 | 30–50% | | | | | | | | | |
| | Retail mortgages | 9,608 | 15% | | | | | | | | | |
| | Credit cards | 846 | Low | | | | | | | | | |
| | Auto loans | 810 | Low | | | | | | | | | |
| | Consumer loans | 139 | Low | | | | | | | | | |
| | Student loans | 1,131 | 7% | | | | | | | | | |
| Bonds | Floating/Variable Rate Notes | 1,470 | 84% | 6% | 29% | 47% | 62% | 73% | 74% | 76% | 80% | 81% |
| Securitisation² | RMBS | ~7,500 | 24% | 47% | 0% | 1% | 2% | 3% | 5% | 6% | 18% | 86% |
| | CMBS | ~636 | 4% | 17% | 1% | 6% | 8% | 12% | 23% | 65% | 80% | 89% |
| | ABS | ~1,400 | 37% | 42% | 3% | 6% | 9% | 15% | 20% | 25% | 39% | 88% |
| | CLO | ~300 | 71% | | | | | | | | | |
| OTC derivatives | IR Swaps | 106,681 | 65% | | 18% | 31% | 42% | 65% | 75% | 83% | 95% | 99% |
| | FRAs | 29,044 | 65% | | 94% | 99% | 100% | 100% | 100% | 100% | 100% | 100% |
| | IR Options | 12,950 | 65% | | 45% | 59% | 66% | 74% | 77% | 79% | 81% | 81% |
| | X-currency swaps | 22,471 | 65% | | 29% | 46% | 60% | 76% | 83% | 88% | 95% | 99% |
| ETD | IR Options | 20,600 | 98% | | 77% | 94% | 100% | 100% | 100% | 100% | 100% | 100% |
| | IR Futures | 12,297 | 82% | | 33% | 67% | 88% | 99% | 100% | 100% | 100% | 100% |
| Deposits | Retail deposits | 7,110 | Low | | | | | | | | | |
| | Corporate business deposits | 948 | TBC | | | | | | | | | |
| | Noncorporate business deposits | 908 | TBC | | | | | | | | | |
| Mutual funds | Money market funds | 2,650 | Indirect | | | | | | | | | |
| | Bank loan funds | High | Indirect | | | | | | | | | |
| Non-financial contracts | Late payment terms | High | | | | | | | | | | |
| | Discount rates | High | | | | | | | | | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Some overlap exists between Syndicated loans and Corporate business loans
2. Roll-off rates in this draft represent contractual maturity, actual roll-off is expected to be significantly faster due to prepayment

Appendix 1 | Sources and assumptions

US Business Loans and USD Floating/Variable Rate Notes

| | Outstanding Volumes (Q4 2012) | Relation to LIBOR | Assumptions/sources |
|---|---|--|--|
| Syndicated loans | <ul style="list-style-type: none"> • \$3.4TN <ul style="list-style-type: none"> – US market: \$2.5 TN – Non-US: \$0.9TN | <ul style="list-style-type: none"> • 97% LIBOR linked¹ <ul style="list-style-type: none"> – Primarily 3 month and 1month – ~10% of deals linked to 6m tenor • <0.01% T-Bill linked | <ul style="list-style-type: none"> • Issuance data and maturities: Dealogic (tenors not available) • Outstanding volumes (US market): Bloomberg, Thomson Reuters, S&P LCD • Tenors: Bank websites/input from market participants • 6 month tenor examples: Alpha Bank Statement, Credit Bank of Moscow |
| Corporate business loans (bilateral) | <ul style="list-style-type: none"> • \$1.65 TN <ul style="list-style-type: none"> – Some overlap may exist with Syndicated loans | <ul style="list-style-type: none"> • 30–50% LIBOR linked (Higher proportion for larger exposures) <ul style="list-style-type: none"> – Primarily 1m and 3m tenors – Some 6m linked • <2% Linked to T-bills | <ul style="list-style-type: none"> • Volumes: Federal Reserve • Relation to LIBOR/ T-bills and tenors: Input from market participants • E.g., World Bank IBRD loans linked to 6 month LIBOR (Source: World Bank Report) |
| Noncorporate Business loans | <ul style="list-style-type: none"> • \$1.25 BN | <ul style="list-style-type: none"> • 30–50% LIBOR linked <ul style="list-style-type: none"> – Primarily 1m and 3m tenors • <2% Linked to T-bills | <ul style="list-style-type: none"> • Volumes: Federal Reserve • Relation to LIBOR/ T-bills and tenors: Input from market participants |
| CRE/Commercial mortgages | <ul style="list-style-type: none"> • \$3.6 TN | <ul style="list-style-type: none"> • Assumed 30–50% LIBOR linked <ul style="list-style-type: none"> – Primarily 3m | <ul style="list-style-type: none"> • Volumes: Federal Reserve • Relation to LIBOR and tenors: Input from market participants |
| Floating/Variable Rate Notes | <ul style="list-style-type: none"> • \$1.5 TN <ul style="list-style-type: none"> – 24% of issuance volume non-domestic¹ | <ul style="list-style-type: none"> • 84% of issuance linked to LIBOR¹, of which <ul style="list-style-type: none"> – 42% linked to 1m – 53% linked to 3m – ~0.5% linked to 6m – ~0.5% linked to 12m • 0.1% of issuance linked to T-bills | <ul style="list-style-type: none"> • Volumes, tenors and maturities: Dealogic, BIS quarterly review |

1. Based on 2012 issuance

Source: Dealogic, Federal Reserve, World bank, BIS quarterly review, Oliver Wyman analysis

USD Syndicated Loans

Outstanding Volumes and maturities

US Market syndicated loans outstanding

Q3 2013, \$BN

| | Bloomberg | Thomson Reuters | S&P LCD | Estimated US Market Total |
|-------------------------|--------------|--------------------|---------|---------------------------|
| Investment Grade | 1,193 | 1,158 | | 1200 |
| Leveraged | | | | 1300 |
| Institutional Loans | 886 | n/a | 800 | 800 |
| Non-institutional | | Range from 392-886 | | 500 |
| Total | | | | 2500 |

Volume Weighted Average of contractual Loan Duration

2012 Issuance of syndicated Loans by Deal Type and Deal Nationality, Years

| | US | Non-US | Total |
|-------------------------|------------|------------|------------|
| Investment Grade | 3.7 | 4.8 | 4.0 |
| Facility | 3.6 | 3.6 | 3.6 |
| Term Loan | 4.0 | 6.6 | 5.7 |
| Leveraged | 4.8 | 4.9 | 4.9 |
| Facility | 4.0 | 3.5 | 3.9 |
| Term Loan | 5.6 | 5.5 | 5.6 |
| Total | 4.3 | 4.9 | 4.4 |

Source: Dealogic, Bloomberg, Thomson Reuters, S&P LCD

USD Syndicated Loans Relation to LIBOR

Total syndicated loan issuance in USD 2012

| | Domestic | | International | | Global | | % of Specified Total |
|--|----------|------------|---------------|------------|--------------|------------|----------------------|
| | \$ BN | % of Total | \$ BN | % of Total | \$ BN | % of Total | |
| LIBOR | 1,391 | 84% | 254 | 40% | 1,644 | 72% | 97% |
| T-Bills | 0% | 0% | 0% | 0% | 0.02 | 0% | 0% |
| Other benchmark (Federal Funds/EURIBOR) | 13 | 1% | 46 | 7% | 59 | 3% | 3% |
| Unspecified | 257 | 15% | 336 | 53% | 592 | 26% | N/A |
| Total | 1,660 | | 636 | | 2,296 | | |

US Business Loans Volumes

L.102 Nonfinancial Corporate Business

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|--|----------------|----------------|----------------|----------------|----------------|
| 22 Total liabilities | 13225.1 | 12904.6 | 13227.9 | 13443.1 | 13974.8 |
| 23 Credit market instruments | 7573.3 | 7342.2 | 7473.3 | 7991.0 | 8686.9 |
| 24 Commercial paper | 131.5 | 58.4 | 82.9 | 116.3 | 130.3 |
| 25 Municipal securities (2) | 415.0 | 452.2 | 485.4 | 493.9 | 509.1 |
| 26 Corporate bonds (1) | 3954.5 | 4366.2 | 4804.8 | 5215.6 | 5795.2 |
| 27 Depository institution loans n.e.c. | 780.1 | 546.0 | 480.9 | 549.8 | 609.5 |
| 28 Other loans and advances (3) | 1384.0 | 1139.1 | 948.3 | 1008.1 | 1039.8 |
| 29 Mortgages | 908.2 | 780.3 | 671.0 | 607.3 | 603.0 |

L.103 Nonfinancial Noncorporate Business

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|--|--------|--------|--------|--------|--------|
| 16 Credit market instruments | 4093.2 | 3984.5 | 3946.3 | 3971.4 | 4039.6 |
| 17 Depository institution loans n.e.c. | 1046.1 | 944.0 | 923.7 | 980.4 | 1070.6 |
| 18 Other loans and advances | 177.3 | 172.0 | 170.6 | 171.2 | 180.6 |
| 19 Mortgages | 2869.9 | 2868.5 | 2852.0 | 2819.9 | 2788.4 |
| 20 Trade payables | 380.6 | 397.4 | 427.7 | 435.8 | 434.1 |
| 21 Taxes payable | 106.2 | 99.9 | 99.2 | 100.4 | 101.6 |
| 22 Miscellaneous liabilities | 1214.3 | 1248.1 | 1197.7 | 1233.6 | 1241.7 |

(1) Equity in the Farm Credit System.

| Corporate Businesses | 2012 Outstanding (USD BN) |
|------------------------------|---------------------------|
| Depository Institution loans | 610 |
| Other loans and advances | 1040 |
| Total | 1650 |

| Noncorporate Businesses | 2012 Outstanding (USD BN) |
|------------------------------|---------------------------|
| Depository Institution loans | 1071 |
| Other loans and advances | 181 |
| Total | 1252 |

Source: <http://www.federalreserve.gov/releases/z1/current/z1r-4.pdf>

US CRE/Commercial mortgages

Volumes

L.217 Total Mortgages

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

| | 2008 | 2009 | 2010 | 2011 | 2012 | |
|----------------------------|----------------|----------------|----------------|----------------|----------------|-----------|
| 1 Total mortgages | 14676.8 | 14386.7 | 13778.5 | 13457.1 | 13191.9 | |
| 2 Home | 11108.0 | 10896.7 | 10437.3 | 10182.8 | 9929.1 | |
| 3 Multifamily residential | 848.8 | 855.6 | 851.5 | 856.9 | 880.7 | |
| 4 Commercial | 2585.3 | 2488.5 | 2335.6 | 2250.2 | 2209.2 | |
| 5 Farm | 134.7 | 146.0 | 154.1 | 167.2 | 173.0 | |
| 6 Total liabilities | 14676.8 | 14386.7 | 13778.5 | 13457.1 | 13191.9 | |
| 7 Household sector | 10735.3 | 10571.1 | 10088.4 | 9853.8 | 9608.8 | Retail |
| 8 Nonfinancial business | 3778.0 | 3648.8 | 3523.0 | 3427.1 | 3391.3 | Corporate |
| 9 Corporate | 908.2 | 780.3 | 671.0 | 607.3 | 603.0 | |
| 10 Noncorporate | 2869.9 | 2868.5 | 2852.0 | 2819.9 | 2788.4 | |
| 11 Federal government | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 12 REITs | 163.5 | 166.9 | 167.1 | 176.2 | 191.8 | Corporate |

Source: <http://www.federalreserve.gov/releases/z1/current/z1r-4.pdf>

USD Floating/Variable Rate Notes Relation to LIBOR

USD Floating Rate Notes issuance in 2012 USD BN

| | Domestic | | Non-domestic | | Total | |
|----------------------|------------|------------|--------------|------------|------------|------------|
| | USD BN | % of total | USD BN | % of total | USD BN | % of total |
| Libor | 285 | 84% | 94 | 85% | 379 | 84% |
| <i>1-month</i> | 151 | 53% | 10 | 11% | 161 | 42% |
| <i>3-months</i> | 120 | 42% | 80 | 85% | 200 | 53% |
| <i>6-months</i> | 1 | 0% | 1 | 1% | 2 | 1% |
| <i>12-months</i> | 1 | 0% | 0 | 0% | 1 | 0% |
| <i>Unknown</i> | 12 | 4% | 3 | 3% | 15 | 4% |
| Federal Funds | 19 | 6% | 0 | 0% | 19 | 4% |
| Prime Rate | 3 | 1% | 0 | 0% | 3 | 1% |
| Treasury | 1 | 0% | 0 | 0% | 1 | 0% |
| Unspecified | 32 | 9% | 16 | 14% | 48 | 11% |
| Total | 340 | | 110 | | 450 | |

Floating rate notes, amounts outstanding USD BN

Table 13B: International bonds and notes

By type, sector and currency

In billions of US dollars

| Type, sector and currency | Amounts outstanding | | |
|-----------------------------|---------------------|-----------------|-----------------|
| | Dec 2012 | Jun 2013 | Sep 2013 |
| Total issues | 21,183.3 | 21,050.3 | 21,600.1 |
| Floating rate | 5,993.9 | 5,800.4 | 5,950.2 |
| US dollar | 1,467.8 | 1,507.7 | 1,546.0 |
| Euro | 3,293.8 | 3,139.4 | 3,212.6 |
| Yen | 143.2 | 105.9 | 99.3 |
| Pound sterling | 803.4 | 785.0 | 820.1 |
| Swiss franc | 28.0 | 24.3 | 24.7 |
| Canadian dollar | 38.6 | 36.5 | 38.8 |
| Other currencies | 219.0 | 201.6 | 208.7 |
| Financial corporations | 5,688.3 | 5,481.1 | 5,608.3 |
| Non-financial corporations | 118.2 | 120.6 | 129.3 |
| General government | 93.8 | 90.1 | 90.9 |
| International organisations | 93.6 | 108.6 | 121.8 |

US Retail Loans

| | Outstanding volumes (Q4 2012) | Relation to LIBOR | Assumptions/Sources |
|-------------------------|-------------------------------|---|--|
| Retail mortgages | ~\$9.6 TN | <ul style="list-style-type: none"> • 15% LIBOR linked <ul style="list-style-type: none"> – Primarily 6m, – Some 1-month, 3-month and 12-month • 5% linked to T-bills <ul style="list-style-type: none"> – All CMT (1 year) | <ul style="list-style-type: none"> • Volumes: Federal Reserve • Proportion referenced to LIBOR/ T-bills: Cleveland Fed Report: 11% of mortgages are ARM (22% of outstanding volumes); 67% of these are LIBOR linked; 25% are linked to T-bills. • Primary LIBOR Tenor <ul style="list-style-type: none"> – Freddie Mac offers 6m and 12m LIBOR indexed mortgages (Source: Freddie Mac) – Cleveland Fed Report names 6m as main index – Merrill Lynch offers one-month, six-month and one-year LIBOR indexed mortgages (source: BoAML) |
| Credit cards | ~\$846 BN | <ul style="list-style-type: none"> • Low proportion of LIBOR linked loans | <ul style="list-style-type: none"> • Volumes: Federal Reserve • “LIBOR is a little used benchmark in pricing (variable-rate) credit cards...The prime rate is the predominant index used in pricing (variable-rate) credit cards.” (Source: Bankrate) |
| Auto loans | ~\$810 BN | <ul style="list-style-type: none"> • Low proportion of LIBOR linked loans | <ul style="list-style-type: none"> • Volumes: Federal Reserve |
| Consumer loans | ~\$139 BN | <ul style="list-style-type: none"> • Low proportion of LIBOR linked loans | <ul style="list-style-type: none"> • Volumes: Federal Reserve |
| Student loans | ~\$1.1 TN | <ul style="list-style-type: none"> • ~7% linked to LIBOR <ul style="list-style-type: none"> – Primarily 1m and 3m tenors • ~1% linked to T-bills <ul style="list-style-type: none"> – All 3-month | <ul style="list-style-type: none"> • Volumes: Federal Reserve • Relation to LIBOR: FinAid <ul style="list-style-type: none"> – Most of the \$150 BN in outstanding private student loans have variable rates (Federal student loans typically have fixed interest rates) – Around half of variable rate private student loans are linked to LIBOR, 10% linked to T-bills |

Source: Federal Reserve, Mortgage Bankers Association, Freddie Mac, Cleveland Fed, BoAML, Bankrate, FinAid, Oliver Wyman Analysis

US retail mortgages

Volumes

L.217 Total Mortgages

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

| | 2008 | 2009 | 2010 | 2011 | 2012 | |
|----------------------------|----------------|----------------|----------------|----------------|----------------|-----------|
| 1 Total mortgages | 14676.8 | 14386.7 | 13778.5 | 13457.1 | 13191.9 | |
| 2 Home | 11108.0 | 10896.7 | 10437.3 | 10182.8 | 9929.1 | |
| 3 Multifamily residential | 848.8 | 855.6 | 851.5 | 856.9 | 880.7 | |
| 4 Commercial | 2585.3 | 2488.5 | 2335.6 | 2250.2 | 2209.2 | |
| 5 Farm | 134.7 | 146.0 | 154.1 | 167.2 | 173.0 | |
| 6 Total liabilities | 14676.8 | 14386.7 | 13778.5 | 13457.1 | 13191.9 | |
| 7 Household sector | 10735.3 | 10571.1 | 10088.4 | 9853.8 | 9608.8 | Retail |
| 8 Nonfinancial business | 3778.0 | 3648.8 | 3523.0 | 3427.1 | 3391.3 | Corporate |
| 9 Corporate | 908.2 | 780.3 | 671.0 | 607.3 | 603.0 | |
| 10 Noncorporate | 2869.9 | 2868.5 | 2852.0 | 2819.9 | 2788.4 | |
| 11 Federal government | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 12 REITs | 163.5 | 166.9 | 167.1 | 176.2 | 191.8 | Corporate |

US Retail Mortgages Relation to LIBOR

| | By number of Loans ¹ | | By volumes outstanding ² | |
|--------------|---------------------------------|-----|-------------------------------------|-----|
| | No. of contract | % | USD TN | % |
| Fixed | 31,602,412 | 89% | 7.5 | 78% |
| ARM | 3,772,655 | 11% | 2.1 | 22% |
| LIBOR | 1,629,599 | 5% | 1.4 | 15% |
| CMT | 1,222,130 | 3% | 0.5 | 5% |
| Other index | 920,926 | 3% | 0.2 | 2% |
| Other | 130,228 | 0% | | 0% |
| Total | 35,505,295 | | 9.6 | |

- “Libor-indexed” in the table refers to loans indexed to the 6-month US dollar Libor
- The Lender Processing Services (LPS) assembles these data primarily from the servicing portfolios of the largest residential mortgage servicers in the U.S

1. <http://www.clevelandfed.org/research/trends/2012/0712/01banfin.cfm> May 2012

2. Household and Real Estate Finance Section, Federal Reserve Board – via email October 2013

US Retail Loans Volumes

L.222 Consumer Credit

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---------------|---------------|---------------|---------------|---------------|
| 1 Net change in liabilities (Households) | 2651.4 | 2553.5 | 2648.1 | 2757.2 | 2924.3 |
| 2 Net change in assets | 2651.4 | 2553.5 | 2648.1 | 2757.2 | 2924.3 |
| 3 Households (nonprofit organizations) (1) | 94.6 | 88.8 | 78.4 | 72.0 | 67.1 |
| 4 Nonfinancial corporate business | 56.0 | 53.8 | 46.2 | 48.5 | 48.5 |
| 5 Nonfinancial noncorporate business | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 Federal government (2) | 135.1 | 223.1 | 356.2 | 487.4 | 616.8 |
| 7 U.S.-chartered depository institutions | 965.0 | 906.3 | 1185.5 | 1192.6 | 1218.7 |
| 8 Credit unions | 236.2 | 237.1 | 226.5 | 223.0 | 243.6 |
| 9 Government-sponsored enterprises | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10 ABS issuers | 610.2 | 572.5 | 50.3 | 46.2 | 49.9 |
| 11 Finance companies | 554.3 | 471.9 | 705.0 | 687.6 | 679.8 |
| Memo: | | | | | |
| 12 Credit card loans (3) | 1005.2 | 917.2 | 840.7 | 842.5 | 845.8 |
| 13 Auto loans | 777.1 | 718.9 | 712.9 | 750.7 | 808.5 |
| 14 Student loans (4) | 730.7 | 831.6 | 912.4 | 1012.3 | 1131.3 |
| 15 Other consumer credit (5) | 138.4 | 85.8 | 182.1 | 151.8 | 138.7 |

Source: <http://www.federalreserve.gov/releases/z1/current/z1r-4.pdf>

USD Securitised products

| | Outstanding volumes | Relation to LIBOR | Assumptions/Sources |
|-------------|---|--|--|
| RMBS | <ul style="list-style-type: none"> \$7.5 TN (estimated) in Q4 2012 | <ul style="list-style-type: none"> 23% LIBOR linked¹, of which <ul style="list-style-type: none"> – 1 month: 83% – 3 month: 17% No reference to T-bills | <ul style="list-style-type: none"> Volumes: AFME, SIFMA (US Agency Mortgage-Backed Securities Issuance and Outstanding) Agency MBS (FNMA, GNMA, FHLMC) and CMO assumed to be primarily RMBS Relation to LIBOR/ T-bills, tenors and maturities: Dealogic |
| CMBS | <ul style="list-style-type: none"> \$636 BN (Non-Agency CMBS only) in Q4 2012 | <ul style="list-style-type: none"> 4% LIBOR linked¹, of which <ul style="list-style-type: none"> – 1 month: 75% – Tenor of remaining 25% not specified No reference to T-bills | <ul style="list-style-type: none"> Volumes: AFME, SIFMA (US Agency Mortgage-Backed Securities Issuance and Outstanding, US Non-Agency CMBS Outstanding) Relation to LIBOR/ T-bills, tenors and maturities: Dealogic |
| ABS | <ul style="list-style-type: none"> \$1.4 TN (estimated) 6% non-domestic¹ | <ul style="list-style-type: none"> 37% LIBOR linked¹, of which <ul style="list-style-type: none"> – 1 month: 76% – 3 month: 22% – 12 month: 1% – Tenor of remaining 1% not specified No reference to T-bills | <ul style="list-style-type: none"> \$1.7 TN (~\$300 BN as CLO detailed below) Volumes: AFME, SIFMA (US ABS Issuance and Outstanding) Relation to LIBOR/ T-bills, tenors and maturities: Dealogic |
| CLO | <ul style="list-style-type: none"> CLO estimated outstanding volumes at Sept 2013:\$304 BN | <ul style="list-style-type: none"> 71% LIBOR linked¹, of which <ul style="list-style-type: none"> – 3 month: 82% – 1 month: 15% – Tenor of remaining 3% not specified No reference to T-bills | <ul style="list-style-type: none"> Volumes: JPM analyst report (Bloomberg Article) Relation to LIBOR/ T-bills and Tenors: Dealogic |

1. Based on 2010–2012 issuance
Source: Dealogic, SIFMA, AFME, Bloomberg, Oliver Wyman analysis

US MBS Volumes



US Mortgage-Related Securities Outstanding

USD BN

| Year | Q | Agency MBS ¹ | Agency CMO ¹ | Non-Agency ^{2,4} | Total ³ |
|------|----|-------------------------|-------------------------|---------------------------|--------------------|
| 2012 | Q1 | 5,589 | 1,335 | 1,387 | 8,311 |
| | Q2 | 5,603 | 1,316 | 1,338 | 8,256 |
| | Q3 | 5,628 | 1,281 | 1,296 | 8,205 |
| | Q4 | 5,657 | 1,232 | 1,279 | 8,168 |

US Non-agency CMBS Outstanding

USD BN

| Year | Conduit/Fusion | Large Loan | Other/Unknown | Portfolio | Re-REMICs/ Resecuritisations | Single Asset/ Single Borrower | Small Business/ Small Balance | Total |
|------|----------------|------------|---------------|-----------|---------------------------------|----------------------------------|----------------------------------|-------|
| 2010 | 630 | 40 | 5 | 6 | 24 | 27 | 12 | 743 |
| 2011 | 588 | 30 | 5 | 5 | 24 | 24 | 11 | 686 |
| 2012 | 544 | 23 | 5 | 3 | 23 | 29 | 9 | 636 |

Summary of Outstanding volumes

USD BN

| | 2012 volume outstanding |
|---|-------------------------|
| Non-agency MBS | 1,279 |
| Non-agency CMBS | 636 |
| Non-agency RMBS | 643 |
| Agency RMBS | 6,888 |
| Agency MBS (Assumed predominantly RMBS) | 5,656 |
| Agency CMO | 1,232 |
| Total RMBS | 7,532 |
| Total CMBS | 636 |

1. Includes GNMA, FNMA, and FHLMC mortgage-backed securities and CMOs

2. Non-Agency MBS includes both CMBS and RMBS

3. Total does not account for overlap of collateral

4. Non-agency outstandings in non-agency numbers include Re-REMICs/resecuritisations

Source: <http://www.sifma.org/research/statistics.aspx>

US ABS Volumes



US Asset-Backed Securities Outstanding USD BN

| Year | Q | Automobile | Credit Card | Equipment | Home Equity | Manufactured Housing | Other ¹ | Student Loans | Total | Addendum: Other: of which are CDO |
|------|----|------------|-------------|-----------|-------------|----------------------|--------------------|---------------|-------|---|
| 2012 | Q1 | 128 | 158 | 18 | 505 | 14 | 737 | 231 | 1,791 | 652 |
| | Q2 | 137 | 141 | 19 | 489 | 14 | 712 | 234 | 1,746 | 626 |
| | Q3 | 143 | 135 | 20 | 477 | 13 | 691 | 232 | 1,710 | 604 |
| | Q4 | 142 | 128 | 19 | 468 | 13 | 695 | 235 | 1,700 | 607 |

US Asset-Backed Securities Issuance USD MM

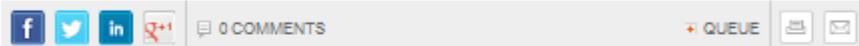
| Year | Auto | Credit Cards | Equipment | Home Equity | Manufactured Housing | Other | Student Loans | Total | Addendum: CDO |
|------|--------|--------------|-----------|-------------|----------------------|--------|---------------|---------|------------------|
| 2010 | 59,319 | 7,372 | 7,826 | 4,575 | | 14,921 | 15,452 | 109,464 | 3,135 |
| 2011 | 68,219 | 16,152 | 9,526 | 4,104 | | 14,275 | 13,963 | 126,238 | 10,964 |
| 2012 | 90,098 | 39,699 | 19,349 | 4,081 | 0 | 20,092 | 26,094 | 199,414 | 45,456 |

Source: <http://www.sifma.org/research/statistics.aspx>

US CLOs issuance Volumes

CLOs Issued Before 2008 May Fall to \$72 Billion, JPMorgan Says

By Kristen Hauness - Sep 16, 2013 6:53 PM GMT



The market for collateralized loan obligations raised before 2008 may be cut in half in the next three years as funds exit their reinvestment periods and begin to pay down debt, according to JPMorgan Chase & Co. (JPM)

The volume of so-called CLO 1.0 deals may fall to about \$72 billion by 2016 or 2017 as almost all funds raised before 2008 exit the period in which they can buy new loans by 2014 and begin to amortize, the bank said in a Sept. 13 report. About \$145 billion of CLOs, or 47 percent of the outstanding market, were issued in 2008 and 2007.

CLOs have historically been the largest buyer of U.S. leveraged loans and the decrease in outstanding deals may create a shortfall for corporate financings unless other types of loan investors, including mutual funds and [hedge funds](#), grow "substantially" over the next few years, according to the report. There have been \$84.1 billion of CLOs raised globally this year, \$58.1 billion in the U.S.

This shrinking CLO market is "a cautionary tale of declining credit capacity," JPMorgan analysts led by Rishad Ahluwalia wrote in the report.

CLOs were the largest buyers of leveraged loans in the second quarter, with a 53 percent market share, according to a report from the Loan Syndications and Trading Association, citing Standard & Poor's Capital IQ Leveraged Commentary & Data. Retail loan funds were the second-largest buyer with 33 percent.

Global Deals

JPMorgan estimates the outstanding global CLO market is \$416 billion, including \$304 billion of U.S. deals, according to the report.

CLOs are a type of collateralized debt obligation that pool high-yield, high-risk loans and slice them into securities of varying risk and returns.

All of the \$130 billion CLOs raised since 2008 will exit their shorter reinvestment periods, typically three to four years, during 2016 and 2017, and also begin to pay down debt

according to the report.

Even with the assumption of \$75 billion of volume in both 2014 and 2015, the entire U.S. CLO market will be about \$200 billion by 2020, according to the report.

Four CLOs totaling \$1.9 billion priced last week. While issuance should pick up, it may be constrained by AAA spreads that are currently about 138 basis points more than the London interbank offered rate, 28 basis points wider than the tightest pricing of 2013 seen in May, according to the bank.

JPMorgan widened its U.S. year-end CLO AAA forecast Sept. 6 to between 125 basis points and 130 basis points more than Libor from 100 basis points. Libor is the rate banks say they can borrow in dollars from each other.

The bank's target for the same CLO portions in Euros is between 140 basis points and 150 basis points, according to the report. A basis point is 0.01 percentage point.

USD Securitised products

Relation to LIBOR

Relation of LIBOR to securitised products issued in USD 2010–2013 (\$ BN, % of Total)

| | % Floating | % LIBOR- related | 1m | 3m | 12m | Variable – Not Specified |
|-------------|---------------|------------------------|-----|-----|------|--------------------------------|
| RMBS | 24% | 23% | 19% | 4% | - | - |
| CMBS | 5% | 4% | 3% | - | - | 1% |
| ABS | 40% | 37% | 28% | 8% | 0.2% | 1% |
| CLO | 90% | 71% | 11% | 58% | - | 2% |

Key market participants

- The largest USD RMBS issuers are Fannie Mae, Freddie Mac and Ginnie Mae, National Credit Union Administration and banks e.g. Credit Suisse, RBS and Lloyds
- The largest USD CMBS issuers are Freddie Mac and banks e.g. Wells Fargo, JP Morgan and Deutsche Bank
- Largest ABS issuers in the last 3 years are SLM Corp (Sallie Mae), large corporates e.g. Ford, General Electric, Nissan, General Motors and banks e.g. Ally Financial, JP Morgan, Santander
- Most ABS issued in the US are based on underlying assets/collateral such as auto, credit-card and student loans receivables
- Most CLOs are issued by private equities e.g. Carlyle, Blackstone, Bain Capital, although Credit Suisse is a notable CLO issuer, with majority of the underlying based on CDO

USD Derivatives

| | Outstanding volumes Q4 2012 | Relation to LIBOR | Assumptions/Sources |
|-------------------------|-----------------------------|--|---|
| OTC | | | |
| IR Swaps | \$106.7 TN | <ul style="list-style-type: none"> Estimated 65% LIBOR linked, of which <ul style="list-style-type: none"> – 90%: 3 month – 9%: 1 month – 1%: 6 month | <ul style="list-style-type: none"> Volumes: BIS OTC IR statistics Tenors and maturities: DTCC (summary across interest rate derivative transactions registered in DTCC) |
| Forward Rate Agreements | \$29.0 TN | <ul style="list-style-type: none"> As above | <ul style="list-style-type: none"> Volumes: BIS OTC IR statistics Tenors and maturities: DTCC (summary across interest rate derivative transactions registered in DTCC) |
| IR Options | \$13.0 TN | <ul style="list-style-type: none"> As above | <ul style="list-style-type: none"> Volumes: BIS OTC IR statistics Tenors and maturities: DTCC (summary across interest rate derivative transactions registered in DTCC) |
| X-currency swaps | \$22.5 TN | <ul style="list-style-type: none"> As above | <ul style="list-style-type: none"> Volumes: BIS OTC FX statistics Tenors and maturities: DTCC (summary across interest rate derivative transactions registered in DTCC) |
| ETD¹ | | | |
| IR Options | \$20.6 TN | <ul style="list-style-type: none"> 98% LIBOR Linked <ul style="list-style-type: none"> – Primarily 3m | <ul style="list-style-type: none"> Volumes: BIS ETD Statistics, CME Tenors and maturities: CME |
| IR futures | \$12.3 TN | <ul style="list-style-type: none"> 82% LIBOR linked <ul style="list-style-type: none"> – Primarily 3m – Small amount referenced to 1m | <ul style="list-style-type: none"> Volumes: BIS ETD Statistics Tenors and maturities: CME |

1. ETD for North America only
Source: BIS, DTCC, CME, Oliver Wyman analysis

USD OTC Interest Rate Derivatives Volumes

Interest rate derivatives by instrument, counterparty and currency¹ Notional amounts outstanding at end December 2012, USD MM

| Instrument/counterparty | Total | US dollar | Euro | Japanese yen | Pound sterling | Swiss franc | Canadian dollar | Swedish krona | Residual |
|-----------------------------------|--------------------|--------------------|-------------|--------------|----------------|-------------|-----------------|---------------|------------|
| Forward rate agreements | 71,352,616 | 29,044,477 | 25,559,982 | 51,630 | 8,964,972 | 943,057 | 248,940 | 2,984,344 | 3,555,214 |
| with reporting dealers | 11,507,040 | 3,021,215 | 3,462,884 | 8,150 | 2,714,713 | 176,285 | 136,797 | 909,065 | 1,077,931 |
| with other financial institutions | 57,387,854 | 25,155,400 | 21,027,401 | 34,276 | 6,034,139 | 668,022 | 106,187 | 2,017,919 | 2,344,510 |
| with non-financial institutions | 2,457,723 | 867,863 | 1,069,697 | 9,204 | 216,121 | 98,750 | 5,956 | 57,360 | 132,772 |
| Interest rate swaps | 369,998,614 | 106,680,617 | 137,553,787 | 48,702,355 | 30,187,646 | 4,334,175 | 7,193,563 | 2,978,231 | 32,368,240 |
| with reporting dealers | 75,466,171 | 20,363,728 | 20,349,704 | 16,249,248 | 4,259,114 | 658,644 | 1,715,465 | 886,471 | 10,983,797 |
| with other financial institutions | 264,707,067 | 78,006,962 | 107,534,156 | 27,140,358 | 23,505,597 | 2,776,654 | 4,579,163 | 1,813,857 | 19,350,320 |
| with non-financial institutions | 29,825,376 | 8,309,929 | 9,669,928 | 5,312,748 | 2,422,934 | 898,877 | 898,933 | 277,903 | 2,034,124 |
| Options sold | 39,771,786 | 10,348,010 | 20,253,297 | 5,195,875 | 2,438,899 | 64,696 | 41,930 | 164,738 | 1,264,341 |
| with reporting dealers | 29,626,605 | 7,050,171 | 15,874,449 | 4,078,946 | 1,820,416 | 36,650 | 14,704 | 76,384 | 674,885 |
| with other financial institutions | 8,783,493 | 2,791,906 | 3,849,811 | 987,121 | 545,819 | 19,895 | 16,993 | 52,302 | 519,646 |
| with non-financial institutions | 1,361,688 | 505,933 | 529,038 | 129,808 | 72,664 | 8,152 | 10,233 | 36,052 | 69,808 |
| Options bought | 38,502,089 | 9,768,138 | 19,979,779 | 4,967,457 | 2,579,875 | 51,243 | 37,844 | 137,394 | 980,359 |
| with reporting dealers | 30,218,406 | 7,281,197 | 16,093,381 | 4,131,468 | 2,033,643 | 35,541 | 16,149 | 67,566 | 559,461 |
| with other financial institutions | 7,197,419 | 2,184,803 | 3,333,030 | 748,428 | 485,619 | 10,645 | 13,514 | 42,541 | 378,839 |
| with non-financial institutions | 1,086,264 | 302,138 | 553,369 | 87,561 | 60,613 | 5,057 | 8,181 | 27,287 | 42,058 |
| Total options | 48,351,377 | 12,950,469 | 24,249,166 | 6,058,134 | 3,091,751 | 79,848 | 64,350 | 230,160 | 1,627,499 |
| Total contracts | 489,702,595 | 148,675,557 | 187,362,928 | 54,812,107 | 42,244,359 | 5,357,072 | 7,506,848 | 6,192,731 | 37,550,993 |

¹ While data on total options are shown on a net basis, separate data on options sold and options bought are recorded on a gross basis, ie not adjusted for interdealer double counting.

USD OTC Currency Swap Derivatives Volumes

Foreign exchange derivatives by instrument, counterparty and currency¹ Notional amounts outstanding at end December 2012, USD MM

| Instrument/counterparty | Total | US dollar | Euro | Japanese yen | Pound sterling | Swiss franc | Canadian dollar | Swedish krona | Residual |
|---|-------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|-------------------|
| Outright forwards and foreign exchange swaps | 31,718,023 | 27,273,698 | 10,509,813 | 5,316,135 | 3,819,501 | 2,065,551 | 1,733,310 | 876,607 | 11,841,431 |
| with reporting dealers | 11,083,369 | 10,203,431 | 3,291,844 | 2,193,821 | 1,166,300 | 790,503 | 542,453 | 196,872 | 3,781,514 |
| with other financial institutions | 14,860,151 | 12,711,881 | 4,733,117 | 2,168,747 | 1,845,433 | 920,776 | 758,073 | 339,449 | 6,242,826 |
| with non-financial institutions | 5,774,504 | 4,358,386 | 2,484,853 | 953,568 | 807,767 | 354,270 | 432,785 | 340,285 | 1,817,094 |
| Total including gold | 32,013,296 | | | | | | | | |
| Currency Swaps | 25,420,032 | 22,471,257 | 9,731,489 | 5,324,630 | 3,503,985 | 1,169,310 | 1,094,635 | 496,621 | 7,048,137 |
| with reporting dealers | 12,895,136 | 12,101,089 | 4,482,038 | 3,124,124 | 1,716,023 | 548,175 | 443,224 | 215,340 | 3,160,259 |
| with other financial institutions | 9,809,144 | 8,347,553 | 3,912,407 | 1,697,023 | 1,340,754 | 469,981 | 428,969 | 202,663 | 3,218,938 |
| with non-financial institutions | 2,715,754 | 2,022,616 | 1,337,043 | 503,483 | 447,207 | 151,151 | 222,442 | 78,618 | 668,948 |
| Options sold | 7,236,919 | 5,796,703 | 2,358,582 | 2,654,762 | 368,290 | 459,970 | 190,858 | 55,649 | 2,589,024 |
| with reporting dealers | 4,438,779 | 3,515,538 | 1,447,126 | 1,743,066 | 218,512 | 321,049 | 114,272 | 31,672 | 1,486,323 |
| with other financial institutions | 2,209,970 | 1,790,290 | 660,796 | 750,689 | 101,669 | 123,599 | 55,524 | 12,458 | 924,915 |
| with non-financial institutions | 588,175 | 490,874 | 250,661 | 161,009 | 48,109 | 15,323 | 21,062 | 11,518 | 177,794 |
| Total including gold | 7,351,038 | | | | | | | | |
| Options bought | 7,839,407 | 5,586,508 | 3,040,758 | 2,580,162 | 351,623 | 462,452 | 194,360 | 57,531 | 3,405,420 |
| with reporting dealers | 5,273,166 | 3,540,505 | 2,240,194 | 1,785,530 | 218,299 | 329,346 | 114,988 | 34,392 | 2,283,078 |
| with other financial institutions | 1,951,871 | 1,559,568 | 561,546 | 614,215 | 92,746 | 111,280 | 54,265 | 11,907 | 898,215 |
| with non-financial institutions | 614,375 | 486,433 | 239,018 | 180,417 | 40,577 | 21,825 | 25,107 | 11,232 | 224,141 |
| Total including gold | 7,958,335 | | | | | | | | |
| Total options | 10,220,361 | 7,855,195 | 3,555,684 | 3,470,631 | 501,517 | 597,231 | 270,595 | 80,154 | 4,109,715 |
| All instruments | 67,358,399 | 57,600,136 | 23,796,979 | 14,111,391 | 7,824,989 | 3,832,081 | 3,098,534 | 1,453,375 | 22,999,313 |
| Total contracts including gold | 67,844,186 | | | | | | | | |

¹ While data on total options are shown on a net basis, separate data on options sold and options bought are recorded on a gross basis, ie not adjusted for interdealer double counting.

US Exchange Traded Options Volumes

Table 23A: Derivative financial instruments traded on organised exchanges

By instrument and location

Notional principal in billions of US dollars

| Instrument / location | Amounts outstanding | | | | Turnover | | | | | |
|-------------------------|---------------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| | Dec 2011 | Dec 2012 | Mar 2013 | Jun 2013 | 2011 | 2012 | Q3 2012 | Q4 2012 | Q1 2013 | Q2 2013 |
| Options | | | | | | | | | | |
| All markets | 35,418.0 | 30,313.1 | 35,796.2 | 43,003.9 | 635,363.4 | 408,690.1 | 94,087.6 | 77,343.4 | 118,258.1 | 125,808.9 |
| Interest rate | 31,579.6 | 25,909.7 | 31,019.6 | 38,373.5 | 466,281.3 | 308,603.9 | 72,239.7 | 54,308.5 | 93,477.2 | 98,730.8 |
| Currency | 87.2 | 105.3 | 114.0 | 116.1 | 2,525.1 | 2,382.7 | 565.8 | 606.0 | 972.9 | 946.6 |
| Equity index | 3,750.8 | 4,298.1 | 4,662.4 | 4,514.3 | 166,556.9 | 97,703.6 | 21,282.1 | 22,428.9 | 23,808.0 | 26,131.5 |
| North America | 19,804.2 | 12,641.1 | 13,557.2 | 19,844.8 | 262,514.8 | 194,065.2 | 43,965.2 | 35,776.2 | 39,255.7 | 57,877.0 |
| Interest rate | 17,779.1 | 10,280.3 | 11,067.1 | 17,461.1 | 218,368.1 | 154,328.8 | 33,861.0 | 24,028.9 | 27,381.7 | 43,151.0 |
| Currency | 49.1 | 68.6 | 86.3 | 83.2 | 1,510.4 | 1,513.5 | 363.6 | 377.0 | 544.8 | 516.6 |
| Equity index | 1,976.0 | 2,292.3 | 2,403.8 | 2,372.4 | 42,636.4 | 38,222.9 | 9,740.6 | 11,370.3 | 11,329.2 | 14,209.3 |
| Europe | 14,280.8 | 15,636.3 | 20,636.1 | 21,560.0 | 258,265.4 | 157,061.9 | 39,464.0 | 31,331.8 | 68,051.4 | 57,864.3 |
| Interest rate | 12,879.8 | 14,225.4 | 19,065.4 | 20,017.2 | 237,541.6 | 144,243.9 | 36,127.9 | 28,175.1 | 64,040.2 | 54,095.6 |
| Currency | 0.3 | 0.6 | 0.5 | 0.4 | 3.4 | 4.3 | 1.1 | 1.5 | 2.1 | 1.6 |
| Equity index | 1,400.6 | 1,410.2 | 1,570.2 | 1,542.3 | 20,720.4 | 12,813.6 | 3,335.0 | 3,155.2 | 4,009.1 | 3,767.0 |
| Asia and Pacific | 349.6 | 563.0 | 659.2 | 642.0 | 102,912.5 | 48,132.3 | 8,551.1 | 8,142.4 | 8,829.0 | 8,515.5 |
| Interest rate | 15.6 | 1.8 | 4.3 | 2.1 | 2,719.3 | 3,182.8 | 656.5 | 692.1 | 704.6 | 683.8 |
| Currency | 0.8 | 1.4 | 1.9 | 2.1 | 257.0 | 237.6 | 59.9 | 76.3 | 97.3 | 117.9 |
| Equity index | 333.3 | 559.8 | 653.0 | 637.8 | 99,936.1 | 44,711.9 | 7,834.6 | 7,374.0 | 8,027.1 | 7,713.8 |
| Other Markets | 983.1 | 1,472.6 | 944.9 | 957.2 | 11,670.6 | 9,430.8 | 2,107.2 | 2,093.0 | 2,122.1 | 1,552.2 |
| Interest rate | 905.1 | 1,402.2 | 882.9 | 893.0 | 7,652.3 | 6,848.4 | 1,594.2 | 1,412.4 | 1,350.8 | 800.4 |
| Currency | 37.0 | 34.6 | 25.3 | 30.4 | 754.3 | 627.3 | 141.2 | 151.2 | 328.7 | 310.4 |
| Equity index | 40.9 | 35.8 | 36.8 | 33.8 | 3,264.0 | 1,955.1 | 371.9 | 529.4 | 442.6 | 441.3 |

Source: http://www.bis.org/statistics/r_qa1309_hanx23a.pdf

US Exchange Traded Futures Volumes

Table 23A: Derivative financial instruments traded on organised exchanges

By instrument and location

Notional principal in billions of US dollars

| Instrument / location | Amounts outstanding | | | | Turnover | | | | | |
|-------------------------|---------------------|----------|----------|----------|-------------|-------------|-----------|-----------|-----------|-----------|
| | Dec 2011 | Dec 2012 | Mar 2013 | Jun 2013 | 2011 | 2012 | Q3 2012 | Q4 2012 | Q1 2013 | Q2 2013 |
| Futures | | | | | | | | | | |
| All markets | 22,924.1 | 24,121.3 | 26,074.6 | 25,188.2 | 1,524,140.6 | 1,159,867.4 | 279,408.6 | 261,471.1 | 352,087.1 | 395,347.2 |
| Interest rate | 21,718.9 | 22,641.3 | 24,630.5 | 23,804.0 | 1,359,130.6 | 1,026,136.8 | 245,574.9 | 226,458.6 | 312,537.9 | 350,565.6 |
| Currency | 221.2 | 230.7 | 237.1 | 224.7 | 37,627.6 | 31,916.2 | 7,766.5 | 7,336.3 | 8,940.4 | 9,717.1 |
| Equity index | 984.0 | 1,249.4 | 1,207.0 | 1,159.5 | 127,382.4 | 101,814.4 | 26,067.2 | 27,676.2 | 30,608.8 | 35,064.5 |
| North America | 13,107.9 | 12,894.7 | 13,743.2 | 12,997.0 | 822,958.4 | 619,897.0 | 145,635.0 | 132,887.5 | 161,576.0 | 208,738.2 |
| Interest rate | 12,568.1 | 12,297.0 | 13,134.9 | 12,464.3 | 740,210.8 | 553,546.2 | 129,269.9 | 116,169.4 | 143,769.6 | 188,097.5 |
| Currency | 150.6 | 157.6 | 165.5 | 127.2 | 30,188.7 | 25,486.7 | 6,233.7 | 5,884.5 | 7,217.4 | 7,632.1 |
| Equity index | 389.2 | 440.1 | 442.9 | 405.5 | 52,558.8 | 40,864.1 | 10,131.4 | 10,833.6 | 10,588.9 | 13,008.6 |
| Europe | 6,531.1 | 8,087.2 | 8,857.0 | 8,767.8 | 565,184.8 | 414,844.8 | 101,758.7 | 96,663.2 | 152,835.7 | 142,969.1 |
| Interest rate | 6,100.0 | 7,560.2 | 8,333.7 | 8,233.7 | 525,692.3 | 387,886.6 | 95,223.1 | 89,882.8 | 145,344.1 | 134,775.0 |
| Currency | 2.7 | 3.4 | 4.1 | 2.9 | 363.3 | 438.9 | 134.7 | 128.5 | 125.5 | 163.0 |
| Equity index | 428.4 | 523.7 | 519.3 | 531.3 | 39,129.2 | 26,519.3 | 6,400.9 | 6,651.8 | 7,366.0 | 8,031.1 |
| Asia and Pacific | 2,339.1 | 2,100.9 | 2,437.1 | 2,336.1 | 107,489.9 | 98,660.0 | 25,909.2 | 25,754.5 | 30,869.7 | 34,248.2 |
| Interest rate | 2,181.9 | 1,822.4 | 2,203.2 | 2,121.4 | 71,504.0 | 64,084.9 | 16,347.7 | 15,501.0 | 18,103.9 | 20,182.2 |
| Currency | 8.1 | 11.3 | 10.1 | 11.2 | 2,001.9 | 1,560.2 | 397.5 | 411.6 | 456.0 | 503.1 |
| Equity index | 149.1 | 267.2 | 223.7 | 203.4 | 33,984.0 | 33,015.0 | 9,164.0 | 9,841.9 | 12,309.8 | 13,563.0 |
| Other Markets | 946.1 | 1,038.5 | 1,037.2 | 1,087.2 | 28,507.6 | 26,465.6 | 6,105.7 | 6,165.9 | 6,805.8 | 9,391.7 |
| Interest rate | 868.9 | 961.7 | 958.7 | 984.6 | 21,723.5 | 20,619.2 | 4,734.1 | 4,905.3 | 5,320.2 | 7,511.0 |
| Currency | 59.9 | 58.4 | 57.4 | 83.4 | 5,073.7 | 4,430.5 | 1,000.7 | 911.7 | 1,141.4 | 1,418.9 |
| Equity index | 17.4 | 18.4 | 21.1 | 19.3 | 1,710.5 | 1,416.0 | 370.9 | 348.9 | 344.1 | 461.8 |

Source: http://www.bis.org/statistics/r_qa1309_hanx23a.pdf

USD OTC and ETD derivatives Relation to LIBOR

Notional amount of outstanding contracts registered with DTCC referencing LIBOR

USD BN Equivalent, November 2012

| | LIBOR s/n–o/n | LIBOR 1w | LIBOR 2w | LIBOR 1m | LIBOR 3m | LIBOR 6m | LIBOR 12m | LIBOR Total |
|-------------------------|------------------|-------------|-------------|-------------|-------------|-------------|--------------|----------------|
| USD | 0 | 0 | 0 | 11,160 | 106,386 | 1,052 | 5 | 118,602 |
| % of LIBOR Total | - | - | - | 9% | 90% | 1% | - | - |

- This table represents the gross notional amounts (in USD equivalent) for all IRS trades referencing LIBOR by ten major currencies and common reset frequencies
- Aggregate summary based on a subset of Interest Rate derivative transactions (IRS) that have been registered in DTCC Derivatives Repository Ltd's (DDRL's) Global Trade Repository (GTR)
- "LIBOR" contract count and notional amount provided are derived from all trades where either leg of the transaction references LIBOR

USD ETD derivatives

Open interest of Interest Rate Contracts on CME January 2014

| Futures | # of Contracts (MM) | Notional amount (\$BN) | % of total |
|--|----------------------------|-------------------------------|-------------------|
| Short-Term Interest Rates (STIRs) | 10.5 | 11,607 | 94% |
| 1 Month Eurodollar Futures (1-Month (LIBOR)) | 0.0 | 1 | 0% |
| 30 Day Federal Funds Futures | 0.3 | 1,421 | 12% |
| 3-Month Overnight Index Swap (OIS) Futures | 0.0 | 0 | 0% |
| Eurodollar Futures (3-Month LIBOR) | 10.2 | 10,186 | 82% |
| EuroYen Futures | 0.0 | 0 | 0% |
| US Treasury | 6.4 | 730 | 6% |
| Deliverable Swaps | 0.1 | 9 | 0% |
| Sovereign Yield Spreads | 0.0 | 0 | 0% |
| Futures Total | 16.9 | 12,347 | 100% |

| Options | # of Contracts (MM) | Notional amount (\$BN) | % of total |
|--|----------------------------|-------------------------------|-------------------|
| Short-Term Interest Rates (STIRs) | 20.6 | 20,601 | 98% |
| 30 Day Federal Funds Options | 0.0 | 12 | 0% |
| Eurodollar 1yr MC Options | 4.1 | 4,111 | 20% |
| Eurodollar 2yr MC Options | 5.3 | 5,320 | 25% |
| Eurodollar 3yr MC Options | 2.7 | 2,674 | 13% |
| Eurodollar 4yr MC Options | 0.7 | 677 | 3% |
| Eurodollar 5yr MC Options | 0.0 | 17 | 0% |
| Eurodollar Option 1 Yr MC Wk 5 | 0.0 | 1 | 0% |
| Eurodollar Options | 7.8 | 7,785 | 37% |
| Eurodollar Options 2 Yr MC Wk 5 | 0.0 | 4 | 0% |
| Eurodollar Options 3 Yr MC Wk 5 | 0.0 | 1 | 0% |
| US Treasury | 2.8 | 365 | 2% |
| Options Total | 23.4 | 20,966 | 100% |

Source: <http://www.cmegroup.com>

USD OTC and Exchange traded Derivatives Maturities

Contractual roll-off of outstanding Interest Rate Derivatives
USD IR derivative trades reported to DTCC Global Trade repository

| November 2013 | Notional outstanding (\$BN) | % roll-off after x years | | | | | | | |
|--------------------------------|--|---------------------------------|----------|----------|----------|----------|-----------|-----------|-----------|
| | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| Swap | 111,287 | 14% | 26% | 38% | 62% | 74% | 82% | 94% | 98% |
| FRA | 28,681 | 94% | 99% | 100% | 100% | 100% | 100% | 100% | 100% |
| BasisSwap | 16,815 | 40% | 56% | 65% | 78% | 83% | 86% | 98% | 100% |
| OIS | 11,747 | 78% | 94% | 97% | 99% | 100% | 100% | 100% | 100% |
| CrossCurrencySwap | 4,663 | 29% | 46% | 60% | 76% | 83% | 88% | 95% | 99% |
| CapFloor | 3,719 | 35% | 50% | 65% | 86% | 92% | 94% | 100% | 100% |
| InflationSwap | 328 | 19% | 31% | 41% | 59% | 68% | 83% | 96% | 99% |
| CallableSwaps | 320 | 4% | 9% | 17% | 41% | 56% | 68% | 85% | 97% |
| CrossCurrencySwapExotic | 24 | 24% | 29% | 35% | 53% | 58% | 61% | 90% | 100% |
| SwapExotic | 1,072 | 32% | 42% | 53% | 70% | 77% | 81% | 90% | 98% |
| Swaption | 9,920 | 45% | 59% | 67% | 74% | 77% | 78% | 80% | 80% |
| OptionExotic | 397 | 40% | 51% | 59% | 76% | 84% | 90% | 95% | 98% |
| DebtOption | 22 | 53% | 61% | 63% | 65% | 65% | 70% | 82% | 100% |

Source: DTCC Global Trade Repository (8 November 2013)

USD Deposits

| | Outstanding volume (Q4 2012) | Relation to LIBOR | Assumptions/Sources |
|---------------------------------------|--|---|--|
| Retail deposits | <ul style="list-style-type: none"> • \$7.1 TN | <ul style="list-style-type: none"> • Low relation to LIBOR expected • <i>LIBOR tenors TBC</i> | <ul style="list-style-type: none"> • Volumes: Federal Reserve <ul style="list-style-type: none"> – Volume outstanding includes time and savings deposits • <i>Research in Progress</i> <ul style="list-style-type: none"> – Bank websites, particularly outside the US (e.g. HSBC; Investec) |
| Corporate business deposits | <ul style="list-style-type: none"> • \$948 BN | <ul style="list-style-type: none"> • <i>Low relation to T-bills</i> | <ul style="list-style-type: none"> • Volumes: Federal Reserve • Volume outstanding includes time and savings deposits and checkable deposits and currency |
| Noncorporate business deposits | <ul style="list-style-type: none"> • \$908 BN | <ul style="list-style-type: none"> • <i>Low relation to T-bills</i> | <ul style="list-style-type: none"> • Volumes: Federal Reserve • T-bill linked Business deposits: ATB; ABT; FNCB |

US Retail Deposits Volumes

B.100 Balance Sheet of Households and Nonprofit Organizations (1)

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|----------------|----------------|----------------|----------------|----------------|
| 1 Assets | 71448.5 | 72931.6 | 77081.5 | 78265.0 | 84238.9 |
| 2 Nonfinancial assets | 24831.9 | 23657.3 | 23319.2 | 23251.3 | 24934.3 |
| 3 Real estate | 19879.5 | 18679.7 | 18326.8 | 18096.7 | 19638.8 |
| 4 Households (2,3) | 17390.4 | 16877.5 | 16299.4 | 15863.9 | 17280.5 |
| 5 Nonprofit organizations | 2489.1 | 1802.2 | 2027.4 | 2232.8 | 2358.3 |
| 6 Equipment (nonprofits) (4) | 268.5 | 279.5 | 290.6 | 304.6 | 315.1 |
| 7 Intellectual property products (nonprofits) (4) | 105.4 | 110.0 | 115.0 | 123.6 | 132.4 |
| 8 Consumer durable goods (4) | 4578.6 | 4588.1 | 4586.7 | 4726.4 | 4848.0 |
| 9 Financial assets | 46616.5 | 49274.3 | 53762.3 | 55013.7 | 59304.6 |
| 10 Deposits | 8043.5 | 7969.8 | 7924.7 | 8572.4 | 8997.8 |
| 11 Foreign deposits | 56.9 | 50.2 | 49.7 | 46.9 | 45.1 |
| 12 Checkable deposits and currency | 364.9 | 400.6 | 425.2 | 749.2 | 820.8 |
| 13 Time and savings deposits | 6115.0 | 6278.1 | 6395.8 | 6749.9 | 7114.3 |
| 14 Money market fund shares | 1506.8 | 1240.8 | 1054.1 | 1026.4 | 1017.6 |

Assumptions

- Only time and savings deposits included
- Checkable deposits and currency assumed to be unrelated to LIBOR

US Business Deposits Volumes

L.102 Nonfinancial Corporate Business

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|-----------------------------------|----------------|----------------|----------------|----------------|----------------|
| 1 Total financial assets | 12936.9 | 13333.8 | 14033.7 | 14542.3 | 15501.1 |
| 2 Foreign deposits | 24.7 | 31.5 | 40.6 | 34.8 | 13.3 |
| 3 Checkable deposits and currency | 14.2 | 155.0 | 234.6 | 269.0 | 363.4 |
| 4 Time and savings deposits | 381.9 | 488.8 | 548.7 | 563.0 | 584.9 |
| 5 Money market fund shares | 727.0 | 655.5 | 497.8 | 462.4 | 458.3 |
| 6 Security RPs | 7.2 | 7.9 | 12.1 | 12.6 | 10.4 |

L.103 Nonfinancial Noncorporate Business

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|-----------------------------------|---------------|---------------|---------------|---------------|---------------|
| 1 Total financial assets | 3693.1 | 3576.1 | 3727.8 | 3747.1 | 3812.9 |
| 2 Checkable deposits and currency | 519.4 | 534.3 | 531.5 | 529.5 | 543.0 |
| 3 Time and savings deposits | 358.1 | 353.3 | 356.2 | 360.4 | 364.7 |
| 4 Money market fund shares | 75.4 | 73.7 | 76.8 | 77.7 | 78.6 |

Corporate Businesses Deposits

2012
Outstanding
(USD BN)

Checkable deposits
and currency 363

Time and savings deposits 585

Total 948

Noncorporate Businesses Deposits

2012
Outstanding
(USD BN)

Checkable deposits
and currency 543

Time and savings deposits 365

Total 908

US Mutual funds/Money market funds

| | Volume outstanding Dec 2012 (USD BN) | Relation to LIBOR | Assumptions/Sources |
|---------------------------|---|-------------------|--|
| Money market funds | 2,650 | Indirect | <ul style="list-style-type: none"> • Outstanding volume : Federal Reserve • Money-market funds, with assets of about \$2.6 TN in the US, invest in short-term-debt instruments which have returns that are sometimes tied to LIBOR • Mutual funds with assets totaling \$23.8 BN, spread across a variety of categories – such as nontraditional bond funds and alternative funds – use LIBOR as their primary benchmarks • As such, LIBOR affects the performance of the underlying asset, but the fund is not directly linked to LIBOR |
| Bank loan funds | <i>TBC</i> | Indirect | <ul style="list-style-type: none"> • Bank-loan funds which invest in syndicated loans tied to LIBOR, have about \$60.9 BN in assets • “Scott Page, director of bank loans at Eaton Vance manages \$25 BN in bank-loan assets which he says is ‘almost 100% LIBOR-based’” (Source: WSJ Article) |

US Money Market Funds Volumes

L.206 Money Market Mutual Fund Shares

Billions of dollars; amounts outstanding end of period, not seasonally adjusted

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---------------|---------------|---------------|---------------|---------------|
| 1 Total assets | 3757.3 | 3258.6 | 2755.4 | 2642.5 | 2649.6 |
| 2 Household sector | 1506.8 | 1240.8 | 1054.1 | 1026.4 | 1017.6 |
| 3 Nonfinancial corporate business | 727.0 | 655.5 | 497.8 | 462.4 | 458.3 |
| 4 Nonfinancial noncorporate business | 75.4 | 73.7 | 76.8 | 77.7 | 78.6 |
| 5 State and local governments | 126.1 | 135.9 | 149.6 | 149.2 | 140.7 |
| 6 Rest of the world | 69.7 | 76.9 | 69.8 | 79.5 | 114.5 |
| 7 Property-casualty insurance companies | 32.8 | 29.6 | 25.6 | 20.0 | 23.8 |
| 8 Life insurance companies | 39.2 | 33.7 | 21.0 | 28.8 | 24.0 |
| 9 Private pension funds | 156.2 | 147.4 | 137.3 | 153.7 | 150.0 |
| 10 State and local govt. retirement funds | 43.7 | 40.9 | 44.0 | 46.0 | 44.5 |
| 11 Funding corporations | 980.5 | 824.1 | 679.4 | 598.8 | 597.6 |

Market Participants Group on Reforming Interest Rate Benchmarks

EUR Currency Report

March 2014

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Executive Summary

Background and Objectives

The euro (EUR) is the official currency of the Eurozone, which consists of 18 of the 28 member states of the European Union. As a consequence it is used by more than 330 million citizens across Europe.

The most commonly used benchmarks for financial instruments denominated in euro are EONIA, Euribor and, to a limited extent, Euro Libor. A number of other benchmarks exist (e.g. Eonia Swaps Index, Eurepo), but at the time of writing their use is in comparison relatively marginal, although the underlying markets in some cases are quite active. The Euro Market Footprint section contains a detailed quantitative and qualitative picture on the use of benchmarks in the Eurozone.

The aim of this report is to analyze euro benchmarks and to suggest a transition to new IOSCO-compliant¹ benchmarks, minimizing market, legal and operational risks arising from the change.

This brief summary will outline the main findings and conclusions from the analysis, providing a compass for the reader to navigate through the comprehensive, deep-dive sections that detail the many dimensions involved.

Summary of Major Findings and Priorities

In the case of euro, the group recommends the following²:

1. Keep the current EONIA benchmark as it is, since it is already transaction based. An eye should be kept on the number of contributing banks, which should be large and diverse enough to be fully representative of banks active in the euro overnight market, avoiding at the same time excessive concentration on a few banks or on specific sub-regions. In order to meet these targets and ensure the reliability of this benchmark, contribution could be made compulsory for a defined set of banks;
2. Substitute Euribor and Euro Libor with new parameters, if possible. Suggested candidates for a successful substitution are: an index based on transaction data from banks' wholesale borrowing, for simplicity referred to in this document as Euribor+, and a transaction-based overnight indexed swap (OIS) index; the selection between Euribor+ and transaction-based OIS will depend on the purposes of the users;
3. The particular structure of the Eurozone, where the domestic government bond market is not unified, but sees the coexistence of all national government bonds of all member states, led the group to exclude the proposal of benchmarks based directly (government

¹ The data used to construct a Benchmark determination should ... be anchored by observable transactions entered into at arms' length between buyers and sellers in the market" (<http://www.iosco.org/library/pubdocs/pdf/IOSCOPD409.pdf>)

² See section 2 'Reference Rates Menu'

bond rates) or indirectly (repo rates) on this market. In the case of repo rates, the secured nature of the underlying transaction, as opposed to the unsecured nature of Euribor and Euro Libor, is a further reason for the exclusion.

Features of Euribor+

Euribor+ is presented in the EUR Reference Rates Menu section and better described in the EUR Fixing Methodology section. The concept is based on the analysis jointly performed by the ECB and Euribor-EBF in 2013/14 (after transactions dealt in 2012 and 2013) on banks' wholesale borrowing activity³. Euribor+ is the rate, calculated on a daily basis, on banks' wholesale borrowing deals with a broad set of instruments and lenders. Therefore, compared to the current Euribor definition, Euribor+ focuses on the borrowing side, includes short-term paper as well as deposits, and covers also wholesale transactions where the investor is not a bank (asset managers, corporates, pension funds and others).

This expansion of the definition of banks' short-term wholesale borrowing is consistent with the evolution of the funding market in the last few decades, where several new actors joined the lending/investing side of the money market and, as in other currencies, interbank transaction volumes substantially contracted.

As far as the fixing methodology is concerned, the group recommends fine-tuning it on the basis of actual data being collected by the EBF and the ECB, in order to ensure the robustness and the reliability of the benchmark. Statistical methods can be used in order to mitigate the volatility component not strictly linked to market changes. Depending on the volumes, the possibility of averaging data from more than one day should be evaluated, in order to ensure the continuity of the fixings. As a contingency-only solution, to be used only if the market is so disrupted to not allow any transaction-based fixings, a quotation-based contribution is envisaged to guarantee the availability of the index in case volumes are not sufficient.

According to the information currently available at the time of writing, Euribor+ can be fixed for maturities from 1 week to 6 months (suggested: 1W, 1M, 3M, 6M). While some doubts persist on the availability of sufficient volumes to publish a continuous and stable enough 12 month fixing, efforts should be made to do so as recommended by the market outreach survey.

Features of transaction-based OIS

The OIS index is presented in the section "Benchmark Transitions for Derivatives Markets". This section covers all currencies, not only euro, therefore not all of the methodologies described can apply to the single currency.

In particular, in the case of the euro, the group supports the creation of an index based on one or more than one of the following methodologies:

- A collection of transaction-based data on the model of Euribor-EBF's EONIA (EONIA Swap+);

³ See ECB October Bulletin for the initial results

- Use of an MTF/SEF-based approach which sources rates directly from regulated electronic trading venues which operate central limit order books (CLOBs) and where market makers stream live, actionable bids and offers;
- Use of transaction based data from swap data repositories.

Transition

The EUR Legal Analysis and Transitions sections deal with the risks arising from the substitution process and suggest the best way to reduce them.

A second peculiarity of the Eurozone appears precisely in this area of analysis: each and every legal jurisdiction of the member states must be considered. Moreover, all Eurozone countries but one (Ireland) are based on Civil Law as opposed to Common Law, and the results of the application of the former can lead to different conclusions than those reached by the legal analysis performed in Common Law-based countries.

In order to reduce the risk of triggering an elevated number of litigations, whose outcome could be very different depending on the underlying contracts and applicable law, the group recommends the involvement of the official sector in regulating the transition from old to new benchmarks and highlights the need for supranational law (European Regulations) not to leave the continuity of contracts to different legal interpretations by member states and different economic compensation.

There is a precedent in the transition from national benchmarks to Euribor in January 1999, when EU-level regulation, transposed at national level, insured a smooth substitution of Euribor for domestic benchmarks.

As far as the transition path is involved, in line with the global transition analysis, the group considered four scenarios: a "seamless" transition, a "successor-rate" transition, a parallel transition with a cut-over at the end of the transition period ("parallel with cut-over") and a "market-led" transition with an indefinite parallel run of Euribor and Euribor+.

The group concluded that, while a transition to an OIS index for certain segments of the market can be "market-led", a more generalized transition from Euribor to Euribor+ should not follow the "parallel with cut-over" path, initially favoured, nor the "market-led" path. In fact both these approaches, with a long parallel of two similar benchmarks, would raise too many issues for banks and corporations in terms of technical infrastructures, accounting set-ups and processes. Therefore, since a "seamless" transition looks not fully implementable given how Euribor and Euribor+ are conceived, the "successor rate" transition path, which is recommended in the MPG report for analyzed currencies in all cases where a "seamless" transition is not feasible, seems to be the most favourable option for a switch from legacy Euribor to Euribor+. As implied in other parts of the overall EUR MPG report, a broader and more detailed analysis is required to define the final and most efficient transition path.

Market Outreach

All the analysis and the recommendations above are fully supported by the survey conducted by the group among main stakeholders. An ad-hoc questionnaire prepared by the group has been compiled by 26 banks, 7 insurance companies and 2 insurance national federations, 3 asset managers and 6 corporates, covering most Eurozone countries.

In particular, from the replies to the questionnaire, the following points emerged:

- Clear preference to move to a benchmark that reflects the unsecured cash market, as opposed to repo-based benchmarks or OIS-based benchmarks. Repo based benchmarks are rejected for the same reasons highlighted above, namely their secured nature and the fragmentation of the repo market in the euro area. OIS-based benchmarks are not considered a valid substitute by most respondents as they *“include neither liquidity premium nor bank credit risk and are too different in nature from the Euribor, reflecting liquidity situation, expectations and derivatives markets, more than real underlying transactions and cash operations”*;
- Preference for transaction-based indices;
- opportunity to include a wider set of instruments on top of deposits, and namely certificates of deposit and commercial paper;
- need for an independent administrator and a transparent fixing process;
- need to set minimum volume thresholds to validate data;
- Mixed views on volatility. Respondents concerned by excessive volatility suggest the use of smoothing techniques and the recourse to the averaging of data from more than one trading day;
- tenors over 3 months are actively used, and should be covered by new benchmarks;
- transition and/or warm-up periods long enough to allow for legal and IT changes;
- slight preference for widening the contributing panel to enhance its representativeness and limit the incentive to manipulate the contributions

The EUR Market Outreach Section contains a detailed summary by typology of respondents.

1. Market Footprint

1.1. Approach

The Euro (EUR) Market Footprint analysis aims to quantify the volumes and estimate the projected maturities of key classes of financial instruments that reference EURIBOR and Euro-LIBOR by asset class and tenor.^{4 5} This information is intended to inform the MPG Workstreams tasked with choosing reference rate menus and designing transition strategies.

Wherever possible, volume and maturity data was taken from official public sources. However, public data is not sufficient to provide a complete picture and so this was complemented with a combination of private data and opinions of market participants⁶ gathered through the outreach exercise and a series of bilateral discussions. Wherever possible, attempts were made to corroborate non-official data by making use of multiple sources such as reports by market analysts, news reports and bank websites.

The main data sources used are summarized in the table below:

Table 1: Key data sources

| Asset Class | Key data sources |
|-----------------------------------|--|
| Syndicated Loans | <ul style="list-style-type: none"> • Dealogic • Input from market participants |
| Retail and Corporate Loans | <ul style="list-style-type: none"> • ECB statistics • Input from market participants |
| Mortgages | <ul style="list-style-type: none"> • European Mortgage Federation • ECB Statistics |
| Bonds | <ul style="list-style-type: none"> • Dealogic • European Covered Bond Council (ECBC) • ECB Statistics |
| Securitised products | <ul style="list-style-type: none"> • SIFMA • Dealogic |
| Derivatives | <ul style="list-style-type: none"> • BIS derivatives statistics • DTCC Statistics • LIFFE statistics |
| Deposits | <ul style="list-style-type: none"> • ECB statistics • Input from market participants |

⁴ The analysis of EURIBOR and Euro-Libor indexed banking product issued outside the Euro Area was covered by the Emerging Markets Market Footprint Analysis sworkstream, and are therefore detailed in that section.

⁵ Outstanding volumes were estimated as of Year-end 2012. Where data was not available for this date the most recent available data was used

⁶ Due to confidentiality obligations, all non-public input from market participants is cited as "Input from market participants".

A number of early versions of these results were circulated to members of the MPG for comment and to feed into their respective analysis. All feedback from MPG members was incorporated into the final version of this analysis.

1.2. Summary of Findings

The notional volume of outstanding financial contracts indexed to EURIBOR is estimated to be greater than \$180 TN. The main types of contracts indexed to EURIBOR include Over-the-Counter (OTC) and exchange traded derivatives, corporate loans, retail mortgages, floating rate bonds and securitized products. 1-month, 3-Month and 6-month are the most commonly referenced tenors across all product groups, with 12-month used across a subset of products in a number of jurisdictions. Other EURIBOR tenors are rarely used. Contracts referencing Euro-LIBOR are uncommon. Around 4% of EUR syndicated loans and a limited volume of interest rate derivatives are linked to Euro-LIBOR, at the 3-month and 6-month tenors.

It is important to note that in addition to the above analysis of financial contracts which directly reference EURIBOR and Euro-LIBOR, there is also a range of other important applications where these reference rates are used. These include:

- Late payment clauses in commercial contracts often refer to LIBOR as an interest rate
- LIBOR is often used as a discount rate for valuation purposes - although less so for cleared OTC derivatives, where OIS rates are primarily used
- LIBOR is sometimes used as a performance benchmark for money market funds and other asset managers.

Although it is difficult to estimate the volume of contracts involved, the 'Impact on Corporates' Workstream provides a view of the various uses of reference rates based on Market Outreach.

An overview of the Market Footprint findings is presented in Figures 1, 2 and 3 below. Details of sources and assumptions used can be found in the Market Footprint Appendix.

Figure 1: EURIBOR Market Footprint overview

| Asset class | | Outstanding volume (\$ BN) | % EURIBOR related | % non-domestic | O/n | 1w | 1m | 2m | 3m | 6m | 12m |
|--------------------------------|--|----------------------------|-------------------|----------------|-----|----|--------|----|--------|--------|--------|
| Level 1 | Level 2 | | | | | | | | | | |
| Loans | Syndicated loans ¹ | 535 | 90% | 12% | | | | | Medium | Medium | |
| | Corporate loans (bilateral) ¹ | 4,322 | 60% | Low | | | | | High | High | |
| | SME loans | 1,518 | 60% | Low | | | Medium | | Medium | Low | |
| | CRE/Commercial mortgages ² | - | 60% | Low | | | Medium | | Medium | Low | |
| | Retail mortgages | 5,073 | 28% | Low | | | | | Medium | Medium | Medium |
| | Consumer loans | 800 | Low | Low | | | Low | | | | |
| | Other Loans to Households | 1082 | Low | Low | | | Low | | | | |
| Bonds | Floating/Variable Rate Notes | 2,645 | 70% | 14% | | | Low | | High | Medium | Low |
| | Covered Bonds | 2,557 | 23% | Low | | | Low | | Medium | Medium | Low |
| Securitisation | RMBS | 952 | 100% | 6% | | | Low | | Medium | | |
| | CMBS | 107 | 100% | 0% | | | | | Medium | | |
| | ABS | 197 | 91% | 10% | | | Medium | | Low | Low | |
| | CDO | 165 | 78% | 78% | | | | | Medium | Medium | |
| OTC | IR Swaps | 137,553 | High | Low | | | High | | High | High | Medium |
| Derivatives | FRAs | 25,559 | High | Low | | | High | | High | High | |
| | IR Options | 24,249 | High | Low | | | High | | High | High | |
| | X-currency swaps | 9,731 | High | Low | | | High | | High | High | |
| ETD | IR Options | 12,439 | 100% | Low | | | | | High | | |
| Derivatives | IR Futures | 4,905 | 100% | Low | | | | | High | | |
| Deposits | Retail deposits | 8,102 | Low | Low | | | | | | | |
| | Corporate deposits | 2,336 | Medium | Low | | | Medium | | Medium | | |
| | SME deposits | | Medium | Low | | | Medium | | Medium | | |
| Mutual funds | Money market funds | TBC | Indirect | | | | | | | | |
| | Bank loan funds | TBC | Indirect | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | | | |
| | Discount rates | TBC | TBC | | | | | | | | |

 Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Significant overlap exists between Syndicated loans and Corporate business loans
 2. CRE/Commercial mortgages included in Corporate and SME loans

Figure 2: Projected roll-off of EURIBOR linked contracts

| Asset class | | Outstanding volume (\$ BN) | % EURIBOR related | % Callable | % roll-off after x years | | | | | | | |
|-----------------------------|---------------------------------------|----------------------------|-------------------|------------|--------------------------|-----|------|------|------|------|------|------|
| Level 1 | Level 2 | | | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| Loans | Syndicated loans | 535 | 90% | | 18% | 45% | 69% | 89% | 92% | 93% | 97% | 100% |
| | Corporate loans (bilateral) | 4,322 | 60% | | 25% | | | 42% | | | | |
| | SME loans | 1,518 | 60% | | | | | | | | | |
| | CRE/Commercial mortgages ² | - | 60% | | | | | | | | | |
| | Retail mortgages | 5,073 | 28% | | | | | | | | | |
| | Consumer loans | 800 | Low | | | | | | | | | |
| | Other Loans to Households | 1082 | Low | | | | | | | | | |
| Bonds | Floating/Variable Rate Notes | 2,645 | 70% | 10% | 23% | 44% | 59% | 76% | 81% | 84% | 87% | 89% |
| | Covered Bonds | 2,557 | 23% | | | | | | | | | |
| Securitisation ¹ | RMBS | 952 | 100% | 63% | 0% | 0% | 1% | 1% | 2% | 2% | 5% | 32% |
| | CMBS | 107 | 100% | 55% | 4% | 10% | 16% | 37% | 53% | 66% | 76% | 86% |
| | ABS | 197 | 91% | 49% | 3% | 7% | 13% | 19% | 27% | 42% | 63% | 82% |
| | CDO | 165 | 78% | | | | | | | | | |
| OTC derivatives | IR Swaps | 137,553 | High | | 18% | 33% | 44% | 62% | 72% | 81% | 93% | 98% |
| | FRAs | 25,559 | High | | 90% | 99% | 100% | 100% | 100% | 100% | 100% | 100% |
| | IR Options | 24,249 | High | | 24% | 38% | 48% | 62% | 69% | 75% | 84% | 85% |
| | X-currency swaps | 9,731 | High | | 27% | 44% | 56% | 72% | 80% | 86% | 95% | 99% |
| ETD | IR Options | 12,439 | 100% | | | 95% | | | | | | |
| | IR Futures | 4,905 | 100% | | | | | 95% | | | | |
| Deposits | Retail deposits | 8,102 | Low | | 38% | 88% | | | | | | |
| | Corporate deposits | | Medium | | 65% | 94% | | | | | | |
| | SME deposits | 2,336 | Medium | | | | | | | | | |
| Mutual funds | Money market funds | TBC | Indirect | | | | | | | | | |
| | Bank loan funds | TBC | Indirect | | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | | | | |
| | Discount rates | | | | | | | | | | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Roll-off rates in this draft represent contractual maturity, actual roll-off is expected to be significantly faster due to prepayment.

Figure 3: Euro-LIBOR Market Footprint overview

| Asset class | | Outstanding volume (\$ BN) | % EUROLIBOR-related | % non-domestic | O/n | 1w | 1m | 2m | 3m | 6m | 12m |
|--------------------------------|--|------------------------------|---------------------|----------------|-----|----|----|----|-----|-----|-----|
| Level 1 | Level 2 | | | | | | | | | | |
| Loans | Syndicated loans ¹ | 535 | 4% | 12% | | | | | Low | Low | |
| | Corporate loans (bilateral) ¹ | 4,322 | - | Low | | | | | | | |
| | SME loans | 1,518 | - | Low | | | | | | | |
| | CRE/Commercial mortgages ² | - | - | Low | | | | | | | |
| | Retail mortgages | 5,073 | - | Low | | | | | | | |
| | Consumer loans | 800 | - | Low | | | | | | | |
| | Other Loans to Households | 1082 | - | Low | | | | | | | |
| | Bonds | Floating/Variable Rate Notes | 2,645 | - | 14% | | | | | | |
| Covered Bonds | | 2,557 | - | Low | | | | | | | |
| Securitisation | RMBS | 952 | - | 6% | | | | | | | |
| | CMBS | 107 | - | 0% | | | | | | | |
| | ABS | 197 | - | 10% | | | | | | | |
| | CDO | 165 | - | 78% | | | | | | | |
| OTC | IR Swaps | 137,553 | 0.01% | Low | | | | | Low | Low | |
| Derivatives | FRAs | 25,559 | 0.01% | Low | | | | | Low | Low | |
| | IR Options | 24,249 | 0.01% | Low | | | | | Low | Low | |
| | X-currency swaps | 9,731 | 0.01% | Low | | | | | Low | Low | |
| | ETD | IR Options | 12,439 | 0.01% | Low | | | | | Low | Low |
| Derivatives | IR Futures | 4,905 | 0.01% | Low | | | | | Low | Low | |
| Deposits | Retail deposits | 8,102 | - | Low | | | | | | | |
| | Corporate deposits | 2,336 | - | Low | | | | | | | |
| | SME deposits | | - | Low | | | | | | | |
| Mutual funds | Money market funds | High | - | | | | | | | | |
| | Bank loan funds | Low | - | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | | | |
| | Discount rates | | | | | | | | | | |

 Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Significant overlap exists between Syndicated loans and Corporate business loans
2. CRE/Commercial mortgages included in Corporate and SME loans

\$350 BN of EUR syndicated loans were originated globally in 2012, according to Dealogic, with an estimated notional outstanding of \$500 BN. ~90% of EUR syndicated loans reference EURIBOR and 4% reference Euro-LIBOR, primarily at the 3-month and 6-month tenors. 90% of current outstanding loans are expected to roll off over a 5-7 year period.

Retail and business loan and deposit volumes for the Euro Area are taken from the ECB Statistical Data Warehouse. The relation to EURIBOR and Euro-LIBOR for business loans is based on input from market participants. The main tenors used are 1- and 3-months for small business loans, and 3- and 6-month for large business loans. There will be some double-counting between corporate business loans and syndicated loans. According to ECB statistics, 58% of business loans have a maturity of over 5 years.

Of the \$5.1 TN outstanding Retail mortgages in the Euro Area, approximately 28% (\$1.4 TN) are indexed to EURIBOR. Data regarding tenors used is taken from the European Mortgage Federation Hypostat. The main tenors used are 3-, 6-, and 12-month. The relative use of tenors varies from country to country, e.g., 3-Month is common in Italy, Austria and Ireland, 6-month is common in Portugal and 12-month is common in France and Spain. Other retail lending (e.g., Student, Credit card, Auto) is generally not indexed to EURIBOR or Euro-LIBOR.

EUR Floating and Variable rate notes outstanding amounted to \$4.9 TN based on ECB statistics. This includes ~\$0.6 TN of floating rate covered bonds, based on data from the European Covered Bond Council (ECBC) and ~\$1.6 TN of securitized products, based on data from SIFMA. Over 70% of notes issued in 2012 were indexed to EURIBOR, mostly to 3- and 6-month tenors. Less than 1% was indexed to Euro-LIBOR. The contractual maturity of many of the securitized products is very long (30 year+), although actual realized maturity is expected to be significantly shorter due to the prevalence of call options. 80% of other notes and bonds are expected to mature within a 5-7 year period.

Exchange traded and OTC derivatives are by far the largest class of contract linked to EURIBOR by volumes outstanding, accounting for over 80% of all EURIBOR linked volumes. Derivatives linked to EURIBOR include Short Term Interest Rate Swaps and Options, Forward rate agreements and cross currency swaps. Data from LIFFE shows that effectively all EUR exchange traded interest rate derivatives are linked to 3-month EURIBOR. OTC interest rate swaps most commonly reference the 6-month rate (~70%) followed by 3-month (~25%). Data from the DTCC Global Trade Repository (GTR), covering OTC and exchange traded derivatives, shows only \$23 BN of notional contract outstanding linked to Euro-LIBOR.

2. Reference Rates Menu

2.1. Overnight

In the case of EUR, as opposed to the case of other currencies including USD, the definition of an overnight rate benchmark seems to be a relative “non-issue”, since in the Euro Area there is already a widely accepted reference rate, feasible and viable.

In fact since the beginning of 1999 the ECB collects the daily transaction data from a panel of contributing banks and calculates the **EONIA rate** (see full description in Appendix A). The index is based on actual transactions and it should therefore be IOSCO compliant.

The panel, until May 2013, has coincided with the panel of Euribor contributing banks. Since June 1st 2013 Euribor-EBF approved the split between the two panels, which can now host different banks.

Potential issues:

- The number of panel banks since the inception of the benchmark has been decreasing, initially due to mergers and more recently partly as a reaction to the 'Libor scandal' and partly because of the ensuing tightening of governance/contribution rules that deterred some banks from participating without an obligation to do so. Nevertheless the panel remains broad and much larger than any other IBOR panel.
- Official sector intervention might help in granting a stable enlargement of the base of banks and appropriate panel representativeness over time. Actually, the recent proposal by European Parliament and Council already contains a provision where the appointed regulator may force some banks to contribute to an index in case the panel loses credibility or is in danger of doing so.
- Currently there is an issue of concentration as from time to time a few banks in specific Euro Area countries can account for the large majority of transactions. Without changing the calculation rules (average of rates of all reported transactions weighted by the volumes) this could be mitigated by increasing the number of panel banks.

2.2. Maturities from 1W to 3M

In this area we have two commonly accepted reference rates, **Euribor** and **EuroLibor** (see full description in Appendix A). Both are contributed rates with a slight difference in the definition.

Euribor banks are asked to contribute: “to the best of their knowledge, the rates at which euro interbank term deposits are being offered within the EMU zone by one prime bank to another at 11.00 a.m. Brussels time (“the best price between the best banks”)”.

EuroLibor banks are asked to contribute the rate at which they “could borrow funds, were [they] to do so by asking for and then accepting inter-bank offers in a reasonable market size just prior to 11 am [BST]”.

Both refer to offered rates (we are actually talking about InterBank Offered Rates, from now on the "IBOR family"), but EuroLibor is slightly biased towards a bid, as the definition puts the emphasis on the borrowing bank, while Euribor puts it on the lending bank.

In the last few years there has been a systematic bias between the two series whereby the EuroLibor is structurally lower than Euribor.

Euribor has a wide representation of banks in the panel (30 now) in terms of number and geographical coverage. EuroLibor is currently contributed by 15 banks, all trading in the London market according to ICE requirements.

An exercise recently conducted by the EBF and the ECB on real unsecured money market transactions has shown that, despite the fact that it is quotation-based, during the review period (1/1/12 to 31/8/13) Euribor has closely tracked the evolution of daily aggregations of real transactions.

Both parameters are extremely well known and widely used in financial markets, as well as in retail and corporate markets. It has to be remarked that Euribor is used to a much larger extent than Euro-Libor.

Potential existing alternative rates are Eurepo⁷ and EONIA Swap Index⁸ (see full description in the Appendix A).

Eurepo

The current version of these parameters is non feasible in IOSCO terms as they are not transaction based. However it cannot be excluded that similarly defined analogous transaction based indexes can be introduced on the same markets, that are liquid to a certain extent.

Eurepo, as opposed to potential repo parameters for other currencies, for the Euro Area has unfortunately the huge and probably at the moment insurmountable problem that the Euro Area Government Bond market is fragmented and therefore the General Collateral (GC) definition, as specified by the Eurepo code of conduct, refers only to rates corresponding to repos having as collateral bonds issued by the financially strongest member States of the Euro Area in the historical phase of the fixing. Therefore it can hardly be used as a common parameter representing market conditions in the entire Euro Area. In this it looks scarcely viable, as long as Euro Area countries will continue each to issue their own bonds.

Another issue of repo rates is their intrinsic nature: they track secured transactions as opposed to unsecured transaction at the base of the IBOR family and of the EONIA rate. In this some see an obstacle towards their adoption for a potential substitution of IBOR rates.

Finally the repo market suffers as the unsecured market from relative illiquidity in periods beyond one week, though to a lesser extent.

⁷ <http://www.euribor-ebf.eu/eurepo-org/about-eurepo.html>

⁸ <http://www.euribor-ebf.eu/eoniaswap-org/about-eoniaswap.html>

The conclusion of this working group is that Eurepo is not a good candidate to replace the IBOR family.

It has to be mentioned that another repo index is currently fixed: RepoFunds, calculated and published by ICAP Information Services⁹. It is based on one-day (O/N, T/N, S/N) repo transactions actually executed on either the Brokertec or the MTS electronic platforms. A separated index is calculated for Germany, France and Italy. The same comments already made on Eurepo are all valid also for RepoFunds, with the exception of the IOSCO feasibility. An added limit for RepoFunds is that in its current form it covers only one day transaction and does not allow the generation of a term curve.

OIS

About EONIA Swap Index, anecdotal evidence suggests that it is used only as a reference for a few markets (e.g. EONIA 1M and 3M futures on NYSE LIFFE) and for the internal revaluation process in some banks and financial institutions. There appear to be only a few or no contracts indexed to it.

The current Eonia Swap Index is now contributed by 8 banks, no longer representative of the entire market. A drop below 7, set as the minimum number of contributing banks for the index to be valid, would trigger a suspension of its publication, similarly to what happened in 2012 to NYFR.

Apart from the contingent situation of the EONIA Swap Index, an OIS based index could have some degree of viability in case market participants decided to adopt it and could be made "feasible" though the recourse to clearing house data, data collected by an independent authority or on firm MTF quotes.

These possibilities, that would allow the creation of an "IOSCO feasible" OIS reference rate, are analyzed at length in 'Fixing Methodologies for OIS Reference Rates' (Appendix E to the Cross Currency Report).

On the viability of an OIS based index there are split opinions in the working group. In particular while its viability for derivatives books and fully-marked-to-market books in general looks easy to reach, there are different opinions in the Group on its viability for banking books and cash books more in general.

Criticism on its use for cash books is based on the following observations:

- OIS would be a purely financial index, based on instruments extremely popular about market professionals (overnight indexed swaps), but much less known to the general public. Therefore there could be issues of viability among SMEs and retail customers.
- As OIS contains the funding spread of banks only for one day, considering that a large part of commercial products indexed to Euribor/Libor sees the banks as lenders or borrowers, it could be difficult to convince them to adopt an index that needs further hedges/spreads. Again this could create viability issues

⁹ <http://www.repofundstrate.com>

- OIS projects almost pure rates expectations, but these are not based on actual cash transactions, but on entirely derivatives-based financial transactions, where expectations can be self-fulfilling and detached from the real economy if an anchor like current Euribor/Libor is removed
- huge volumes of trading (and in perspective of indexation) are based on a single index (EONIA), whose relatively low volumes in theory are not immune to manipulation attempts. Huge pressure would build on it if EONIA would represent the only cash transaction based point in the curve
- EONIA is a pure interbank rate, based on overnight transaction among banks. It can be fragile in case of an adverse evolution of bank-to-bank transactions of the kind the market has been experiencing at least since the last decade of the previous century, even before Lehman

Euribor+

A third alternative provided by real market data: as mentioned before, the ECB, together with Euribor-EBF, is conducting a “backward looking” test for the creation of a benchmark which would be IOSCO and EU compliant by construction.

In order to facilitate the discussion this potential index will be referred to as Euribor+ in this paper, even if it is not its official name.

A first data collection exercise has already been completed and a second run is being conducted at the time of writing. The features of the first test were the following:

- The scope of data collection was set deliberately wide to capture bank unsecured borrowing and lending volumes beyond interbank transactions:
- On the borrowing side, the data collected included funding through interbank deposits, deposits attracted from other financial but not credit institutions, from the official sector and through the issuance of short term securities.
- On the lending side, data on interbank lending, lending through the purchase of short term securities issued by other banks as well as non-financial corporations was collected.

The results of the first collection round suggest the following:

- The borrowing side of wholesale funding provides more robust and resilient figures as the data sufficiency was greater for the borrowing side.
- As expected, the activity in the shorter tenors was higher. Some tenors (e.g. 2M, 9M) were dropped for the second collection exercise based on sufficiency considerations. The focus with the second data collection is placed on tenors: 1W, 1M, 3M, 6M and 12M with some flexibility around those windows to detect broken date deals
- The choice of the computational method for the reference rate has a strong impact on the rate characteristics. When combining all borrowing transactions, using the median results in lower rate levels and volatility relative to Euribor than when using other

methodologies such as the weighted average, trimmed average and the weighted median.

The second transaction exercise in addition also covers the borrowing via deposits from large corporations with the aim to increase data sufficiency¹⁰. A clearer picture is expected with respect to the reporting population, the business coverage, tenors and the computational methods.

The EBF and ECB are expected to end consultations/back-testing and provide a detailed proposal by the end of Q1/2014 to the Euribor stakeholders, so that Euribor-EBF can decide on a new reference rate thereafter.

The idea of the working group is that the existing euro benchmarks like Euribor and Euro Libor ("IBOR family") can be absorbed by Euribor+.

As a note of caution, since Euribor+ is different from the IBOR family because it covers a larger number of investors/lenders and instruments (CD/CP), and differently than the rest of the IBOR family is more based on the borrowing side than on the lending side, the transition from the IBOR family to a prospective Euribor+ would be helped by the Official Sector support.

On this topic, the Euro Area is not new to benchmark transitions. Actually between 1998 and 1999, with the introduction of the euro, a benchmark substitution process of unprecedented size and scope was successfully performed in all member countries supported by the Official Sector and technically by ISDA.¹¹

To sum-up this area of analysis (1 week to 3 months) the working group is suggesting a coexistence of two parameters, namely Euribor+ and OIS, as each of them appears more suited to one particular area of the market. The coexistence would be helped by an actively traded basis market.

2.3. Over 3 months

Though the landscape in this area looks similar to that described for maturities from 1W to 3M, the relative illiquidity of the underlying market for cash transactions - and to a lower extent for repo transactions - makes it more challenging to find transaction based alternatives for these parameters. Eonia swaps, on the other hand, remain liquid also in these maturities.

However the second round of EBF/ECB tests showed that enlarging the data collected to the whole range of banks' short term wholesale funding instruments (CDs, CP, corporate deposits) and to all investors (that is, not only banks on the lending side) allows a fixing of the 6M maturity, and with less volumes, of the 12M maturity.

The Euro Fixing Methodologies document elaborates further on this.

¹⁰ Though it only concentrates on bank's borrowing side

¹¹ A useful recap is publicly available at: <http://www.euribor-ebf.eu/assets/files/Euribor%20Legacy.pdf>

2.4. STEP+ Project

It has to be mentioned that a project to revitalize the unsecured money market has been launched in 2013 by ACI-The Financial markets Association and Euribor-EBF. This project could be beneficial for money market volumes and therefore increase the significance of any transaction based index on these markets.

2.5. Recap Table

The following table recaps the alternatives discussed in this paper for a EUR Reference Rate Menu:

Table 2: EUR Reference Rate Menu Recap Table

| EUR Indexes | Fixing method IOSCO Compliant? | Transition to new Rate | Alternative/additional rates |
|---------------------------|---|-----------------------------------|-------------------------------------|
| EONIA | ✓ | Not needed | Not applicable |
| Euribor 1W-3M | Not entirely | Encouraged | Euribor+/OIS Index |
| Euribor over 3M | Not entirely | Encouraged | Euribor+/OIS Index |
| Euro Libor 1W-3M | Not entirely | Encouraged | Euribor+/OIS Index |
| Euro Libor over 3M | Not entirely | Encouraged | Euribor+/OIS Index |

3. Fixing Methodologies

3.1. Transaction based Euribor (“Euribor+”)

The benchmark reflects the banks’ wholesale cost of funding, including short term paper, deposits from MFIs and non MFIs.

Maturities considered are 1W, 1M, 3M, 6M[, 12M¹²].

In order to capture all possible deals, it is suggested that banks submit data as of close-of-business, after 18:00 CET, or later considering different time zones, and taking into consideration technical constraints [exact time to be verified after banks consultation].

It has to be noted that the benchmark is fed by the individual banks contributing their own cost of funding and there is a serious issue of data confidentiality, since the funding level is sensitive information; it would be highly desirable that banks’ contributions were not made public.

The benchmark administrator will aggregate the data and publish the result of the calculation the following working day, ideally at the same time of current Euribor publication (11am CET) [the same working day after close of business if data collection, data check and result calculation is feasible].

If the administrator is not in the position to ensure the minimum robustness and reliability requirements, a back-up solution is activated.

3.2. Initial MPG Proposal

3.2.1. Fixing Methodology

The short term cash market liquidity changes over time, especially for maturities beyond one month; there might be periods when a low number of transaction, also possibly with a very low aggregated volume, may be dealt in the marketplace.

Here two options are open, depending basically on:

- data sufficiency
- connected with data sufficiency, extension of the curve (6M and 12M inclusion)

If, after the test being carried out by ECB/EBF, the MPG is reasonably sure that a consistent fixing can be granted under most conditions on the selected maturities, then a one-day fixing (meaning a fixing encompassing only the deals traded on the day of fixing) can be selected.

¹² 12M will be included only if data allow a stable fixing without recurring to the back-up solution on a regular basis

Otherwise, in order to be reasonably sure to be able to calculate a transaction based benchmark under most market conditions, it is suggested to use a 3 or 5 days rolling average/median of daily data.

This mechanism naturally smoothes data volatility. In order for this benchmark to better react to market movements and capture the inner volatility of the deposit market, a vector of weights should be applied to data, so that more recent data weighs more. An example of weights, to be backtested on actual data, is shown in the table below:

Table 3: Example weights vector for rolling average calculation

| | T0 | T-1 | T-2 | T-3 | T-4 |
|----------------------|-----------|------------|------------|------------|------------|
| Weight 3 days | 50% | 30% | 20% | - | - |
| Weight 5 days | 40% | 25% | 15% | 10% | 10% |

There is a trade-off between the data sufficiency and the immediate hedgeability of a benchmark. The longer the fixing period, the more difficult it becomes to hedge the benchmark through cash instruments and derivatives.

A transaction will be eligible for a specific tenor if it is traded on a given date, with value date from "same date" to Spot. As far as maturity date is concerned, in order to capture the so-called "broken dated transactions" we envisage the following:

- In order to be considered a 1-Week Eligible Transaction, a deal has to have Value Date equal to T, T+1 or T+2 and Maturity Date equal to Value Date +1 week \pm 1 Business Day
- In order to be considered a 1-Month Eligible Transaction, a deal has to have Value Date equal to T, T+1, or T+2 and Maturity Date equal to Value Date +1 month \pm 5 Business Days
- In order to be considered a 3-Month Eligible Transaction, a deal has to have Value Date equal to T, T+1, or T+2 and Maturity Date equal to Value Date +3 months \pm 5 BD
- In order to be considered a 6-Month Eligible Transaction, a deal has to have Value Date equal to T or T+1, or T+2 and Maturity Date equal to Value Date +6 months \pm 10 BD
- In order to be considered a 12-Month Eligible Transaction, a deal has to have Value Date equal to T or T+1, or T+2 and Maturity Date equal to Value Date +12 months \pm 10 BD
- Market conventions, TARGET Calendar

The above reflects the features included in ECB/EBF data extraction exercise.

3.2.2. *Minimum robustness and reliability requirements*

In order for daily data to be robust enough and meet IOSCO principles, a set of daily thresholds is defined, higher in case of a 1-day fixing, lower in case of a 3-day or 5-day fixing:

- | | |
|--|-------------|
| 1. minimum daily aggregated volume per maturity: | X MM |
| 2. minimum number of contributor per maturity: | X |
| 3. single contributors don't exceed: | 25% |

If on a given day either condition 1 or condition 2 are not met, the back-up solution is activated for that day.

If condition 3 is not met by some contributors, their contributed volumes are reduced to 25% of the total and the weight of remaining transactions are re-calculated in order to obtain the sum of recomputed weights equal to 100. If after this reduction condition 1 is still met, then the benchmark can be calculated, otherwise the back-up solution is activated.

3.2.3. *Back-up solution*

In those cases when the back-up solution is activated, panel banks that were not able to provide information based on actual transactions would be required by the benchmark administrator to provide the average cost of funding that they would have contributed for that given day, according to the definition of the benchmark.

The administrator would then calculate the benchmark for the missing data day merging the transaction based data with the contributed data. Contributions would weigh less (suggested 40%) than transaction based data (suggested 60%).¹³

Data sufficiency, observed and expected, will help to choose among the three methods proposed (1, 3 or 5 days fixing).

In fact, in case transactions are not sufficient in the 1-day fixing solution, contributed data would immediately step in, reducing the scope for transacted data, though immediately incorporating available market information.

In case a 3 or 5 day fixing is chosen, only if the lack of transactions lasts for a number of days, would contributions weigh progressively more, reflecting the inherent lack of market activity. In this situation, again, contributions would take into account all the factors influencing the price evolution also in related markets, while an alternative solution where, in the absence of new transactions, the latest available transacted data are simply carried over unchanged, would not reflect underlying changes in market conditions.

¹³ This mechanism is explicitly mentioned in IOSCO Principles: "Principle 7 does not mean that every individual Benchmark determination must be constructed solely from transaction data. Provided that an active market exists, conditions in the market on any given day might require the Administrator to rely on different forms of data tied to observable market data as an adjunct or supplement to transactions. Depending upon the Administrator's Methodology, this could result in an individual Benchmark determination based predominantly, or exclusively, on bids and offers or extrapolations from prior transactions." [IOSCO Principles](#)

3.3. ECB/EBF Transaction Data Collection Exercise

3.3.1. Background information

Phase 2 of the abovementioned test run by ECB/EBF on real transactions, has been carried out covering 59 banks operating in Europe, in the time frame between January 1st 2012 and August 31st 2013¹⁴. In order to analyze the relevance of different funding sources in the euro money markets, the exercise included transactions of various funding types, namely interbank borrowing activity, banks' issuance of short term paper, funding obtained from MFIs, non-MFIs and the Official Sector. Moreover, the tenor windows were extended in phase 2 to capture more transactions and assess the relevance of broken-dated transactions¹⁵; this is in line with MPG preliminary conclusions.

3.3.2. Main takeaways

The exercise shows that non-interbank borrowing accounts for a substantial portion of a bank's short-term funding structure. (Interbank transactions make up one fifth of the total volume when aggregating all funding types). This argues that the aggregate wholesale business is more appropriate in representing a bank's funding cost.

Aggregating all types of sources on the borrowing side and widening input windows for detecting eligible trades, has obtained the main target as far as data sufficiency is concerned, meaning that - in the study period - there has been no day with zero transactions/volumes.

The test analyzed the MPG moving average approach as well as other methods of data enrichment in order to stabilize the panel and mitigate data insufficiency. The preferred method was one where only same-day data is considered for banks with positive volume on the day, while lagged data (most recent contribution in the previous 4 days) was only used for those banks with zero volume on the day. The outcome was positive since the method relies first on same-day data and automatically reduces reliance on lagged data when activity increases. The effect of a stabilized panel participation reduced the idiosyncratic volatility and produced a more representative index with no apparent lag to the market trend.

On the use of non-same-day data, some MPG members pointed out that, as mentioned in paragraph 2, this can, in principle, reduce the viability of the index, in that some users might find it more difficult to hedge a position with real transactions. On the other hand, some MPG members highlighted that also the hedging activity actually requires some time to be performed or completed, depending on the instruments and on the size of the position to be hedged. Moreover, as proved by the real transactions analysis from January 2012 to August 2013, there is no evidence of a lag induced by the described methodology, though

¹⁴ There have been two rounds of tests, Round 1 between January 1st 2012 and February 28th 2013, and Round 2, which is the one we are referring to since it had a larger and deeper scope.

¹⁵ E.g.: flows that were 96 or 86 days long were both included in the 3m bucket.

data from a longer period should be observed in order for all market participants to gain full confidence in the index.

The analysis highlighted that using a wide (non-rating-based-filtered) panel of banks, a theoretical fixing using the very same Euribor methodology (so called "Trimmed Average") would produce an extremely volatile benchmark due to the high degree of heterogeneity in the underlying data reflecting the current segmentation in the euro money market

Therefore in order to i) reduce the high volatility coming from the heterogeneity in the data set, ii) keep data sufficiency as a cornerstone and iii) build a benchmark reactive to the underlying market activity, other fixing methodologies have been tested; such methodologies have been covering various combinations of panel selection, data enriching methods and fixing calculation methods.

Two broad variants seem to strike the right balance in reducing idiosyncratic volatility and increasing robustness while at the same time representing the underlying market trends: the first variant is one involving a homogenous panel and the usage of a simple outlier elimination calculation, while the second variant would encompass a wider and more diverse panel and the usage of stronger outlier elimination techniques to tackle the added heterogeneity in the data.

3.4. Conclusions

The analysis conducted so far on available data shows that data sufficiency and data robustness can be achieved for Euribor+ at least for maturities up to 6 months included.

Data show that with an unfiltered panel of banks, excessive volatility due to idiosyncratic reasons might undermine a benchmark fixing, unless adequate statistic methodologies are used.

The initial MPG proposed method can be enhanced on the base of actual data and the final benchmark calculation algorithm should be decided accurately, taking in due consideration the final outcome of the ECB/EBF quantitative analysis, only available after the deadline of this report.

In order to properly support and encourage the adoption of the new benchmark, the MPG recommends that a formal business community consultation takes place once the ECB/EBF analysis is concluded and made available.

4. Transitions

4.1. Introduction

Benchmark rates, based on expert judgment, have become dominant, partly because they reflect banks' funding activities, but also because they were the first types of rates to be introduced and have emerged as the market standard over time. These rates are deeply embedded in financial systems, especially in loan and interest rate derivatives contracts.¹⁶ This report outlines the main possible non-legal transitions issues when EURIBOR+ will be introduced in order to guarantee a smooth transition process.¹⁷ It focuses on issues which the EUR MPG substream regards as crucially important. These are transition issues arising under the various considered transition paths.

Assessing the possible transition options from an accounting point of view, none of them are easy to conduct or to implement. According to the considered transition paths, a seamless transition bears, in comparison to the other possible transition paths, the least accounting risks.¹⁸ On the contrary a market-led transition path is the most risky and unfavourable transition path for several reasons. Therefore, a successor-rate and parallel-and-cut-over transition, appear as the most discussable options for this report.

From a tax perspective, it is quite likely that a change to EURIBOR+ will have a direct impact in terms higher or lower earnings or expenses and an indirect impact on tax burdens. The latter mainly arise by the fact that already existing contracts will be referenced to a new benchmark which inevitably leads to a revaluation of these contracts and therefore to a profit or loss. Whether banks and other affected non-financial corporations (henceforth: corporations) will be in a better position from a tax point of view depends firstly, on how much a revaluation of existing contracts will generate profits and losses and secondly on the tax system under which profits and losses are generated.

The introduction of EURIBOR+ will be accompanied with great technical and infrastructural efforts at which the requirements for banks and corporations' IT infrastructures depend heavily on the transition path and period which will be chosen. Depending on the final proposed framework, finance, operations, technology and other infrastructure may require significant development. Here, precedents for infrastructure development (e.g. Basel III, EMIR) provide examples as to the length of transition period required to ensure participants can put the appropriate infrastructure in place.

From a legal point of view, there are fairly significant differences between European jurisdictions, namely Germany, France, Italy, and Spain¹⁹, in place, albeit these jurisdictions are civil law systems. These major differences lead to the need for supranational law not to leave the continuity of contracts to different legal interpretations by member states and different economic compensation since contract frustration is the biggest legal transition risk.

¹⁶ For EURIBOR's overall importance see section 1 – Market Footprint Analysis.

¹⁷ For a broader analysis of legal issues within the Eurozone, see section 5 – Legal Analysis.

¹⁸ See Appendix B (KPMG (2014), p. 11).

¹⁹ These countries represent roughly 75% of the population of the Euro area.

Therefore, an introduction of EURIBOR+ without an EU Regulation or national legislation is pretty risky.

For the products discussed in this section, namely covered bonds, asset backed securities and loans, the report shows that there generally are three different main interconnected effects which might cause transition problems for these products: valuation and accounting effects which are closely accompanied with tax effects as well as legal effects which are caused by the respective national legislation of the products.

Lastly, and as this report will show, the official sector can play a number of important roles in supporting and reducing potential risks associated with the transition paths. The nature and extent of the different roles of the official sector will vary according to the type of transition envisaged.

Section 4.2 below outlines the purpose and the main assumption of this analysis. The remainder is structured as followed: 4.3 provides an overview of transition issues on a bank and/or corporation level. This bird's eye view of EURIBOR transition is complemented by a product-level analysis of selected financial instruments in 4.4. This is followed by 4.5 which describes experience from the EURIBOR introduction which can serve as a blue-print for the upcoming EURIBOR+ introduction. 4.6 gives an overview of the STEP+-project and section 4.7 provides some concluding remarks.

4.2. Purpose of the Transitions analysis

The purpose of this section is to analyze the issues which the EUR MPG workgroup regards as crucially important under the considered transition paths. The considered transitions paths are those presented by the Cross-currency Transitions Workstream: 'Seamless' transition, 'Successor Rate' transition, 'Parallel with Cut-over' transition and 'Market-Led' transition with an indefinite parallel run of EURIBOR and EURIBOR+.

This indefinite parallel run of EURIBOR and EURIBOR+ which is potentially given with a 'Market-Led' transition is, according to EUR markets participants, unfavorable. Even if transition incentives are given, inertia in moving to the new reference rate and bifurcated liquidity between contracts referencing the legacy and new reference rates are significant issues. This view differs from that presented by some of the other currency groups. Moreover, a market-led transition may also lead to problems with tax and accounting, portfolio management and corporate treasury systems. Finally, a market-led transition is quite unfavorable from a legal point of view.²⁰

In this report, the EUR MPG substream only recommends a transition to EURIBOR+ for two reasons: Firstly, the potential EURIBOR+ was analysed profoundly and backtested by the European Central Bank (ECB) and secondly, the EUR MPG substream regards Overnight Index Swaps not as a benchmark beyond any doubt for several reasons: OIS would be a purely financial benchmark which is not known by a broader general public, OIS contains the funding spread for banks for only one day and reflects pure rate expectations rather than real cash transactions. Correspondingly and due to the fact that seamless transition is regarded as the most efficient and riskless possible transition path among the MPG

²⁰ See Section 5 – Legal Analysis.

members, this report discusses only a 'parallel with cut-over' transition and a 'successor rate' transition from legacy EURIBOR to EURIBOR+.

4.3. Transition Issues

This section outlines the main issues which might arise when EURIBOR+ is introduced and describes the implications at a bank and corporation's level. Implications at a product level will be described in the following section.

4.3.1. Accounting

This section provides an overview of the main accounting issues which might arise in a transition process from legacy EURIBOR to EURIBOR+. Firstly, practical and preliminary thoughts on accounting will be briefly discussed. Since a seamless transition bears the least risk from an accounting point of view and a market led transition seems unfavourable from many angles, only two possible transition paths and their implications towards accounting procedures in banks and corporations will be presented. Finally, section 4.3.1.4 will conclude the discussion of accounting issues.

4.3.1.1. Preliminary Thoughts and Practical Issues

According to credit risk considerations, the new EURIBOR+-panel will also have a certain, implied credit risk, even when this credit risk is different to the hypothetical credit risk in today's EURIBOR. To assess the overall potential (hedge) accounting consequences when EURIBOR+ is introduced in greater detail, KPMG were asked to prepare a comparative potential impact study (henceforth: KPMG report) on accounting and tax issues identified by the MPG and considered as relevant for the MPG when changes in reference rates or changes in fixing methods for existing reference rates occur.²¹

The KPMG report points out that under IFRS, the interest rate benchmark could significantly impact the financial statements, as it is referred to in several standards. IFRS emphasizes the relevance of "fair value" and "current value" both for the measurement of assets and liabilities and for disclosure purposes. Furthermore, financial assets and liabilities would reasonably be the items most significantly affected by a transition from EURIBOR to EURIBOR+. The KPMG report identifies three fields in which potential accounting issues may arise: amortised costs, fair value and hedge accounting. These potential issues are analysed under the considered transition paths.

Lastly, from practical valuation considerations, the main issue is how to value trades with maturities longer than the transition period. In this sense, valuation models need to be changed and altered to reflect new valuation environment. Moreover, from a theoretical point of view it is required to consider the hypothetical value of today's EURIBOR, when EURIBOR+ is introduced.

²¹ See Appendix B

4.3.1.2. Parallel with Cut-over Transition

In this type of transition path EURIBOR+ is published in parallel with legacy EURIBOR before a final transition. At the end of that period, a cut over would abandon legacy EURIBOR, leaving EURIBOR+ as the only valid reference benchmark.

Even though this transition path is associated with a reduced risk of market disruption; such a transition would cause potentially serious problems for the accounting setups of banks and corporations. Especially, there will be problems to differentiate between portfolios and trades or contracts which are against EURIBOR and those which are referencing towards EURIBOR+. Therefore, it is quite likely that products would have to be classified into two different portfolios: A EURIBOR-portfolio which will decrease during the transition period since contracts will mature, and a EURIBOR+-portfolio which will increase during the transition period. Consequently, an entirely second accounting setup for systems and portfolios, valuation-curves, etc. will be needed. This will cause some imbalances in banks and corporations balance sheets.

From an accounting and risk management perspective, this creates several problems: Firstly, it is likely that EURIBOR will get more illiquid during the course of the transition period. As a consequence, this might cause problems in the portfolio-hedges, when having two different reference rates. These two reference rates will cause imbalances and mismatches from accounting perspective, and these risks need to be consistently managed. Finally such a transition would lead to undesirable accounting and hence tax effects and legal challenges.

4.3.1.3. Successor Rate Transition

In a successor rate transition to a new benchmark rate there would be an announcement of the successor rate (EURIBOR+) which will be considered as replacements of legacy rate (EURIBOR), effectively converting all contracts to EURIBOR+ after a longer lead-in period. Here, no parallel phase would be scheduled.

This transition option is relatively less labor intensive in comparison to a parallel transition process which was described in the previous section. Due to its' one-off character, such a switch must be well prepared and needs a careful elaboration of the final conversion logic. In this context a careful investigation of the design of banks' processes has to be undertaken. Precisely, there is a need to examine how front offices and accounting departments work together in terms IT-infrastructure and processes in detail. This assessment needs to be done very carefully, since EURIBOR+ would be, to put it simple "just another rate in the IT-systems". Therefore and in contrast to the already described parallel transition, a second set up for curves and further no portfolio distinction is needed.

In contrast to the parallel transition, a sudden switch to another benchmark could cause "jumps" in accounting and valuation. These "jumps" can be avoided when the transition process is properly managed. Moreover, it is likely when, if any, problems might occur that all banks and / or corporations may face the same.

4.3.1.4. Conclusion on Accounting

From a general perspective, as long as corporations' and banks' treasuries and other front office desks can evaluate and manage risks which arise from a shift to the new reference

rate benchmark EURIBOR+, their respective accounting departments should be able to retrace and to reproduce these risks.

Assessing the possible transition path options, all of them are not easy to conduct or to implement. According to the given options here, a successor rate transition bears less risk than a market led transition or parallel with cut-over transition not least because at the end of a parallel with cut-over approach, there will be a cut of the legacy rate anyway. Hence, a successor rate approach would ensure that front office, valuation, and accounting processes can be continued as before. Here, a de facto switch to EURIBOR+ by using 1:1 conversion factor (EURIBOR+ is equal to legacy EURIBOR) is favourable from an accounting perspective.

Given precedents and precursors like the abolishment of national European reference rates when the EURIBOR was introduced in 2002, the amount of contractual exceptions should be as low as possible. A switch of at least 98 to 99 per cent of all contracts to EURIBOR+ is therefore favourable. In addition to this, due to potentially arising accounting problems, the planning and introduction of EURIBOR+ is likely to need support from auditing companies.

4.3.2. Tax

This section gives an overview about how the introduction of EURIBOR+ could impact banks' and other corporations' tax burdens. Albeit this section is written from a German point of view, we believe that the below mentioned patterns will hold in other European tax systems as well.

On principle, there are two basic implications when EURIBOR would be transitioned to EURIBOR+: Firstly, there are direct implications and secondly, there are indirectly implications in place which may alter a bank's tax burden. Furthermore, there need to be a distinction what kinds of contracts are affected: contracts already in force or newly agreed contracts.

First, immediate or direct implications when EURIBOR+ is introduced are higher or lower expense or income taken to a profit or loss deriving from a change in the benchmark rates for contracts already in force. In addition to this, there will be no tax effects for newly agreed contracts since these contracts are more likely to refer to EURIBOR+ than the legacy EURIBOR. Furthermore, it is quite unlikely that internal transfer prices within banks and corporations will be affected when EURIBOR+ is adopted in internal systems. This is because EURIBOR+ is not an internal pricing mechanism or an intra-group pricing system, but a market-wide, valid basis for calculations that affects all other market participants as well. Finally, it can be assumed that EURIBOR+, like EURIBOR today, will be an arms-length market rate.

On contrary, it is quite likely that a change to EURIBOR+ will have an indirect impact on tax burdens. This tax impact mainly arise by the fact that already existing contracts will be referenced to a new benchmark which inevitably leads to a revaluation of these contracts and therefore to a profit or loss. With the two exemplary scenarios:

- i. A profit will increase the tax burden of bank. Here, the actual profit after tax will be the profit from the revaluation less the tax paid on this profit. The only problem which arises here is when the profit is in accounting terms whereas the tax must be paid in cash terms.

- ii. A loss due to revaluation will only conditionally have a relieving effect. Location-dependent, there could only be an increase of the carry-forward. In this case and if there are no deferred taxes in place, there would no off set of these and therefore no tax relief.

These are just two very general scenarios. The effective tax impact depends on a proper analysis of the accounting effects when EURIBOR+ is introduced. Whether banks and other affected corporations will be in a better position from a tax point of view depends firstly, how much an revaluation of existing contracts will generate profits and losses (some contracts gain, some contracts loss) and secondly in which tax system (Germany, United Kingdom, Luxembourg, ...) profits and losses are generated.²²

4.3.3. Legal

As can be seen from the phase II EUR Legal Report, there are fairly significant differences between European jurisdictions in place, albeit these jurisdictions are civil law systems.²³

From a legal point of view, contract frustration is the biggest transition risk. The German and Italian systems are codifying contract frustration, whereas the Spanish system has not codified but has developed an extensive jurisprudence on this subject. In contrast to that, the French system does not recognize frustration, only force majeure. These major differences lead to the need for supranational law (European Regulations) in order to maintain the continuity of contracts under different legal interpretations by member states and different economic compensation: As argued in the phase II EUR Legal Report, an introduction of EURIBOR+ without an EU Regulation and further national legislation is pretty risky. So, in essence, more time will be needed to explain into details the situation in all euro-zone countries. Therefore, broader transition considerations also depend on further findings on legal risk and issues. Hence, the length of the transition period heavily depends on the length of European and national legislations processes.

In this sense, the introduction of the euro can be regarded as a precedent. This transition was governed by EU Council Regulations.²⁴ While not imposing a change in the specific interest rate referenced in financial contracts, these regulations forced a change in the denomination of the currency underlying existing reference rates. This changeover was implemented in accordance with the principle of the continuity of contracts and other legal instruments.²⁵

In Italy, national legislation specified the change in the reference rate for financial contracts from the Rome Interbank Offered Rate (RIBOR) to EURIBOR. In France, the switch from the Paris Interbank Offered Rate (PIBOR) to Euribor also required a change in national legislation. The legal framework confirmed the principle of continuity of interest rates and indices: An order from the Ministry of Finance replaced Pibor by Euribor. In Germany, the authorities decided that the Frankfurt Interbank Offered Rate (FIBOR) would only be

²² For a broader analysis of potential tax issues in different countries see Appendix B (KPMG report, pp. 13, 16)

²³ For a detailed legal analysis of these differences see Section 5.3 - EUR Legal Analysis Phase 2.

²⁴ Council Regulations 1103/97 and 974/98.

²⁵ Article 3 of the 1103/97 regulation therefore states that: "The introduction of the euro shall not have the effect of altering any term of a legal instrument or of discharging or excusing performance under any legal instrument, nor give a party the right unilaterally to alter or terminate such an instrument. This provision is subject to anything which parties may have agreed."

produced until 30 December 1998. From 1 January 1999 onwards, German banks instead contributed to the compilation of EURIBOR and EONIA.

Public regulation stipulated that EONIA replaced the overnight FIBOR rate and EURIBOR the corresponding FIBOR rates for 1-to-12 month maturities. Spain permitted the continued use of the Madrid Interbank Offered Rate (MIBOR) for legacy contracts. This continued use after the introduction of the Euro, in parallel to that of EURIBOR, was regulated in the Spanish “Umbrella law” on the introduction of the Euro.²⁶

4.3.4. IT Infrastructure

The introduction of EURIBOR+ will be accompanied with great technical and infrastructural efforts. A properly managed technical transition requires approximately a timeframe from 6 month up to 1 year, once all new specifications are finalized. This is due to a detailed analysis that should be performed firstly and to update all systems and methodologies impacted by a change in the benchmark linked to all retail products, wholesale products and capital market products

Banks and corporations have a multiplicity of systems in operation, both in-house and 3rd party. Therefore, there would be some IT resource requirements to successfully effect a transition for the systems and the timeline required to transition the breadth of products and businesses.

The requirements for banks and corporations’ IT infrastructures depend heavily on the transition period which will be chosen. As implied in section 4.3.1 on accounting, a parallel transition from EURIBOR to EURIBOR+ will require a greater effort to IT systems, than a seamless / one-off transition. Depending on the final proposed framework, finance, operations, technology and other infrastructures may require significant developments. Recent precedents for infrastructure development (e.g. Basel III, EMIR, national laws in Europe) provide examples as to the length of time required to ensure participants can put the appropriate infrastructure in place.

4.3.5. Transition Path

As can be seen from the previous line of argumentation in this report, certain transition issues are closely interrelated. Therefore, and given the above discussed benefits and pitfalls, this report sees reasons to shortlist a successor rate transition since a sophisticated accounting and tax analysis as well as legal analysis expressed the view that running new benchmark rates in parallel to legacy EURIBOR for a given transition period, bears more risks or disadvantages than advantages.

As argued in sections 4.3.1.1 and 4.3.1.2 of this report, a parallel with cut-over transition would cause tremendous difficulties in the accounting set-ups and processes of banks and corporations. These potential problems will cause great technical and infrastructural efforts which in turn increase the already high complexity of the intended endeavour. Moreover, as argued in the phase II Euro Legal report, a successor rate transition would be favourable since section 5.3.5 (“Legislation guaranteeing continuity”) of this report argues that any

²⁶ See Economic Consultative Committee (2013), p. 20.

"[...] transition provision should deal with the question whether a payment period, to which a EURIBOR reference relates and which has not yet elapsed at the time of introduction of EURIBOR+, shall be entirely dealt with by the existing EURIBOR reference or whether e.g. a new (short) payment period automatically starts on the business day following the first fixing after the introduction of EURIBOR+, which would result in a "big bang" and would reduce the arbitrage potential."²⁷

Even though a seamless transition bears, in comparison to the other possible transition paths, the least accounting risks, the EUR workgroup believes that this transition path is infeasible from a political point of view in the EUR-area. Given this and the previously mentioned examples, the successor rate transition path, which is recommended in the MPG report for covered currencies in cases in which a seamless transition is infeasible, seems to be the most favourable path for a switch from legacy EURIBOR to EURIBOR+. But, as implied in the previous sections and other part of the overall EUR MPG report, a broader and more detailed analysis is required to recommend the final and most efficient transition path.

4.4. Products

This section gives a brief overview about product-related transition issues. Due to the size and complexity of the here presented European markets, namely covered bonds and asset back securities as funding instruments for banks, as well as loans, only general patterns will be shown, which are believed to be effective in the whole Euro-area. The issues presented here are mainly product-related issues, legal and accounting issues which are not explicitly mentioned in section 5.3 (EUR Legal Report phase 2) or in section 4.3 of this report. Based on these findings deeper and further analysis can be implemented.

4.4.1. Covered Bonds

Covered bonds are debt instruments secured by a cover pool of mortgage loans (property as collateral) or public-sector debt to which investors have a preferential claim in the event of default. While the nature of this preferential claim, as well as other safety features (asset eligibility and coverage, bankruptcy-remoteness and regulation) depends on national legislation under which a covered bond is issued, it is the safety aspect that is common to all covered bonds in the Euro-zone.

In recent years, covered bonds are increasingly used as a funding instrument, in addition to savings deposits, senior issuances, mortgage-backed-securities, etc. The issuance of covered bonds enables banks to obtain lower cost of funding in order to grant mortgage loans for housing and non-residential property as well as, in certain countries, to finance public debt. Thus, covered bonds play an important role in the financial system.²⁸

When EURIBOR+ will be introduced, covered bonds will be affected in two ways: Directly and indirectly. The direct effect would be related to the covered bond itself since, as a security, there will be valuation effects. Further, the underlying cover pool will be affected. This would be the indirect effect.

²⁷ See Section 5 of this report - EUR Legal Analysis.

²⁸ See European Covered Bond Council (2014) and EUR MPG Market Outreach.

With the change of the mark-to-market (MtM) value of the assets in the cover pool and also the hedging instruments (e.g. swaps)²⁹, it is quite likely that the overcollateralisation of the cover pool will change. Here again, there are two possible outcomes: If the pool gains in value, the covered bonds will have larger collateral from a valuation point of view than required. Consequently, the excess collateral can be used for other purposes. Contrary, when the collateral pool depreciates in value, it might be that further assets need to be transferred into the cover pool in order to fulfill over collateralisation requirements from rating agencies. This will be accompanied with higher cost for running the cover pool.

Albeit covered bonds are often regarded as related to asset backed securities (ABS) or mortgage backed securities (MBS)³⁰, the following, crucial, differences exist: Firstly, in the Euro-zone, covered bonds are governed by certain national legislations, whereas ABS are based individual contracts of the parties. Secondly, the assets maintained in the cover pool or lodged in a special purpose affiliate remain on the covered bond issuer's balance sheet. In the case of ABS or MBS the assets are segregated from any other assets and are usually off balance sheet and placed in a special purpose vehicle (SPV). Thirdly, the covered bond issuer is the source of the principle and the interest cash flows, whereas the actual assets provide those payments. Lastly, eligible assets for covered bonds are clearly defined by law and are substitutable. Therefore, the asset mix varies over time and is relatively heterogeneous. In contrast to this, for ABS/MBS the assets are of the originator's choice and once structured and finalised, no assets adjustment can generally be made. The ABS's asset mix is often quite homogenous.³¹ All these differences could lead to (hedge) accounting and taxation effects as well as implementation requirements.

4.4.2. Asset Backed Securities

Securitisation is a well-established practice in global banking. It refers to the sale of assets, which generates cash flows from the institutions which own the assets, to another company that has been specifically set up for the purpose of acquiring them, and the issuing of notes by this second company to fund the asset purchase. These notes are backed by the cash flows from the original assets. From a bank's or corporation's perspective, this technique is a means of funding and allows them to convert assets that are not marketable, e.g. auto loans, credit card payments, into tradable securities.³² As with other products, there might be direct effects, here which may affect the ABS's contractual structure itself as well as valuations and therefore accounting and tax effects on the one hand side, and indirect effects on the backing assets on the on the other hand side.

In comparison to covered bond which were described afore, it can be seen from the set-up of asset backed securities completely varies from the law-driven covered bond setup. Here, the first transition issue arise: Due to the fact that ABS are based on an individual contractual design, the need for a broader legal analysis of how the introduction of EURIBOR+ would affect the contractual design this funding tool. Here, it is quite likely that

²⁹ See section 4.3.1 on accounting. Moreover, it has to be investigated whether the hedging instruments are booked in cover pool related books or in book which are not related to the cover pool, since this would impact the overall MtM value of the cover pool.

³⁰ Asset backed securities will be discussed in section 4.4.2 of this report.

³¹ See Gross (2004), p. 211.

³² See Choudhry (2012), p. 179.

the general contractual constraints, which are described in further detailed in the phase II EUR Legal report, may also hold for asset backed securities, as a type of bonds, in the Euro-area. Further, such legal risks will also be effective for the assets backing the particular ABS-structure. Here, it depends heavily on the legal provision of the backing assets. Based on the analysis of the Phase II EUR legal report, legal risks which are inherent in the contractual design of the underlying assets have an effect on the ABS structure itself. Lastly, the third legal effect will be based on the hedging contracts used in the ABS structure.

As with other financial products, there would be accounting and in consequence of these, tax effects: Firstly, there would be direct accounting effects on the ABS-structure itself and secondly there will be indirect effects due to accounting changes in the underlying assets. Both effects alter the valuation of the ABS structure itself and may cause either a profit or loss and therefore tax effects. Lastly, this also holds for the respective hedging instruments.

So, to sum up, there are somehow two-dimensional legal and transition risks incorporated in asset backed securities which make them highly risky from a transition point of view. Analysing the offering memorandums / prospectuses, which provides the terms of the issue, the nature of the issuer, financial analysis, and other relevant details may be a time consuming task: a thorough review of the ABS documentation is worthy of attention, regarding whether or not a change from EURIBOR to EURIBOR+ is properly backed by the documentation or need to be renegotiated. For this purpose industry associations like the European Securitisation Forum (ESF) or the Dutch Securitisation Association (DSA) should be contacted to design a preferably smooth transition of this product group.

4.4.3. Loans

Loan contracts are the transfer of means between a providing access unit and demanding deficit unit and bear certain transition risks, namely legal and accounting risks.

From a legal point of view, a consistent and smooth transition of loan contracts would only be achievable in cases where standardised contracts among market participants, such as ISDA Master Agreements, are in place. Given the fact that in the Euro-area loan contracts between banks and customers, e.g. private customers or small and medium sized enterprises (SME), even if standardised, are heavily governed by national laws, transition issues arise from potential guaranteeing contractual continuation or potential contractual frustration. While consistent rules might be introduced by the way of revised general business terms, there is a significant risk that such general business terms would be tested before the courts. Moreover, in cases where individual contracts are affected, no consistency could be achieved at all, and disagreement about the compensation to be paid might result in frequent litigation. Here, as a whole, legal risk could materialise in economic risks.

These risks lead to the need for supranational law (European Regulations) not to leave the continuity of contracts to different legal interpretations by member states and different economic compensation.

From an accounting or valuation perspective respectively, it depends whether the loans are booked in the banking or trading books and therefore whether they are exposed to the MtM- / valuation changes. If the loans are booked in a bank's banking book, they are not exposed to valuation changes due to changes in the underlying EURIBOR / reference benchmark. The reverse is true when loans are booked in trading books. Here, changes in the reference rates cause a revaluation of the contracts and cause again a profit or loss on the loan. The same holds for hedging contracts.

As implied in this section, the transition effects for loans heavily depends to what extent changes of reference benchmarks are backed by national legislations and, from an accounting view, how banks booked the loans.

4.5. Official Sector Involvement and Experience from the Past

As this report implies in the previous sections, the official sector play a number of roles in supporting and reducing the aforementioned risks associated with the transition paths. We regard governments, regulators, and corresponding international public sector bodies as parts of the term “official sector”. The nature and extent of the different roles of the official sector will vary according to the type of transition envisaged. As can be seen, in the EUR-market a very high degree of international coordination will be necessary across the European Central Bank (ECB), national market regulators, industry stakeholders and, of course, in turn, national jurisdictions as well as European legislation.

As a precedent, the introduction of the Euro demonstrates how different countries handled the transition from national currencies reference rates (FIBOR, PIBOR, RIBOR, et cetera) into a common euro area reference rates (EURIBOR). The public sector played a key role in the transition. In 1998, the European Monetary Institute (EMI) and subsequently the ECB issued a large number of public opinions assessing the various national legal initiatives regulating the changeover process for the introduction of the euro and the transition from the old national reference rates. These opinions favoured the replacement of the old reference rates with a reference rate able to represent the whole euro area.³³ Most member states decided to replace their domestic unsecured interbank reference rates with EURIBOR/EONIA for both legacy contracts and new contracts starting 1 January 1999.

Further, the private sector took important initiatives in order to ensure the continuity of outstanding interest rate derivatives contracts entered into before the introduction of the euro and Euribor. The International Swaps and Derivatives Association (ISDA), for example, sponsored a multilateral amendment mechanism, called the ISDA EMU protocol. The protocol modifies master agreements between participating parties collectively, eliminating the need to modify each master agreement individually. The price sources provision of the ISDA protocol lists a number of “fallback” options for obtaining price sources for cases when national currency reference rates disappear or change.³⁴

4.6. STEP+

In order to pursue the objective of higher liquidity under all conditions, the stakeholders of the European market-led initiative STEP+ are currently assessing the implications for the uncollateralised money market segment of the trading concentration on one or few recognised electronic platforms. STEP+ stakeholders are also investigating how to increase

³³ See European Monetary Institute (1998), p. 2.

³⁴ See Economic Consultive Committee (2013), p. 20.

- i. market activity transparency,
- ii. oversight and supervisory capabilities of the competent authorities, and
- iii. risk management capabilities of the credit risk managers, in terms of making available more and better quantitative and qualitative information.

The MPG recommends the OSSG to support and incentivize market-led initiatives, such as STEP+ in EU, which primarily aim at promoting market liquidity, under normal and stressed conditions. This should be conducive to promote more accurate, sound and resilient fixing for benchmarks.

4.7. Conclusion

This report reveals predominantly two things: Firstly, nearly all of the mentioned transition risks, no matter whether they depend on accounting, taxation or legal issues, have the same interconnections among each other, so that, secondly, the report reveals that a deeper analysis will be needed to explain in greater detail the situation in the aforementioned countries and in other Euro-zone member states, as well as for the aforementioned exemplified products.

At this stage the outcome of the analysis of this report is quite simple: If the transition from legacy EURIBOR to EURIBOR+ is accompanied at least with the transition issues explained afore, a successor rate transition seems to be the most favourable for EUR-linked debt products. But having this without an EU-Regulation or national legislation bears tremendous risks for the financial system.

References

BIS Economic Consultive Committee (2013): Towards better reference rate practices: a central bank perspective. URL: <http://www.bis.org/publ/othp19.pdf> [Retrieved 24.02.2014]

Choudhry, M. (2012): The Principles of Banking. Singapore 2012.

European Covered Bond Council (2014): Introducing Covered Bonds. URL: <http://ecbc.hypo.org/Content/default.asp?PageID=504> [Retrieved 24.02.2014]

European Monetary Institute (1998): Opinion of the European Monetary Institute. URL: http://www.ecb.europa.eu/ecb/legal/pdf/en_con_98_11.pdf [Retrieved 24.02.2014]

Gross, H. (2004): The German Pfandbrief and European Covered Bond Market. In: Fabozzi, F. J.; Choudhry, M. (edit.): The Handbook of European Fixed Income Securities. Hoboken 2004, p. 201 – 228.

KPMG (2014): MPG – Accounting and Tax Topics Overview – Preliminary Potential Impact Overview (Unpublished presentation).

5. Legal Analysis

5.1. Overview³⁵

The phase I EUR Legal report (“phase I report”) predominantly base on answers of two questionnaires, one developed by the MPG EUR Transition substream, the other developed by a task force set up by the European Financial Markets Lawyers Group (“EFMLG”). Both sought to identify legal risks which may arise from the implementation of certain types of Euro benchmark transition. The phase I report expresses the views of market participants on potential legal risk implications for their respective local jurisdictions: Most market participants believe that the switch to a new reference rate and/or the change of methodology may have important legal consequences owing to the wide use of existing indices as a parameter of indexation for a variety of financial products. Further, they argue that for their domestic market business EURIBOR is very important and so it is crucial to avoid any potential risk of litigations. In addition to that, markets participants believe that new reference rates should be introduced for new agreements exclusively, for the existing agreements EURIBOR should be upheld until the maturity of contracts. In this sense, the most likely outcome for a properly managed rate cessation / substitution would be the application of an industry wide solution negotiated and implemented under the auspices of a trade organization such as ISDA. This may be the only way to guarantee legal certainty.

The Phase II EUR Legal Report (“phase II report”) complements the phase I report insofar that general legal views were replaced by a brief legal analysis. In relation to German, Italian, Spanish, and French law considering the phase II report considers the questions of whether are there legal doctrines in place, according to which existing contracts may be flexibly interpreted so as to facilitate contractual continuity if the fixing methodology for EURIBOR is significantly altered, and whether legislation is desirable to guarantee this kind of contractual continuity and, if so, what would it look like. Here, the following assumptions were made: firstly, any agreement containing EURIBOR as a financial benchmark is not subject to existing statutory or contractual fallback provisions, and secondly, EURIBOR’s fixing methodology is so significantly altered, affecting the economic equivalence existing between the parties immediately prior to the introduction of EURIBOR+. The report shows that there are fairly significant differences between the jurisdictions: Contractual risk is very strong in Germany and Italy. In Spain, the law does not offer this possibility. Under French law, the continuity of contracts does not seem threatened except in cases of force majeure. Hence, reliance on contractual interpretation concepts alone will not result in full legal certainty. So, it is desirable that legislation guaranteeing contractual continuity shall be introduced and not to leave contractual continuity of two different legal interpretations.

Based on the findings of both reports, a deeper analysis will be needed to explain in detail the situation in the aforementioned countries and in other countries of the Euro area. At this stage the outcome of this analysis is quite simple: if the transition from EURIBOR to EURIBOR+ is considered as economically significant, transitioning to EURIBOR+ without any

³⁵ The presented findings are subject to the reservation that a full legal research might result in different findings.

EU regulation, national legislation or/ and industry-wide solutions, like ISDA protocols, bears risks.

5.2. Phase 1

5.2.1. Background and objectives

This report identifies legal risk which may arise from the implementation of certain types of benchmark transition. The jurisdictions of the major Eurozone economies, in which a significant proportion of commercial contracts and financial instruments are linked to EURIBOR, are considered in this report. We developed a questionnaire to gather the views of market users on additional reference rates and potential transition issues. Assistance was also sought from the European Financial Markets Lawyers Group ("EFMLG"). The EFMLG established a task force which prepared another questionnaire regarding the implications of EURIBOR transition. This report is predominantly based on the answers received from both of these questionnaires (see Appendix C.4).

5.2.2. Overview

This report is structured in the following way: the paragraphs immediately below give an overview of the legal constraints which might arise if the existing EURIBOR benchmark is transitioned to a substitute rate or significantly modified. In section 5.2.2, the views of market participants on the legal risk implications for their respective local jurisdictions are discussed; based on our findings within this report, we set out our recommendations and conclusion in section 5.2.3.³⁶ In addition, Appendix C.1 provides a product profile for each of the financial instruments and products considered; Appendix C.2 outlines the hypotheses for transition; Appendix C.3 sets out the views of major trade associations in Europe; and Appendix C.4 appends the template questionnaires mentioned in the paragraph above.

5.2.3. Executive Summary

Most market participants that we interviewed believed that the switch to a new reference rate and/or the change of methodology may have important legal consequences owing to the wide use of existing indices as a parameter of indexation for interbank and non bank-to-bank transactions. Clients could exercise legal actions, on the basis that their contractual consent was given under the specific terms of the engaged transaction, including a particular index which was calculated on a particular way, having these terms changed after their consent was given resulting in a previously unforeseeable economic harm (*rebus sic stantibus*). In any case some market participants argue that for their domestic market business EURIBOR is very important and, as said at the beginning, largely in use especially for mortgages and loans and so it is crucial to avoid any potential risk of litigations.

³⁶ As implied, this report should not be considered as a substantive legal assessment or legal opinion written by a law firm. It is only an aggregation of views of polled market participants.

More generally, with a change of a benchmark it is quite likely that all financial products which are based on a certain reference rate, or are related to it in some way will be affected. These products are over-the-counter (OTC) derivatives, repurchase agreements (repos) or floating rate bonds (floaters) and (syndicated) loans (see Appendix C.1). The contracts for these products are often based on master agreements and other standardised documents (e.g. ISDA, LMA). It is likely that some of the outstanding contracts will have certain (local) provisions, to cater for situations where their respective benchmark is changed or replaced. In the absence of such provisions, general legal regulations take effect - e.g. additional interpretation of the contract or even discontinuation of the basis of the contract. In any case, changing the contractual terms will require the approval of all of the contracting parties; otherwise the contracting parties are likely to go to court.

5.2.3.1. Elimination of Reference Rates

The elimination of EURIBOR maturities or a general switch to another / new benchmark could raise legal actions regarding the contracts still in force and contractually linked to a maturity or benchmark intended to be withdrawn or replaced. A significant number of legal conflicts may arise and might lead to a renegotiation of the contractual conditions or termination of the existing contracts. Without a clear and suitable contractual arrangement the adaption of new benchmarks could not be implemented against the will of one of the involved parties.

5.2.3.2. EURIBOR Conversion

Some respondents believe that a differentiation between existing contracts and new contracts then concluded under the new regime has to take place. For new contracts, the definition of the benchmark methodologies could be negotiated and a new agreement reached that deviates from the system used to date. This might be viable from a legal standpoint.

What does not appear legally possible for existing agreements is giving up the EURIBOR system in its entirety or making very significant changes to it. If the methodology is changed so significantly that the reference rate used can no longer be covered by the definition in the existing contracts, the contractual parties might no longer feel bound to them. Moreover, it can be assumed that one of the contractual parties would feel disadvantaged by the changes and terminate the contract with immediate effect. It was objected that there might be an extraordinary termination event for financial contracts or financial instruments by the holders of the financial instrument or by a party to the financial contract. Therefore, no one should be allowed to argue that the financial instrument or contract was amended because of the application of the regulation on the previous benchmark. This argument should not be allowed to increase the amount of claims owed under financial instruments/contracts. Otherwise this would result in a high degree of legal uncertainty for all market participants. Therefore, the legal identity of the existing benchmarks has to be conserved as market participants vote for the legal continuity and identity of the existing benchmarks and a clarification by the legislator in the regulation.

5.2.3.3. Screen Rate

Several general agreements like ISDA or LMA quote EURIBOR as a so-called screen rate. Reference rates in financial instruments and contracts on the EURIBOR are made by reference to certain screen pages by these agreements, such as the respective REUTERS page EURIBOR01 where the EURIBOR fixing is published. But detailed provisions that relate

to the applied methodologies of calculation and the respective provision of input data do not appear in most respective documentation of financial instruments or financial contracts. Some respondents believe that when these contracts are used to determine a reference rate the impact will be limited as the legal documentation generally refers to a screen page or reference rate name, and not to how such a rate is calculated.

5.2.3.4. Fall-back Provisions

In general, if no quotation is provided the fall-back is to request a quote from several banks for the reference rate in question. If such quotations are not given which is quite likely if the EURIBOR or at least some of its tenors no longer exists, one would look at the rate of deposits in the relevant currency for the relevant period. Where the reference rate is not EURIBOR or a similar index, but e.g. an ISDA rate, the ISDA fall-backs apply. An ultimate remedy would be to amend the product (or cancel it if that is not feasible) if the above does not work.

5.2.3.5. Legal Constraints

Contractual uncertainty and contractual disruption, as the consequences of such a modification are not necessarily provided for in the various contracts using the EURIBOR (derivatives, securities lending, financing, etc.). Market participants believe that this could lead to an increase in disputes and, possibly, litigation, over contractual documentation.

According to legal issues that might arise in existing contracts if a switch to new reference rate is implemented, mandatory transition of existing contracts difficult to imagine. Here, a responder suggests a special termination right of termination should be granted to both contractual parties.

The next section of this report provides an outline of noteworthy legal issues in respect of each of the following jurisdictions in the Eurozone: Belgium, Germany, France, Italy, Ireland, Portugal and Spain.

5.2.4. National European Legislations

5.2.4.1. Belgium

Fall-back provisions apply for OTC derivatives, floater and loans when there is a cessation of EURIBOR or at least some of its tenors disappear. When the calculation method / fixing method are changed and the new reference rates are migrated. Therefore, running the EURIBOR and its substitution benchmark in parallel would not cause any issues because the memo from MPG suggests that EURIBOR+ is a complete new benchmark. Moreover, there should not be a distinction in respect of the involved parties to financial contracts or instruments.

Clauses and fall-back provisions under e.g. ISDA and LMA are not identical; this might create a gap between the two contracts and products. In order the switch from EURIBOR to a new reference rate successful and legally safe manner, European and national legislation is needed to achieve this goal. Unless EURIBOR+ is only for new agreements, for the existing agreements EURIBOR should not be withdrawn until the maturity of contracts occurs.

5.2.4.2. France

On French law aspects, the main concern is whether contemplated changes of methodology would lead to a new index or not. Therefore, one of the following cases might be possible. If not, an official confirmation from relevant authority is needed to avoid doubt and if yes, standard French derivatives / repo documentation does not address any "market rate disruption" situation, most frequent fall-back solutions rely on reference banks to provide quotation in the absence of EURIBOR. We may have to review affected contracts and negotiate new provisions with our counterparties.

But regarding the existing financing agreements there are two possible scenarios: first the direct application of the substitute interest rates agreed in the contracts. Financing contracts with retail customers, in these, a replacement interest rate is included, usually the "Savings Banks mortgage Loans Benchmark Index". Corporate Financing contracts (e.g. syndicated loans), usually a replacement interest rate is agreed, that, depending on the circumstances, the interest rate may be determined by a number of predetermined reference [bank] entities. And secondly, the need to novate all executed contracts to include the new interest rate.

5.2.4.3. Germany

Because German bond agreements give no information on how the benchmark should be calculated it might be that the new benchmark setting process is covered by the existing provisions. According to the provision set out in Appendix C.1, it is necessary that a certain number is quoted at certain point of time and that this number is published on a certain webpage / screen: what is published on that page is, by legal definition, the EURIBOR benchmark. It is strictly required that this rate is a deposit rate. The term "deposit" is not defined further in the contracts. With the exemption of bearer or order bonds from this deposit definition, this could be critical from legal point of view because the German definition does not take securitised transactions into account and, therefore, following a strict legal interpretation, the new benchmark would not reflect true deposit rates anymore. It is quite likely that existing contracts will be affected by EURIBOR transition because the continuity of the current EURIBOR rates will not be given anymore.

There should be no issues if the "old" EURIBOR fades out during an agreed transition period in a well-defined manner. Legacy OTC derivative contracts could work on the basis of the "old" EURIBOR and new reference rate will be agreed only for the new ones. Whether counterparties could declare an OTC derivative contract terminated on the basis of "*Wegfall der Geschäftsgrundlage*" (similar to the concept of frustration) following a sudden discontinuation of the old EURIBOR would depend on the circumstances of the relevant case. Generally speaking, we would consider it to be improbable that counterparties could successfully invoke *Wegfall der Geschäftsgrundlage* in a sudden discontinuance of the EURIBOR.

In light of what is stated above regarding the possible coexistence of EURIBOR and the new reference rate there would be no particular issues under German law, as long as terms and conditions clearly define which EURIBOR they are referring to. In this context, we would expect the new reference rate to be published on a different screen page. Moreover, the usage of the new reference rate or benchmark should be agreed in loans contracts.

5.2.4.4. *Italy*

For floating rate securities, should the reference rate disappear with a new reference rate, such an event under certain circumstances could be considered equal to a force-majeure event. Should the replacement of the reference rate with the new benchmark rate be made by law, it would not be necessary to amend the offering documentation. In such case market participants believe that existing benchmarks do not have to be substituted by new indices for the outstanding issues and any new benchmark should apply only to new issues.

Covered bonds and EMTN programmes industry type made in accordance with art. 5.4 of 2003/71/CE Prospectus Directive as amended. The calculation of the reference rate remains unaffected but a new reference rate ("EURIBOR+") is established in parallel. Introduction of new reference rate and parallel maintenance of new rate: no particular legal issues.

5.2.4.5. *Ireland*

Any amendment to affected contracts can generally only be achieved by agreement of the parties. However, certain standard documentation may contain provisions that would allow a change-over without the need for agreement by the counterparty, for example where the documentation allows for a successor benchmark. Generally speaking, ISDA do not allow for this in their standard documentation but have when required put in place a protocol where parties to the protocol will unilaterally change their agreements with the other adhering parties for the requested change. Contrary to this, the LMA does allow for fall-back scenarios if EURIBOR is unavailable. However, the standard ISDA or LMA documentation may well have had certain provisions amended so a complete review of these agreements would have to be undertaken. In addition, Irish banks would have a large number of bespoke agreements that would need to be reviewed and amended individually (if required).

5.2.4.6. *Portugal*

For OTC derivatives, provided that EURIBOR continues to apply to the arrangements in force, the fall-back provision should not be triggered. New market standard shall in any case be adopted for new arrangements. Provided that EURIBOR continues to apply to the arrangements in force, the aforementioned fall-back provisions should not be triggered. New standard provisions shall in any case be adopted for new arrangements using EURIBOR+.

Should EURIBOR be discontinued, not applying to the arrangements already in force, a basis risk could indeed manifest itself in relation to arrangements with more than one leg and with different fall-back provisions, to the extent that different fall-back provisions will probably lead to different rates being applicable to each leg. Therefore, it is believed that the most suitable course of action would be to allow EURIBOR to continue to apply to arrangements already in force, with an exemption for the arrangements mentioned in our comment on the previous query.

5.2.4.7. *Spain*

Assuming that the new benchmark methodology is imposed by a mandatory piece of legislation directly applicable in Spain (i.e., a European Union regulation), no legal effects should arise, provided that new regulation specifically ensures the continuity of the affected contracts (hereinafter, the "affected contracts") and such affected contracts are governed by the law of a European Union. Spanish courts would also apply the new regulation, regardless

of the applicable law, if it were characterised as internationally mandatory. Finally, if the new regulation were deemed a part of the Spanish public policy, foreign judgments terminating or adjusting an affected contract due to the methodology change would not be recognized in Spain.

It is important to note that reference rates are not properly defined in most cases and no contractual adjustments are usually agreed by the parties. In such cases, in the absence of a mandatory norm enacted by the European Union, an interpretation issue would arise. As per Section 12 of the Rome I Regulation, such an issue should be within the scope of the law applicable to the affected contract. In our opinion the relevant statutes and case law on frustration would also be those pertaining to the law applicable to the affected contracts.

LMA standards refer to the EURIBOR reference rate itself and a replacement EURIBOR reference banks index in case of non-availability of the EURIBOR index but they do not point to the EURIBOR definition *per se*. Some market participants took the view that there may be a risk of early repayments of corporate loans, following a change in the methodology of EURIBOR calculation leading to increased volatility. Clients do have a repayment option at the end of every floating rate period. Moreover, LMA standards imply that in case of discontinuation of the EURIBOR, clients will have two options; first the bank's contracts adopted ISDA definition that states that in case of non-availability, the "EURIBOR reference banks" index will be used, reference rate fixed by rates of at least two prime eurozone banks for a given maturity; secondly the renegotiation option will be applicable for existing corporate clients. The bank's clients will have the possibility to renegotiate an alternative reference rate or terminate their loan contract.

Recently, Law 14/2013 of 27 September 2013 on support to and internationalisation of business came into force. In accordance with this law, certain reference rates must, in the next revision of applicable rates, be replaced by the substitute rate or index envisaged in the loan agreement. (See Appendix C.1 for further detail.) The replacement of rates will signify the automatic novation of the loan agreement without any alteration or loss of the rank of the mortgage in question. Also, the parties will have no recourse to any action to claim modification, unilateral alteration or extinguishment of the loan as compensation for application of the provisions of the new law.

Where a mortgage contract cannot be interpreted as having regard to any particular substitution rate, local law will govern and define the substitution rate. Owing to the fact that "EURIBOR+" – the hypothesised rate under consideration in this report – is likely not to have been foreseen by contracting parties to legacy contracts as a substitution rate, other rates might be implemented by local law. It is possible that, today, existing contracts will move to alternative substitution rates because EURIBOR+ is unknown to Spanish regulators. It is arguably conceivable that legislators might insist that EURIBOR+ as should be interpreted as the new reference rate in the future. Notwithstanding, market participants in Spain took the view that a transition to EURIBOR+ could be problematic as most Spanish mortgages refer to 12-month EURIBOR: the 12-month tenor has been identified as one which may be withdrawn under a proposed EURIBOR+ regime. With regard to market transactions, banks will have to verify every hedging and investing instrument contract to check if there has been an inclusion of a potential replacement reference rate or if all the terms of a given contract will still be viable in case of a switch to a new reference rate. This scenario could lead to potential hedging position changes for eurozone banks or corporate clients if reference rate changes would lead to different NPV's of concluded transactions. Some contracts (senior debt) already include clauses for an alternative method of interest calculation in cases where there is a disruption in the calculation of the benchmark. ISDA

and GMRA agreements follow English law. But the majority of contracts in case of a unilateral change from banks will face legislation for consumer protection.

5.2.5. Recommendations and Conclusion

The switch to new reference rates and/or the change of methodology on existing ones may have important legal consequences owing to the wide use of existing indices as a parameter of indexation for transactions. These outstanding transactions should continue to be linked to the current indices and calculated in the same way as in the present date during a prudential period of time regardless of the creation of a new index. Otherwise, an eventual substitution of current indices or the introduction of any changes regarding the way they are calculated may have important legal and economic implications for banks. Unless the new reference rate introduced for new agreements exclusively, for the existing agreements EURIBOR should be upheld until the maturity of contracts. Therefore, we recommend that new benchmarks should coexist with existing ones during a prudential period of time – the transition period. The extension of such a period should be assessed by the relevant authorities taking into consideration the nature of the benchmark, the volume of contracts linked to such benchmark, etc. Once such a period of time has elapsed, if the discontinuation of certain benchmarks or changes in their methodology is deemed necessary or arises due to other reasons, this should be implemented by law, so that all market participants are in the same position and contracts must mandatorily be amended. This is the only way to guarantee legal certainty and prevent the exercise of legal actions based on the lack of consent with regards to the change of the benchmark used.

If an existing rate is substituted there may be scope under some contracts for the reference rate to follow to the new rate under “substitute rate” provisions but this would probably not be the usual position. Instead, the absence of a quotation of a reference rate on the specified rate source would result in the triggering of contractually provided rate fall-backs. If major rates are cancelled or withdrawn without an appropriate industry solution being applied the requirement for dealer surveys could cause considerable disruption to major dealers, who may as a result have to refuse to quote for fixings, causing major disruption to the market. The most likely outcome for a properly managed rate cessation / substitution would be the application of an industry wide solution negotiated and implemented under the auspices of a trade organization such as ISDA.

5.3. Phase 2³⁷

5.3.1. Summary and Report Structure

This report supplements an earlier analysis of legal issues arising from benchmark transition for financial products denominated in Euro (“EUR Legal Report”). It focuses on four national jurisdictions in the Eurozone, namely Germany, Italy, Spain, and France. This report considers only civil law without mentioning the special laws that address significant imbalance.

As the report will show, there is a fairly significant difference between

- (1) the German and Italian legal systems which codified frustration,
- (2) the Spanish system which has not codified but has developed extensive jurisprudence on the subject, and
- (3) the French system which does not recognize frustration but only force majeure.

Applied to the continuity of contracts and the pattern of the underlying questionnaire, the risk to the continuity of contracts is very strong in Germany and Italy but the system leaves the possibility of allowing the continuity of the latter by the mechanism of restoring the balance economic cooperation between the parties. In Spain, the law does not offer this possibility, but there is a recognized doctrine applied by the courts that would ensure the continuity of those contracts if it were disputed by the parties before the courts. Under French law, the continuity of contracts does not seem threatened except in cases of force majeure.

These major differences in mentioned legal systems lead to the need for supranational law (European Regulations) not to leave the continuity of contracts to different legal interpretations by member states and different economic compensation.

As the report also shows, a deeper analysis will be needed to explain in detail the situation in the aforementioned countries and in other Eurozone member states. At this stage the outcome of the analysis is quite simple: if the transition from EURIBOR to EURIBOR+ is considered economically significant, at least for Eurozone, transition to EURIBOR+ without an EU Regulation or national legislation bears risks.

Section 5.3.2 below outlines the purpose and the main assumption of this analysis. The remainder is structured as follows: section 5.3.3 discusses the challenges on contract continuity if changes to EURIBOR or a transition away from it become economically significant and to the extent that EURIBOR is fundamentally changed into something else (here: EURIBOR+). This is followed by section 5.3.4 which outlines whether there are legal doctrines in place according to which existing contracts may be flexibly interpreted so as to facilitate contractual continuity if the fixing methodology for EURIBOR is significantly altered. Here, the common law doctrine of implied terms is used by way of an example. Finally, section 5.3.5 points out that it is desirable that legislation guaranteeing contractual

³⁷ This report was prepared by Christian Buschmann on the basis of legal analysis of Kramer Levin Naftalis & Frankel LLP, Paris; Allen & Overy LLP, Frankfurt am Main; Allen & Overy Studio Legale Associato, Rome; and Allen & Overy, Madrid.

continuity shall be introduced because reliance on contractual interpretation concepts alone will not result in full legal certainty.

5.3.2. Purpose of the Report and Assumptions

This report has been prepared to consider in relation to German, Italian, Spanish, and French law the following two questions:

1. If the fixing methodology for EURIBOR is significantly altered, are there legal doctrines according to which existing contracts may be flexibly interpreted so as to facilitate contractual continuity (using the common law doctrine of implied terms by way of an example); and
2. Is legislation desirable to guarantee this kind of contractual continuity and, if so, what would it look like?

In answering those questions, experts have confined their review to the civil law of their respective national law presently in force and have not made any investigations of, and express no views as to, the laws of any jurisdiction other than their respective national law. Furthermore, this report is not the performance of a full legal research in the aforementioned national jurisdictions. Hence, the presented findings are subject to the reservation that a full legal research might result in different findings.

For the purposes of this report, the following assumptions were made:

- (1) Any agreement containing EURIBOR as a financial benchmark is not subject to existing statutory or contractual fall-back provisions.
- (2) The fixing methodology of the EURIBOR is significantly altered, affecting the economic equivalence existing between the parties immediately prior to the introduction of EURIBOR+.

As a preliminary question, it should be considered what, if any, effect would a significant change to the EURIBOR fixing methodology have on the continuity of contracts under national laws.

5.3.3. Contract Continuity

This section outlines the challenges on contract continuity if changes to EURIBOR or a transition away from it become economically significant and to the extent that EURIBOR is fundamentally changed into another reference rate benchmark (here: EURIBOR+).

5.3.3.1. Facts

It must be understood, that a very large number of all sorts of contracts contain a reference to EURIBOR in order to determine the payment obligation of the debtor. In particular, this is the case with loan agreements, deposits, the terms and conditions of bonds and notes, derivative contracts. These contracts can exist between enterprises or between enterprises and consumers. The parties to such contracts may be easily identifiable or it may be difficult (e.g. if contract positions are traded in a secondary market) or close to impossible (e.g. in case bearer bonds and notes held through multiple layers of depositories) to identify the counterparties to such contracts. The contracts might contain bespoke terms or might follow a defined market standard. The obligation linked to EURIBOR might be the contractual core

obligation (e.g. in the case of an interest rate swap) or it might be an ancillary payment obligation. Finally, it is also frequently the case that one contract making reference to EURIBOR is just one element in a longer chain of contracts referring to EURIBOR, where such individual contracts may be governed by different laws (i.e. the laws of Eurozone member states or of non-Eurozone states, typically English law or New York law).

In each of the above cases, the obligation linked to EURIBOR may be seriously affected, if the existing EURIBOR is discontinued. Absent a fall-back rule, the parties to the contract or any agent acting for the parties would have to face the question of whether reference to EURIBOR can be considered as a reference to EURIBOR+. It needs to be considered whether EURIBOR+, using a fixing methodology which is materially altered, would contractually replace the discontinued EURIBOR. It needs to be further considered whether such replacement would give rise to a right of the affected party to either prematurely terminate the existing contract or to demand an amendment of the agreement restoring the economic equivalence existing prior to such replacement (assuming that the introduction of EURIBOR+ would affect the economic equivalence).

5.3.3.2. *Legal considerations*

The question whether or not the parties should strictly hold on to their contractual bargain regardless of the changed circumstances has deep historical roots and remains a point of strong divergence in prominent European legal systems. While Italy and Germany have established special changed circumstances provisions in their national law ("frustration theory": the binding force of contracts has been eased by admitting the notion of frustration of purpose: where economic circumstances have changed radically, a judge may modify the content of a contract in order to re-establish the economic balance the parties originally intended), Spain relies on case law and on the doctrine of the *cláusula rebus sic stantibus*. The French legal system represents the most inflexible approach as its civil courts are under no circumstances, with the exception of *force majeure*, allowed to modify or terminate a contract or exonerate parties from the performance of the contract because of changed circumstances.

5.3.3.3. *Unforeseeability regulated in Italian and German Law*

a) Italian law

Under the Italian Civil Code (Article 1467), if the performance by one of the parties to a contract becomes substantially more onerous as a result of unpredictable and unforeseeable circumstances, then that party is entitled to terminate the contract unless the counterparty offers to amend the contract in order to reinstate the economic equivalence of the two performances.

b) German law

After the 2002 modernization of the German civil code, German legislators codified the developed jurisprudence on unforeseeability in § 313. According to 313 (1) BGB, the adaptation of a contract may be demanded if the circumstances on which the contract was based have materially changed after the conclusion of the contract and if with regard to all the circumstances of the specific case, in particular the contractual or statutory allocation of risk, it cannot reasonably be expected that a party should continue to be bound by the contract in its unaltered form (objective basis of the contract). The same is true under 313 (2) BGB if material assumptions that have become the basis of the contract subsequently

turn out to be incorrect (subjective basis of the contract). If adaptation of the contract is not possible or cannot reasonably be imposed on one party, the disadvantaged party under 313 (3) BGB may terminate the contract. The provision includes a change of the previous legal position in so far as the adaptation to the changed circumstances does not automatically take place but only if it is demanded by one of the parties.

5.3.3.4. *Spanish case law and doctrine*

Spanish civil law, due to the importance of the *pacta sunt servanda* doctrine (as it is codified in article 1091 of the Spanish Civil Code), refuses to grant relief on grounds of hardship. Nevertheless the Spanish tribunals have developed the doctrine of the *cláusula rebus sic stantibus* that allows the party who is unduly burdened because of changed circumstances to obtain a discharge of the contract, or to pursue in court the adaptation of the contract to the changed circumstances.

The conditions stated by the courts for the application of the doctrine of the *rebus sic stantibus* clauses are strict:

- The contract must be a long-term contract or a contract in which none of the obligations have yet been performed or where one of the parties has performed but the other has not.
- There must be an alteration of the basis of the contract. It is possible when: a) the contract has become excessively burdensome for one of the parties; b) the purpose of the contract is totally frustrated.
- The change of circumstances must be extraordinary and unforeseen. Neither of the parties could reasonably have taken the impediment into account at the time of the conclusion of the contract.
- Neither of the parties should take the risk of the change of circumstances (as a contractual obligation). The doctrine of the *cláusula rebus sic stantibus* would not be applicable to aleatory contracts.
- The person invoking the change of circumstances should not be accountable for it according to the contract or common opinion.

5.3.3.5. *Impossibility of performance under French law*

Under French law, the line is drawn between the impossibility of the performance on the one hand, i.e., *force majeure*, and, on the other hand, circumstances which destabilize the contract where economic conditions are such that fundamental and far-reaching changes occur. The latter is called the doctrine of *imprévision*.³⁸

In France, the principle *pacta sunt servanda* (as incorporated in Article 1134 of the French Civil Code) prevails over the principle *rebus sic stantibus*. If the contract does not contain

³⁸ Traditionally, the French courts have always refused to acknowledge the theory of "unforeseeability" (*imprévision*), i.e., the theory whereby the parties or the courts can, if necessary, revise or terminate a contract in the event of an unforeseeable change of circumstances (this has been standard case law since the "Canal de Craponne" decision in 1872)

any provision regarding events of changing circumstances, then, the performance of the contract will be enforced without any changes to the contract. A judge is not supposed to appraise the economic situation of the parties or to rule in equity against the wording of a contract. In principle, the only excuse for non-performance of the contract is force majeure. The doctrine of *imprévision* has not been adopted by French courts.

Article 1142 of the French Civil Code stipulates that any obligation to do, or not to do, is dissolved by damages whenever the debtor does not execute the obligation. Article 1148, however, specifies that damages are not due in the case of force majeure. While courts have applied those articles strictly, some change and more flexibility are noticeable in recent case law.

The application of Article 1148 requires four conditions to be fulfilled simultaneously:

- The event is "irresistible" (this clearly distinguishes the force majeure from *imprévision*):
- The event must be unforeseeable:
- The event is to be an outside one: the failure of suppliers or subcontractors or associates is no excuse for the contractor:
- The debtor is not at fault: the event should be unavoidable and absolutely beyond the control of the debtor.

5.3.4. Change of EURIBOR's Fixing Methodology

As the legal analysis above demonstrates, deep divergence exists under national legal systems. However, national courts may have tools to facilitate contract continuity.

5.3.4.1. The re-establishment of the economic equivalence under Italian and German law

As pointed out above, under Italian law, the amendment of EURIBOR could either

- a. if not causing a substantial alteration of the parties performances, be effected with no right to terminate the contract; or
- b. if causing a substantial alteration of one of the parties performances, would not cause termination if the other party is willing to re-establish economic equivalence.

Similarly under German law, the frustration of contract rules in § 313 German Civil Code would not result in an automatic replacement, but would – in principle - allow for an amendment of an existing contract leading to the introduction of EURIBOR+ into the contract and to the payment of compensation restoring the pre-existing economic equivalence.

5.3.4.2. The *clausula rebus sic stantibus* doctrine in Spanish case law

Under Spanish case law, the effects of the application of the doctrine of the *rebus* clause may be two-fold:

- a. the revision of the contract to restore its equilibrium;
- b. the termination of the contract. However, courts prefer the revision of the contract.

5.3.5. Legislation guaranteeing continuity

Reliance on the legal concepts mentioned above would have numerous practical disadvantages.

A consistent approach and result would only be achievable where, in case of standardised contracts among market participants (such as derivatives based on the ISDA Master Agreement), a market organisation (such as ISDA) would introduce all relevant amendments by way of a uniform amendment (e.g. by way of an ISDA protocol). This approach, however, may not work in the case of standardised agreements among enterprises or banks on the one hand and consumers on the other hand. While consistent rules might be introduced by way of revised general business terms, there is a significant risk that such general business terms would be tested before the courts. Moreover, in cases where individual contracts are affected, no consistency could be achieved at all, and disagreement about the compensation to be paid might result in frequent litigation.

Furthermore, in cases of contract chains governed by different national laws (including laws from non-Eurozone states) it cannot be foreseen with certainty, if and how an interaction of different national laws in a contract chain (e.g. back-to-back hedging arrangements subject to different laws) would work. As a consequence, the mismatch risk to which parties might be exposed would be increased.

Finally, as the analysis above has revealed, reliance on contractual interpretation concepts alone will not result in full legal certainty. As a consequence, it is desirable that legislation guaranteeing contractual continuity shall be introduced.

Provided that the European legislator has the required legislative competence, such legislation should, in our view, stipulate at least the following principles:

Where a contract (including any calculation agency agreement) refers to the EURIBOR as the method to determine a periodic payment in relation to a defined payment period (e.g. 3-months EURIBOR), such reference shall be replaced by EURIBOR+ as per the beginning of the period immediately following the introduction of EURIBOR+, which is in economic terms the closest resemblance to the original contractual EURIBOR.

A transition provision should deal with the question whether a payment period, to which a EURIBOR reference relates and which has not yet elapsed at the time of introduction of EURIBOR+, shall be entirely dealt with by the existing EURIBOR reference or whether e.g. a new (short) payment period automatically starts on the business day following the first fixing after the introduction of EURIBOR+, which would result in a "big bang" and would reduce the arbitrage potential.

Where a contract refers to the EURIBOR as the method to determine a periodic payment in relation to a defined payment period (e.g. 3 months EURIBOR), the replacement of such EURIBOR by the equivalent EURIBOR+ shall not give rise to a right of any party to prematurely terminate the contract or to require the cancellation or the amendment of such contract. However, the right of the parties to cancel, novate or amend the contract by mutual consent shall remain unaffected.

As far as bonds and notes are concerned, upon the replacement of the EURIBOR the terms and conditions of the bonds or notes issued under a particular ISIN shall be deemed to be amended accordingly without any need to exchange global instruments or definitive

instruments (each of which shall remain in full force and effect) or to call a bond or noteholders meeting. However, the issuer shall publish a notice setting out the affected ISIN and the amended wording of affected provisions contained in the terms and conditions of the bonds or notes.

5.3.6. Conclusion

This report shows that there are fairly significant differences between the jurisdictions considered. Applied to the continuity of contracts and the pattern of the underlying questionnaire, the risk to the continuity of contracts is very strong in Germany and Italy but the system leaves the possibility of allowing the continuity of the latter by the mechanism of restoring the balance economic cooperation between the parties. In Spain, the law does not offer this possibility, but there is a recognized doctrine applied by the courts that would ensure the continuity of those contracts if it were disputed by the parties before the courts. Under French law, the continuity of contracts does not seem threatened except in cases of force majeure. These major differences in mentioned legal systems lead to the need for supranational law (European Regulations) not to leave the continuity of contracts to different legal interpretations by member states and different economic compensation.

As the report also shows, a deeper analysis will be needed to explain in detail the situation in the aforementioned countries and in other Eurozone member states. At this stage the outcome of the analysis is quite simple: if the transition from EURIBOR to EURIBOR+ is considered as economically significant, at least for Eurozone, transitioning to EURIBOR+ without an EU Regulation or national legislation bears risks.

6. Outreach to Market Participants

6.1. Outreach approach

During the months of September and October 2013, the EUR MPG Working Group sent a questionnaire to a large variety of institutions: banks, asset managers, insurance companies and corporate companies. This questionnaire has been sent either directly and/or through trade bodies [Insurance Europe, CFO Forum, EFAMA]. To date, 37 responses [26 banks, nine insurance companies or federations, and two asset managers] have been received.

The questionnaire asked respondents to provide a list of benchmarks and tenors that their organization uses, as well as a list of products per benchmark. We asked for ideas on potential replacements and other data/instruments in the markets that could serve as potential benchmarks in the future. We also asked about potential issues that will arise when transitioning from each legacy benchmark to a replacement benchmark.

The survey results indicate that there is a wealth of products that reference LIBOR. Given the number of impacted products, respondents raised many concerns regarding the transition to a new benchmark, with the majority of concerns relating to the altering of existing contracts and the potential impact on legacy positions. Respondents indicated that a transition would need to be long enough to accommodate the re-writing of existing contracts. In addition, there would need to be a deep and liquid market for any new benchmark at all of the relevant tenors.

Please note that the responses in this section represent initial feedback from Market Participants and was collected prior to the deeper analysis conducted by the EUR workstream during Q4 2013. This initial feedback has been very helpful in indicating the direction which shall be envisaged and in pointing out potential issues. Further analysis, notably that which was completed by the Transition and Legal Analysis workstreams, led us to conclusions which vary from the initial feedback summarized below.

6.2. Benchmark usage by outreach contributors

6.2.1. Banks

Banks confirmed that Euribor is widely used, for various purposes: trading, valuating, hedging, issuing. All maturities are used, especially 3M and 6M. In particular, some banks report extensively using Euribor maturities beyond 3M for IRS. 12M is also quite widely used, mostly for corporates and mortgage loans (one bank indicated that 35% of their mortgage loans are indexed on the Euribor 12M).

One bank underlines that for about 4 years, a lot of their clients switched from longer Euribor maturities to Euribor 3M, and estimates that today 70% of issuance swaps are traded against 3M.

Other interest rates benchmarks used are: Libor (USD, GBP, and sometimes EUR) the Eonia (floating leg of swaps, short term transactions), ISDA fixing Euribor and Libor (for swaptions or constant maturity swaps), OIS (see below). Marginally, some banks also report using the Eurepo, and one market participant reports using the 10 year -TEC index (French Constant

Maturity Treasury) for derivatives or structures notes; finally, another bank reports using refi rate for loans.

6.2.2. Insurance Companies

Seven Insurance companies and two national federations responded to the questionnaire.

The respondents reported using a variety of benchmarks. Please see below a list of benchmarks they reported using (non-exhaustive):

- EONIA
- EURIBOR
- LIBOR and LIBID
- EUREPO
- OIS

According to the responding panel, under 6 months maturities are the most commonly used. As we will see in later in the analysis, the whole range of maturities is nevertheless important (e.g., the over 6M EURIBOR reference is the standard index used for swap pricing purposes).

The use of these indices is wide-ranging and includes, amongst other things:

- Acting as a reference rate for interest rate swap and options market
- Valuation of derivatives positions and subsequent collateral posting
- Floating rate reference for assets linked to variable rates (floating rate notes, ABS etc...)
- Fund benchmark
- Solvency II liabilities reference rate definition

As can be observed in the above list, none of the respondents mentioned direct trading of the Indices. Reference rates seem to solely be used as benchmarks, valuations or liability index.

6.2.3. Asset Managers

Three Asset Management companies responded to the questionnaire.

As a consequence to their role in the market, Asset managers extensively use reference rate products. The respondents quoted the following indices:

- EONIA
- EURIBOR and EURIBID
- LIBOR and LIBID
- EUR LIBOR
- BofA Merrill Lynch Euro Currency. Deposit Bid Rate Constant Maturity Index

According to the responding panel, maturities under 6 months are most commonly used. Longer tenors (up to 1Y) have nevertheless been mentioned.

Respondents mentioned that they are not trading the index itself but rather using derivatives linked to it or investing in assets whose returns are linked to these rates:

- Coupon linked to reference rates
- Derivative business (mainly EURIBOR and OIS)
- Cash funds' benchmarks
- Swaps
- Cap
- CCS
- CFM

6.2.4. Corporate Companies / Treasurers

Six corporate treasurers responded to the questionnaire.

The respondents reported using a variety of benchmarks. Please see below the list of benchmarks they reported using (non-exhaustive list):

- EONIA
- EURIBOR (up to 12m)
- LIBOR and LIBID (up to 12m)
- Bloomberg Fair Market Curves (used for various purposes, but not considered in the following)

The use of these indices is wide and includes, amongst other things:

- Intercompany loans
- Hedges
- Short and long term financing transactions
- Interest calculations on I/C accounts of group companies
- Pricing and accounting of money market, debt and derivatives

Respondents were unanimous in saying that these rates were not traded directly but rather used as references in various contracts:

- Interest rate swaps
- Debt issuing (FRN, e.g. ABS)
- Cross-currency-swaps
- Loans and Deposits
- Benchmarks for external asset management mandates

6.3. Potential alternative reference rates

Details of key asset classes where LIBOR / EURIBOR / TIBOR are used as reference rates and relevant LIBOR maturities used

6.3.1. Banks

The use of OIS-benchmarks is reported for about half of the surveyed banks, for derivatives and hedging purposes, and on all maturities. However, the opinions of using the OIS as an alternative to Euribor are usually rather negative: the OIS includes neither liquidity premium, nor bank credit risk, and is too different by nature from the Euribor, reflecting liquidity situation, expectations and derivatives markets, more than real underlying transactions and cash operations.

One bank however, is of the opinion that using OIS instead of Euribor would decrease its credit exposure on the pricing, and that the hedging of the fixings would be easier. Another one is also favorable to OIS becoming the standard reference rate for maturities beyond 3M.

Eurepo or other repo indices are mostly seen as not suitable for the replacement of the Euribor: repo are not used as funding instruments; repo indices very much reflect the type of underlying collateral, and do not capture the credit risk as well as the Euribor. One bank also underlines that CCP's risk mitigation techniques can affect the collateral and therefore the repo rates. Moreover, the views on determining the type of underlying collateral (GC only, need to differentiate between countries) which should be taken into account in an "ideal repo index" seem to be split. The panel-principle used for Eurepo is also seen as fragile, and its definition of the underlying collateral too restrictive and, for many banks, even not representative from the euro area as a whole. One bank however advocates for the creation of a repo index given the higher volumes, provided that the underlying basket of collateral be clearly defined.

Finally, two banks refer to refi rates as possible alternative to Euribor, without very detailed arguments; one argues that given the reliance on ECB funding in the Eurosystem, it is de facto a transaction-based index.

With the exception of a few "conservative views", most of the banks agree on the principle of an alternative index based on real transactions; the criterion of an index based on real transaction is the most widespread one in the description of the features of a "ideal benchmark". The need for improved governance within the benchmark administrator, avoiding conflicts of interests and defining clear guidance and checks for the contributions, also seem rather consensual.

Keeping the principle of an index based on the unsecured market is also overall the most common view: banks underline that they need to rely on an index which captures liquidity and credit risk, notably in order to correctly hedge. A wider definition than the Euribor to capture more volumes is therefore the most frequent option suggested by the surveyed banks.

In particular, some banks advise using short term securities such as commercial paper or deposit certificates, transactions with non-bank counterparties (asset managers notably, but

also central banks with the exception of monetary policy operations); transactions with corporates are a bit more rarely considered. Most of the banks seem reluctant to mix unsecured and secured transactions data. A few banks however disagree, arguing that a wider range of instruments would certainly reinforce volatility of the index.

Regarding volatility and methodology: about half of the banks underline the need for "smoothing techniques" to limit volatility, especially on longer tenors, and possibly, the need for fall-back or complementary procedures in case volumes are not sufficient enough; other mention the hypothesis of threshold of volumes under which the rate of the previous day could be re-used.

One bank suggests involving CCP and SSS into the process for a better representativeness of the markets.

One bank suggests the possibility to weight transactions according to the contributing banks (balance sheet, country GDP) instead of the volumes, for days where those are not sufficient; this methodology could help decreasing volatility.

One bank mentions fears that a transaction-based index would push the rate higher compared to the actual Euribor; a few other mentions that higher volatility could increase transaction costs.

One bank suggests that a minimum number of contributions could be defined for the publication of the index.

On the specific case of avoiding a bank holidays effect, a minimum threshold of countries opened and/or a calendar for the business day of the benchmark could be defined.

A few banks declared that volatility would be an issue but not a stopper, provided that a derivative markets can be developed from the index in order to hedge.

Capturing volumes: the majority of the surveyed banks declare being in favour of the transaction-based principle, without undermining the practical issues which still needs to be solved, notably regarding the lack of volume on the unsecured markets: one participant estimates that a minimum of 20 contributors are necessary on each maturity to limit the concentration; a few banks prefer a mix of transactions and quotes; one bank favour remaining the current framework of declarative quotes.

Collecting data: almost all banks underline practical difficulties to implement a transaction-based replacement rate on longer maturities (insufficient underlying volumes), some of them referring to the first results of the E-EBF/ECB simulation test. It seems that beyond the transaction-based principle, there is no consensus on the way to proceed concretely. A few market participants think that real trades could be completed by committed quotes and/or executable bid/ask as a substitute to real trades.

In terms of methodology, the idea of collecting transactions through clearing systems, trade repositories or brokers is also quoted by about a third of the surveyed banks. The use of broker data is quite often quoted as a source of possible additional transactions (MTF, ICAP). The idea of a trade-repository similar to OTC derivatives is also mentioned by one bank. Another bank underlines that using broker data could also allow for establishing a more reliable swap index.

Regarding the composition of the panel: no broad consensus seems to prevail on the size and characteristics of the panel (broad size, best-rated bank only given the concentration of the market, or G-SIB; geographical representativeness...), but a short majority of the participating banks seems to favour a wider panel to enhance its representativeness and limit the incentive to manipulate the contributions. On the contrary, some banks suggest reducing the panel to the banks which are closed to a "prime bank" definition; in particular, one bank suggests relying on the G-SIB definition used by the FSB. A few banks recall that a geographic criterion is also important to maintain the representativeness of the panel.

Most of the banks seem to agree to the principle of making the participation to the panel mandatory in order to safeguard the representativeness of the panel. One bank suggests that the obligation to contribute should be reserved to G-SIB banks; another bank suggests that the panel could be defined by the banks supervised by the ECB (for the Eonia panel notably).

Finally, a few banks confirm that they are worried that individual contributions to an index based on real transactions should be published, even with a lag. One bank underlines that a broad-based panel would tend to reinforce the comparison between the highest rated banks and the rest of the panel.

6.3.2. Insurance Companies

The below is a synopsis of discussions around alternatives to EURIBOR/LIBOR suggested by Insurance Company respondents.

The respondents to the survey quoted the following criteria as important in order for a reference rate to be reliable:

- Transaction based (or at least linked to)
- Significant number of contributing data to avoid manipulation/volatility
- High liquidity both of the index and induced liquidity on the derivatives market referencing this index.
- Minimum disruption from the existing system (see transaction part)

Keeping in mind that different maturities might raise different methodology issues, the MPG divided its questionnaire into 3 main parts: Overnight / 1W to 3M / Over 3M reference rates.

Overnight rate: EONIA

There is a consensus amongst the respondents that EONIA does not need any change in methodology and that this index is fully suitable as an overnight rate.

The characteristics of this index are indeed considered as very reliable:

- Liquidity is fine with on significant amount traded per day
- The index relies on real transactions

If anything, the MPG participants would advise a similar index methodology but with stronger safeguards (regulatory monitoring).

1 Week to 3 Months: EURIBOR +

The market participants mainly discussed three preferred indices for the 1W to 3M maturities: OIS, Eurepo and Euribor Plus (two methodologies offered).

OIS

Most of the respondents mentioned that their companies did not often use the OIS.

Even though this index is indispensable to Insurance Companies at least from a derivative valuation point of view, respondents were skeptical with regards to a broader use of OIS as a Reference Rate.

Despite the index's high liquidity and reliable pricing characteristics, the fact that OIS does not include any credit risk is indeed seen as a major drawback in light of existing legacy derivatives and variable yield books which need to be catered for. Should OIS be used as a reference index, the respondent would need to be able to separately reintegrate the credit risk component in order to reconstruct something akin to EURIBOR in principle. A respondent brought the debate further mentioning that a reference rate reflecting solely prime bank's credit risk was not enough and that he would like reference rates to be declined by rating so as to include the corresponding credit risk components (i.e., a reference rate per rating).

Eurepo

With regards to EUREPO, a respondent mentioned that this reference rate does not appear suitable as it would need the introduction of a single index for each important issuing country or a basket of homogenous collateral, as there would be further problems such as mixed collateral baskets.

Euribor Plus

Excluding transition issues (which will be developed below), there seems to be a consensus amongst the respondents for the below approach on an improved version of Euribor:

Market participants are unanimous that the replacement index should follow the following principles:

- Needs to increase the number of participants (over 40 seems to be acceptable)
- Needs to somehow be linked to real transactions
- Needs for a regulatory safeguard / an independent administrator
- Needs to be IOSCO compliant

Index based on real transactions with the following characteristics:

- Exclusion of extreme trades (both in terms of volume and price)
- Minimum volume to be traded on the market to validate an official quote
- Weighted average of previous day quotations shall be used in case of lack of market trades.

Over 3 Months

Even though these maturities seem to be of less use to some of the responding Insurance Companies, an Index remains crucial given the swap market is priced using 6M reference rate indices

The above developed solutions have been discussed by the respondents. Given the even lower volumes traded on the over 3 months market, the induced volatility shall be contained through statistical smoothing techniques.

6.3.3. Asset Managers

As general requirements, the asset managers share the view that the potential index replacement shall:

- Allow access to liquid hedging instruments
- Be representative
- A fair and independent establishment
- Represent fair market levels therefore linked to effective transactions
- Minimize disruption in the case of a transition

Overnight rate: EONIA

Asset Managers agree that EONIA is a suitable and reliable index for overnight rates.

1 Week to 3 Months: EURIBOR +

EUREPO / OIS

Despite the benefit of a good liquidity level mentioned by a respondent, it seems that the two Asset Managers share the view that Eurepo is a secured rate, which would not be picked by their clients as a transaction-based unsecured index is considered a better solution.

As for OIS, one of the Asset Managers made the following comment on OIS index:

We use OIS based indices for overnight index swaps where the floating rate leg is based on Sonia, EONIA or Fed Funds. It is also now a market standard to use OIS as a discount rate for cash-collateralized derivatives. OIS is also the reference rate for short term financing (ie: commercial paper issuance)

As OIS rates reflect pure interest rate exposure, they can represent a good alternative for market participants that want to hedge the "pure" interest rate exposure without any bias coming from credit risk or term risk. Nevertheless, the robustness and reliability of OIS rates relies on the quality of the underlying indices (Sonia, FED funds, EONIA). The volume of these overnight rates, while still significant, have sharply decreased over the last few years (especially in the above 2 years maturity segment) and have been somewhat affected by the monetary policies currently conducted by the major central banks. Diverging behaviors and costs of funding from banks within the panel from one

day to another and the implementation of Basle III can lead to unexpected volatility that is not only / directly linked to liquidity issues.

EURIBOR Plus

If one of the respondents is fairly agnostic on the question, the second one expressed the following view: Keep on using an improved Euribor and concentrate the improvements on:

- Enlargement of representative banks
- Asking them to contribute on their theoretical fixing rather than on a theoretical prime bank
- Use real transactions as a safeguard

The reasons for this preference are:

1. Purpose of such fixing
 - a. Such fixing should give a representative view of the financing costs of European banks over several maturities
 - b. Should therefore be articulated around a panel of representative banks; imposing a prime feature is not a guarantee on this
 - c. Hence a governance body should establish a list, potentially based on balance sheet size, of contributors
 - d. Could use (to be further checked) the list of systemic banks or those subject to the AQR review
2. Fixing principle
 - a. The limit of asking for theoretical quotes of prime bank borrowing levels/ lending activity has been demonstrated as of late
 - b. Ideally, would need this index to be linked to 100% of transactions
 - c. Rather it is suggested to ask for the theoretical borrowing / lending levels of each contributing bank
 - d. With quality control linked to the effective activity carried on by such banks in the market (either through interbank activity or wholesale activity : Certificate of Deposits (CD), Commercial Paper (CP) for example)
3. How to control quality
 - a. As per 2), bank internal governance bodies should be set up to "guarantee" the quality of the theoretical quote vs the real activity in the market
 - b. Additionally, at publication governance level, some further review of relative contributions and their evolution through time should be monitored with questions asked to the bank's governance body if need be

Over 3 Months

If one of the asset managers sees no importance on the over 3M tenors, the other one mentions it is an important part of its EURIBOR activities.

As for the 1 week to 3 month maturities, an improved EURIBOR Plus seems to be favored.

6.3.4. Corporate Companies / Treasurers

As an introduction, one of the respondents mentioned the following requirement for a replacement index: at least 40 contributors / transaction based data not from the contributors themselves (but from an independent third party).

Keeping in mind that different maturities might bring about different methodology issues, the MPG divided its questionnaire into 3 main parts: Overnight / 1W to 3M / Over 3M reference rates.

Overnight rate: EONIA

Given the predominant position of the index coupled with its transaction-based characteristic, EONIA is considered as a solid candidate for an overnight reference rate.

1 Week to 3 Months: EURIBOR +

Respondents agree that:

Eurepo and other parameters based on repos

Do not seem suitable as they are rates based on secured transactions and rely on EUR government debt as collateral which is not seen as homogeneous, in terms of credit quality, across the Euro zone.

OIS

Candidates expressed interest in a risk-free base curve which could then be customized by participants by adding spreads if need be. This has to be considered cautiously as it could have an adverse effect on funding costs since banks have to price in basis risk.

Euribor Plus

Most corporates have a positive view on Euribor+. However, some are skeptical with regards to Euribor+ since the market is simply not liquid enough.

Other proposal

A Synthetic EURO Government Bond Yields index has been mentioned as a potential replacement candidate.

Over 3 Months

Such maturities are also considered as important for most of the respondents.

A respondent mentioned that OIS-swaps can serve this purpose too, as liquidity in longer term OIS swap markets is continuously deepening.

All corporates want to avoid high volatility in benchmarks. One expressed the view that any index that requires additional smoothing techniques is generally not suitable.

6.4. Transitions

6.4.1. Banks

Concerns regarding legal issues which could arise in the transition towards a new benchmark are almost unanimous, and most of the banks underline the risk of contractual uncertainty and possibly of contractual disruption; one bank even claim that the nature of the index has to be preserved in order to avoid any transition issues. On the contrary, a few banks estimated that the legal transition should not be impossible, provided that it is guaranteed by an EU/national legal instrument, which would mandatory replace one rate by another.

Most of the banks have noticed that the page-driven definition of the Euribor allows for a few methodological changes without leading to a complete disruption.

That being said, the assessments of the availability of potential replacement rates in various financial contracts are very diverse. Globally speaking, it seems that replacement rates might exist in some contracts, but that: **i)** not all contracts provide such fall-back provisions; **ii)** the fallback provisions, whenever they exist, appear to be very diverse, depending obviously from the product and the contract, but also possibly from the national legal framework or the international framework (quotes from reference banks, judgement from the calculation agent, deposit rate, ISDA calculation...); **iii)** there is no consensus within the surveyed banks, whether such provisions would apply in case of a Euribor disruption.

At the end of the day, should a transition occur, about a third of the banks report that they would refer to ISDA provisions when it comes to derivatives, to refer to possible replacement rate or guidance, or looking for a coordinated approach; some banks suggest that a ISDA Protocol could be drafted or amended on this issue, to allow for guidance for the private sector, and would be progressively introduced on a voluntary basis by market participants. In the same vein, one bank mentions in this regard the example of the ISDA recommendations as agreed for the recently deleted Libor tenors or currencies on the 25 March 2013.

For the loan agreements, a few banks suggested that the LMA documentation either already have fall-back provisions in place, or could be amended accordingly. GMRA agreements could also serve as a reference to market participants.

As a very last solution or consequence, a few banks consider that contractual law would apply between parties, requiring both parties to renegotiate the contracts; this scenario would obviously be the worst option given the legal uncertainty and operational burden it represents. One bank underlines the risk for consumer associations endorsing collective claims, with possible fines and sanctions for retail banks.

A few banks express the need for the assessment of a public body or public guidance during the transition phase, as a guarantee for a coordinated transition.

Regarding the option of a parallel run or a big bang, views are really split between the surveyed banks.

A short majority of the surveyed banks seem to favor a more private-sector-led and progressive migration from one benchmark to another, on a voluntary basis, and support a parallel run of the two benchmarks for a transition period. The option of a parallel run could yet lead to the issue of the spread and potential basis between the two indices. In this regard, one bank highlighted the extreme risk of the switch between the two indices becoming impossible if the spread between the two indices were to be too different and some products becoming illiquid.

Other banks would favor a “big bang” approach, and often ask for public authorities (national or European) to legally guarantee the framework for the transition and the continuity between the indices. The main arguments relate to the risk of a segmented market, the need for a quick transition, the necessity to avoid confusion, and also operational consequences (notably from an accounting point of view). A few banks ask for the switch from one benchmark to another to be made binding by public authorities and not left to the good will of market participants. In this prospect, one bank explains that the switch to a new benchmark would depend of the legal framework in place (i.e., binding or not), given the legal accounting and reputational issues.

In any case, a lot of banks, whatever the scenario they favor, call for a strong coordination at the European level, and some from an international level: for example, the possibility of developing “a set of transition guidelines”, or to clearly identify the public authorities which could coordinate the phasing-in of the new benchmark, are mentioned. One bank even suggests that the index elaboration should be done by an independent supranational organization.

Concerning hedging and accounting issues: one bank underlines that a change of benchmark would have basically two types of impact: (i) change in the valuation of the fair value products (derivatives) and (ii) changes of items that are accrual accounted through the income statement (loans and deposits).

According to some banks, the potential impact of a change in benchmark on P&L (notably due to the fair value of the derivatives) and hedging could be considerable. A few banks mention the issue of the repricing of the existing contracts, or hedging becoming inefficient, in particular if the two indices are very different; one bank notices that a change of credit quality of the hedging instrument would most likely introduce additional basis between the hedged item and the hedging instrument. A few banks are concerned about the valuation of the existing hedges, should the underlying benchmark be removed, and the potential impact in terms of hedge inefficiency. One bank repeats that higher volatility in the new index could make hedging more difficult and costly.

However, it seems that a very short majority of the banks seem to consider that these issues are manageable, provided that a liquid market for derivatives is developed from the new benchmark.

One bank suggests that accounting regulators (IASB and FASB) could be involved if the change from one benchmark to the other were to be important, similar to what has been done for novating bilateral trades to CCPs.

Concerning other operational challenges during the transition, tax issues:

IT changes are mostly considered as manageable, although some banks estimate that a bit of time would be required to adjust. One bank affirms that the parallel run of the 2 benchmarks would be more complex than a "big bang" transition in this regard.

The most difficult situations for a change would be related to low liquidity products (exotic, complex derivatives), hedging derivatives, long term retail loans.

Tax consequences are mostly regarded as negligible and temporary. However, about half of the banks estimate that the change in benchmark would primarily affect the MTM valuation and the balance sheet, and therefore affect the final taxable benefits.

Most of the banks estimates that the transition from one reference rate to the other would require about 6M-12M; one bank mentions that it could take 2 years; another one up to 5 years.

6.4.2. Insurance Companies

The transition period between the current reference rate system and any new index is definitely the biggest concern raised by responding Insurance Companies.

When asked which route the transition should follow, respondents answered that:

- Ideally, the EURIBOR change should be an evolution and not a revolution so reforming the index without building a new one from scratch would be preferable: in such a case a transition period would be necessary for IT purposes
- Should a new index be developed, a double-quotation transition period would also be preferable.
This would enable the legacy contracts to mature while using the new reference rate for new contracts.

Furthermore, various potential issues have come up through the MPG responses:

Legal

The legal aspects will clearly be a major point of attention for the reference rate transition. Interviewed people expressed concerns about this aspect but, not being legal experts, were not fully able to develop the point. It is advised to refer to the Legal work stream conclusions.

Legal concerns are mainly linked to the in-force contract. Respondents wondered if the change in reference rate would not be considered as a substantial change in the existing contracts and therefore trigger contract cancelations.

Accounting issues

Accounting treatment of the index changes is a second source of concern as various accounting aspects would be impacted by this change.

- Liability management
- Hedge Accounting

- IT related

As widely developed by the bank workstream, the respondents mentioned that efforts will be needed to include the new reference rates in their systems.

Even though this effort is not as important as it is for the banks, this shall be taken into account when setting the transition period.

6.4.3. Asset Managers

Asset Managers are in favor of a smooth transition: ideally, a gradual evolution is needed, not a revolution.

The objective should be to improve the current Euribor setting so as to minimize the risk of legal disruptions during the transition period, whilst avoiding as much as possible that the two families of hedging instruments co-exist, with one becoming illiquid after the other.

A 6 to 12 month period would be needed whereby new and old indices would be available throughout this transition period, during which IT, legal and operational issues would be addressed.

An additional 6 to 12 month period would then be needed, during which the comparability of both indices would help parties to transition their Front to back – accounting statements and at the end of which old indices would no longer be available.

Legal

Various potential issues are mentioned:

- Need to amend existing IMAs & fund's prospectuses
- For derivatives, the ISDA definitions will be amended accordingly reflecting the new definition/methodology of the benchmark and therefore will apply to OTC trade confirmations referencing such definitions.
- However, definitions of the benchmark shall be amended accordingly in the transaction documents that do not use the ISDA definitions (loan agreements, fund prospectuses etc.)
- Respondents do not expect that the impact will be different from one jurisdiction to another.

The relevant transaction documents (OTC confirmations, loan agreements, fund prospectuses etc.) will have to be manually amended if the original reference disappears and the parties decide to apply the new one.

However if only the definition/methodology changes, the impact on transaction documents where such a definition/methodology is not disclosed will probably be limited.

In the case of an index being too different from the current one, from a legal standpoint we would need to assess whether it could give rise to a termination under a MAC clause for example, or whether the change would be so fundamental that it could potentially constitute a frustration under the agreement.

IT

According to one of the respondents, it may take up to 6 months to integrate the new indices into the various systems and processes.

It also mainly relies on data availability; agreements therefore need to be found with data providers linking all systems to the new data feed.

A bit like the transition to EUR, the transition may need to be smoothed over a reasonable period of time to let the parties see the impacts of the switch.

With regards to IT, it entails the development of a new set of data with dual valuations based on old and new indices; this could entail material IT developments.

The technical transition should be covered within 6 to 12 months.

6.4.4. Corporate Companies / Treasurers

Two different views are proposed for the transition methodology:

- Some market participants would recommend making a clear cut, i.e. no parallel run and no longer using the name "Euribor"
- Others think that a big bang transition is certainly difficult to realize. And that during a defined transition period both concepts and benchmarks should be applied in parallel (also to build up some experience with the new benchmark).

This leads the outreach to think that the best solution may be a hybrid approach: Mandatory big bang after generous transition phase (max 5Y).

Various potential issues have been brought up through the MPG responses.

Legal

Should the reference index methodology change be mandatory, Market Participants do not foresee any difficulties as the relevant documentation does not refer to certain methodologies.

In the case of a voluntary switch to the new index, issues might arise for in-force contracts. This would nevertheless have to be investigated by their legal department in depth.

One respondent expressed more concerns around the legal transition issue:

For new contracts, the definition of the benchmark methodologies could be negotiated and a new agreement reached that deviates from the system used to date (e.g. LIBOR). This is viable from a legal standpoint. What does not appear legally possible for existing agreements, however, is giving up the LIBOR system in its entirety or making revolutionary changes to it. There are simply too many contracts that use the LIBOR as the reference interest rate. If the methodology is changed so significantly that the reference rate used can no longer be covered by the definition in the existing contracts, the contractual parties will no longer feel bound to them. At the very least, it can be assumed that one of the contractual parties would feel disadvantaged by the changes and terminate the contract with immediate effect.

Accounting issues

The accounting treatment of the index changes is a second source of concern as various accounting aspects would be impacted by this change.

Hedge Accounting: Strong desire to avoid Hedge Accounting problems

Hedge effectiveness testing and documentation of the hedge relationship need to be updated. Potentially, in case hedge effectiveness could no longer be proven, this may lead to subsequent adjustments or correction postings. Finally, this could lead to P/L swings if the fair value changes would not be offset.

Auditors / Tax

From most of the Corporate Treasurers' point of view, no big issues are foreseen.

Tax could be an issue but would have to be seen with fiscal specialists / tax authorities.

IT

Most respondents do not see big issues.

The affected deals and some basic data will have to be changed once, at the onset, and new market data will have to be imported:

1. Set-Up of new interest rates in the system
2. Set-Up of interest rate curves
3. Testing efforts
4. Customizing of Interest Rate Uploads

It is hard to say how long this could take because this depends on the number of deals in the system – worst estimate provided by the respondent is 6 months.

6.5. Other feedback

6.5.1. Banks

A few banks underline the risk that current regulations (notably LCR, NSFR and FTT) would further harm unsecured markets and decrease the volumes of transactions.

A number of banks welcome the possible positive effect of the market initiative STEP+ (which aims at creating a common platform for cash lending) on the unsecured market; in particular, one bank underlines that this initiative could create the conditions to set-up a transaction-based benchmark alternative to the Euribor.

One bank mentions that the transition from Euribor to a new benchmark should be replicated to other interest rate benchmark (Libor USD and GBP) and requires coordination at an international level.

6.5.2. Insurance Companies

Amongst the other feedback received from responding Insurance companies,

1. Worries concerning the impact of a reference rate change could have on Solvency II methodology/treatment have been raised.
2. Concerns around the implied change in benchmarks for Mutual funds, UCITS funds and overall Unit-Linked business which could trigger early redemptions.

6.5.3. Asset Managers

Amongst the other feedback received from responding Asset Managers,

1. Concerns around the implied change in benchmarks for Mutual funds, UCITS funds and overall Unit-Linked business which could trigger early redemptions.
2. Companies and funds' GIPS compliance shall also be taken into account.

Market Participants Group on Reforming Interest Rate Benchmarks

EUR Currency Report Appendix

March 2014

Appendix A. Euro Reference Rates

A.1. Eonia®

Eonia® (Euro OverNight Index Average) is the effective overnight reference rate for the euro. It is computed as a weighted average of all overnight unsecured lending transactions in the interbank market, undertaken in the European Union and European Free Trade Association (EFTA) countries. **Eonia®** is computed with the help of the European Central Bank.

Similarly to Euribor®, **Eonia®** is sponsored by the European Banking Federation (EBF), which represents the interests of some 5,000 European banks, and by the Financial Markets Association (ACI).

The first **Eonia®** was published on the evening of 4 January 1999, on the basis of January 4 overnight unsecured lending transactions. On 3 September 2007, **Eonia®** moved to 3 decimals.

The contributors to **Eonia®** are the banks with the highest volume of business in the euro zone money markets. The panel of banks contributing to **Eonia®** consists of 35 banks (27/02/2014):

Austria

Erste Group Bank AG

Belgium

Belfius; KBC

Finland

Nordea; Pohjola

France

Banque Postale; BNP-Paribas; HSBC France; Natixis/BPCE; Crédit Agricole s.a; Crédit Industriel et Commercial CIC; Société Générale

Germany

Deutsche Bank; Commerzbank; DZ Bank; Norddeutsche Landesbank Girozentrale; Landesbank Baden-Württemberg Girozentrale; Landesbank Hessen Thüringen Girozentrale

Greece

National Bank of Greece

Ireland

Bank of Ireland

Italy

Intesa Sanpaolo; Monte dei Paschi di Siena; UniCredit; UBI Banca

Luxembourg

Banque et Caisse d'Épargne de l'État

Netherlands

ING Bank

Portugal

Caixa Geral De Depósitos (CGD)

Spain

Banco Bilbao Vizcaya Argentaria; Banco Santander Central Hispano; CECABANK; La Caixa Barcelona

Other EU Banks

Barclays Capital

International Banks

London Branch of JP Morgan Chase Bank N.A.; Bank of Tokyo Mitsubishi

A.2. Euribor®

Euribor® is the rate at which Euro interbank term deposits are offered by one prime bank to another prime bank within the EMU zone, and is published at 11:00 a.m. (CET) for spot value (T+2).

The reference rate is referred to as Euribor® (Euro Interbank Offered Rate).

A representative panel of banks provide daily quotes of the rate, rounded to three decimal places, that each panel bank believes one prime bank is quoting to another prime bank for interbank term deposits within the euro zone.

Euribor® is quoted for spot value (T+2) and on an act/360 day-count convention. It is displayed to three decimal places.

Euribor® (Euro Interbank Offered Rate). Euribor® is the benchmark rate of the large euro money market that has emerged since 1999. It is sponsored by the EBF, which represents the interests of some 5,000 European banks, and by the ACI.

Panel Banks contribute for one, two and three weeks and for twelve maturities from one to twelve months.

The contributors to Euribor® are the banks with the highest volume of business in the euro zone money markets. The panel of banks contributing to Euribor® currently consists of 31 banks (19/09/2013):

Belgium

Belfius; KBC

Finland

Nordea; Pohjola

France

Banque Postale; BNP-Paribas; HSBC France; Natixis; Crédit Agricole s.a.; Crédit Industriel et Commercial CIC; Société Générale

Germany

Deutsche Bank; Commerzbank; DZ Bank

Greece

National Bank of Greece

Ireland

Bank of Ireland

Italy

Intesa Sanpaolo; Monte dei Paschi di Siena; UniCredit; UBI Banca

Luxembourg

Banque et Caisse d'Épargne de l'État

Netherlands

ING Bank

Portugal

Caixa Geral De Depósitos (CGD)

Spain

Banco Bilbao Vizcaya Argentaria; Banco Santander Central Hispano; CECABANK; CaixaBank S.A.

Other EU Banks

Barclays Capital; Den Danske Bank

International Banks

London Branch of JP Morgan Chase Bank N.A.; Bank of Tokyo Mitsubishi

A.3. Eoniaswap®

EONIA SWAP INDEX®, the new derivatives market reference rate for the Euro sponsored by Euribor –EBF (European Banking Federation) and Euribor ACI (the Financial Market Association).

EONIA SWAP INDEX® is the average rate at which , at 11:00 Brussels time, a representative panel of prime banks provide daily quotes, rounded to three decimal places, that each Panel Bank believes is the Mid Market rate of EONIA® swap quotations between prime banks. It is quoted on an actual/360 day basis.

An "EONIA swap" is an interest rate swap transaction, where one party agrees to receive/pay a fixed rate to another party, against paying/receiving a floating rate named Eonia®

EONIA SWAP INDEX® was launched on 20 June 2005 jointly by Euribor-EBF and Euribor ACI. As for Euribor and Eonia, Eonia Swap Index® benefits from an impressive panel of quoting banks, applying a strict code of conduct and supervised by an independent Steering Committee of market experts.

In February 2008, the Eonia Swap Index® fixing time moves to 11.00CET.

The panel of contributing banks currently consists of 8 contributors (27/02/2014):

France

Natixis

ItalyIntesa Sanpaolo;
UniCredit SpA (Milan)**Netherlands**

ABN AMRO (Amsterdam)

SpainBBVA (Madrid);
Banco Santander Central Hispano**EU Banks**

Barclays Capital (London);

International Banks

JP Morgan (Frankfurt)

A.4. Eurepo®

Since the introduction of the Euro, the European repo markets have developed significantly, with more and more emphasis on cross border financing trades. This has led to an increasingly homogenous Euro-denominated General Collateral ('GC') market.

Eurepo® is the rate at which, at 11.00 a.m. Brussels time, one bank offers, in the euro-zone and worldwide, funds in euro to another bank if in exchange the former receives from the latter the best collateral within the most actively traded European repo market.

Eurepo®, which was launched on 4 March 2002, has become the benchmark for secured money market transactions in the Euro zone.

It is supported by the EBF (European Banking Federation) and the ERC (European Repo Council)

The **Eurepo®** panel of contributing banks currently consists of 15 contributors (19/09/2013).

Austria

Erste Group Bank AG

Belgium

KBC; Belfius

Germany

Commerzbank; DZ Bank;
Unicredit AG

Greece

National Bank of Greece

Italy

Banca Monte dei Paschi di Siena;
Intesa Sanpaolo

Portugal

Caixa Geral De Depósitos (CGD)

Spain

Banco Bilbao Vizcaya Argentaria;
Banco Santander Central
Hispano; CECABANK

INTERNATIONAL BANKS

Nomura International Plc;
Morgan Stanley & Co. International Ltd.

A.5. EuroLibor®

EuroLibor stands for 'EuroLondon InterBank Offered Rate'. It is quoted from overnight to 12 months each business day. It is a benchmark giving an indication of the average rate at which a EuroLibor contributor bank can obtain unsecured funding in the London interbank market for a given period.

It is calculated on the basis of actual days in funding period/360.

EuroLibor Panel

Individual banks are selected within this guiding principle, based upon 3 criteria:

1. scale of market activity
2. reputation and;
3. perceived expertise in the currency concerned.

The EuroLibor panel of contributing banks currently consists of **15 contributors (19/09/2013)**.

- Abbey National plc
- Bank of Tokyo-Mitsubishi UFJ Ltd
- Barclays Bank plc
- Citibank NA
- Credit Suisse
- Deutsche Bank AG
- HSBC
- JP Morgan Chase
- Lloyds Banking Group
- Mizuho Corporate Bank
- Rabobank
- Royal Bank of Canada
- Société Générale
- The Royal Bank of Scotland Group
- UBS AG

Appendix B. Transitions – Accounting and Tax Overview

This appendix contains the attached study of accounting and tax implications of reference rate reform, prepared for the MPG by KPMG. The MPG gratefully acknowledges this work, done by the following individuals at KPMG:

- Mr. Fabiano Gobbo, Partner
- Mr. Roberto Spiller, Partner
- Mr. Michele Rinaldi, Partner
- Mr. Gianluigi Di Benedetto, Senior Manager
- Mr. Francesco Bellotto, Senior Manager
- Mr. Marco Foresti, Senior Manager

[See full report below]

Appendix C. Legal Analysis

C.1. Product profile: market standard definitions of EURIBOR

C.1.1. Derivatives

Belgium

OTC derivatives are governed by the provisions of the International Swaps and Derivatives Association (ISDA) and English law. Therefore, for EURIBOR the ISDA definition and fall-back provisions apply. This is also included in the European Master Agreements (EMA), which are governed by the Belgium law.

Germany

In Germany, EURIBOR definition have a standard in confirmations (may differ in specific transactions): the fall-back provision for OTC derivatives is described in clause 5.2 of the German Master Agreement for Financial Derivatives Transactions (*Deutscher Rahmenvertrag für Finanztermingeschäfte –i.e. "DRV"*). Moreover, the EURIBOR-definition can be tailor-made: the standard in-house definition in DRV confirmations is tailor-made. Here, the fall-back provision is the DRV standard provision, which is set out in the second column in all DRVs. According to the 2006 ISDA definitions, the fall-back provision provides an alternative method for obtaining a reference rate through "reference bank" quotations, without the attempt of a mutual agreement like it is provided by the German master agreement. There is no loophole for OTC derivatives which are traded under the ISDA master agreement or the German Master Agreement as long as these standard agreements were not changed in the individual contracts. At the moment, ISDA prepares new protocols to manage the potential omission of certain LIBOR and EURIBOR tenors.

Italy

In Italy, EURIBOR-definition is governed by standard master agreement language. In case of no fixing/no publication of the rate, the simple arithmetic average rate of rates declared operational at 12:00 (Rome time) by three primary Italian banks, identified by the bank that are quoting at that time. Again, standard master agreement language applies.

Portugal

The EURIBOR-definition is contained in the ISDA standard documentations. Some Portuguese banks draft specific (and simplified) documentation for OTC arrangements, but as the documentation differs from bank to bank, there is no national market standard which is worthy of note.

C.1.2. Loans

Belgium

Loans use the standard language of the LMA with respect to EURIBOR and its fall-back provision or with respect to the market disruption clause. Here, both Belgium and English law are applied.

Germany

Loans are following the LMA standard language (screen rate and interpolation, if relevant). Here, the fall-back provisions are reference bank quotation. Loan contracts are governed under English and German law.

Portugal

The definitions of EURIBOR contained in loan agreements entered into by Portuguese banks are in general identical to the definition contained in the LMA standard documentation. The fall-back is as provided in the aforesaid definition of the screen rate. Moreover, there are no standard agreements used in this domain in Portugal. Typically, Portuguese banks draft specific documentation for loan arrangements, but as the documentation differs from bank to bank, there is no national market standard which is worthy of note.

Spain

As mentioned above, recently, Law 14/2013 of 27 September 2013 on support to and internationalisation of business came into force. It included, in its additional provision nr. 15 the following regulation regarding how to handle some disappearing reference rates for mortgages.

Finally, certain reference indices or interest rates are discontinued. In particular, from 1 November 2013 the Banco de España will cease to publish on its website the following official indices applicable to mortgage loans:

1. average interest rate of mortgage loans over three years for purchasing unsubsidised housing, granted by commercial banks;
2. average interest rate of mortgage loans over three years for purchasing unsubsidised housing, granted by savings banks; and
3. savings bank lending reference rate.

These reference rates must, in the next revision of applicable rates, be replaced by the substitute rate or index envisaged in the loan agreement. In the absence of any contractually envisaged substitute rate, they must be replaced by the official interest rate denoted. "The average interest rate of mortgage loans over three years for purchasing unsubsidised housing, granted by credit institutions in Spain", applying to them a spread equal to the arithmetic average of the difference between the outgoing rate and that stated above, calculated using the data available between the date of entry into the loan agreement and the date on which the rate is effectively replaced.

C.1.3. Debt Securities

Belgium

Repurchase agreements and / or security lending transactions are governed by the Global Master Repurchase Agreement (GMRA) 1995 and 2000 and Global Master Security Lending Agreement (GMSLA) respectively. Both are governed under English law.

Germany

Repurchase agreements and security lending transactions are governed by the German Master Agreements for Repurchase Transactions (*Rahmenvertrag für Wertpapierpensionsgeschäfte*) and the Master Agreements for Securities Lending Transactions (*Rahmenvertrag für Wertpapierdarlehen*) and their respective confirmations. Both master agreements were set up by the German banking association (*Bundesverband deutschen Banken - BdB*) and do not include any EURIBOR-definitions.

For floating rate securities the following definition for the EURIBOR-rate standard master agreement documentation applies. If quotations are not provided, the reference interest rate for the respective interest period shall be determined by the calculation agent in its reasonable discretion in accordance with § 317 of the German Civil Code (*Bürgerliches Gesetzbuch - BGB*). Here, no template terms and conditions in the form of the ISDA or LMA template documentation are available and is therefore somehow "tailor-made": the wording is in line with market practice for floating rate notes governed by German law.

Italy

For repurchase agreements the following procedure applies: In the GMRA MA there is no definition of EURIBOR. The parameter is used, without definition, in Italian Annex to GMRA governing Italian bonds. The fall-back provision for repurchase agreements in Italy is simply the Pricing rate for the relevant Transaction.

Security lending transactions in Italy are governed by GMSLA which does not have a definition for EURIBOR.

The reference rate of covered bonds and EMTN programmes is defined in the 2006 ISDA definitions. Also, the definition is based on the domestic bond programme "Parametro di Riferimento" in relation to floating rate bonds and fixed and floating rate bonds. If the relevant screen page is unavailable, the ISDA "Reference Banks" fall-back provision will be applicable. The domestic bonds programmes of some Italian market participants include translation into Italian of the above mentioned provision.

Portugal

The standard documentation used for repurchase agreements and security lending transactions does not contain a definition of EURIBOR. The definition of EURIBOR is agreed on a case-by-case basis by the parties. Repurchase agreements and security lending transactions are governed by ICMA's GMRA and ISLA GMSLA. Some Portuguese banks draft specific (and simplified) documentation for repurchase and securities lending arrangements, but as the documentation differs from bank to bank, there is no national market standard which is worthy of note. Arrangements governed by the GMRA and the GMSLA involving Portuguese entities are usually governed by English law.

Standard ISDA language is used throughout programmes and standalone issues of floating rate bonds in Portugal. Furthermore, the definition of “Euribor” and the corresponding fall-back provisions used in privately placed bonds, to be retained by credit institutions – i.e., the so-called “loan-like” bonds – are similar to the ones used for loans.

C.2. Transition hypothesis

C.2.1. National Regulators

Each Euro member state should designate the relevant competent authority responsible for carrying out the duties and by providing competent power to take appropriate administrative measures in order to get a harmonized initiative under European Union and to avoid possible issues.

C.2.2. Novation

The potential legal effects in jurisdictions when benchmark methodologies are altered: the effect would be the need to, predictably, novate all contracts that have been agreed including EURIBOR as the reference interest rate, replacing it with the new reference interest rate.

C.2.3. Screen Rate

Several agreements like ISDA or LMA quote EURIBOR as a so-called screen rate. Reference rates in financial instruments and contracts on the EURIBOR are made by reference to certain screen pages by these agreements, such as the respective REUTERS page EURIBOR01 where the EURIBOR fixing is published. But detailed provisions that relate to the applied methodologies of calculation and the respective provision of input data do not appear in most respective documentation of financial instruments or financial contracts. Some responders believe when these documentations are further used to determine a reference rate the impact will be limited as the legal documentation generally refers to a screen page or reference rate name, and not to how such a rate is calculated.

C.2.4. Substitution Rates

In general, there are two cases in which substitutions might be necessary: one case could be when you substitute the older index because it will disappear. In this case a general rule has to be proposed. Another case is when old index exists and you try to change it from another, whether of new creation or not. In this second case both parts in the contract have to agree the change. So, there must be an excellent coordination of the change facing agreements. Different contracts and new methods and rules will coexist at the same time, but the key is having “clear rules” and managing properly the differences. The big constraint would be the lack of information and all related switching costs.

If existing contracts lack appropriate index substitution rules both parties has to come an amicable conclusion. This also takes place if the existing contracts are not reasonably clear. This also applies when benchmark rates are officially replaced or “re-launched”. Without a clear and suitable contractual arrangement the adaption of new benchmarks could not be implemented against the will of one of the involved parties needing substitutions rules.

C.3. Opinions of Non-Legislative Organisations

C.3.1. *European Banking Federation (EBF)*

The European Banking Federation (EBF) believes that the discontinuation of tenors could have a global impact affecting other entities and not only panel banks. In order to envisage the global consequences of the mentioned maturities' discontinuation an assessment should be performed by the European Supervisory Authorities (ESA). According to EBF, the elimination of some maturities could raise legal actions regarding the contracts still in force and referenced on the maturities intended to disappear. It was suggested for banks to be able to assess the number of contracts they have still in force and which are contractually linked to these maturities prior to eliminating any reference rates.

In order to envisage the global consequences of the mentioned maturities' discontinuation an assessment should be performed by the ESA. The elimination of some maturities could raise legal actions regarding the contracts still in force and contractually linked to the maturities intended to disappear. It was suggested for banks to be able to assess the number of contracts they have still in force and contractually linked to these maturities prior to eliminating any reference rates. This also applies for ISDA master agreements: By joining an ISDA protocol the acceded parties agree upon the amendments of the respective contracts. Whereas practical experience shows that such protocols are only partially accepted: Especially smaller market participants show little efforts to join these amendments.

C.3.2. *Eurosystem*

The Eurosystem has acknowledged "that legal risks and uncertainties can be significantly reduced if legislation is used to effect the transition from a benchmark intended to be discontinued to a particular new benchmark or to a reformed EURIBOR benchmark over a well-defined transitional period, as this would protect the legal validity of existing contracts affected by the transition: "[...] The important legal and financial stability issues that may be raised by changing EURIBOR's methodology and potentially its definition in order to make it more transaction-based need to be carefully assessed. Such changes may lead to changes in the economic value of contracts and potentially even to disputes between contractual parties." Furthermore, the Eurosystem believes, that public authorities could support the transition process by providing an adequate transition regime which addresses the operational and legal risks in a transparent, predictable and equitable manner. Given the importance that EURIBOR have in various jurisdictions, it is important that a unified framework on transaction data sufficiency, which defines the criteria for undertaking methodological changes, is agreed for these rates. Such a framework should, in addition to several other provisions, put forward into a realistic timeline for the transition process, also considering the current state of financial markets. Once a suitable solution has been identified, authorities could substantially contribute to the transition to the new methodology or reference rate by providing an appropriate legal framework in a timely manner. Such a transition regime would mitigate the operational and legal risks and protect the rights of affected contractual parties in a transparent and predictable manner. Specific legislation may be needed at the national level to define such transitional arrangements and safeguard the continuity of contractual parties' rights and obligations under existing contracts.

C.3.3. French Banking Federation (FBF)

There is a substantial litigation risk which is linked to the renegotiation of existing contracts where the legal consequences are difficult to predict and therefore a transition period is necessary. But such a period of grace is somehow discussable: Firstly a transition might fail because the newly introduced benchmarks wouldn't reflect the abandoned ones properly. Hence, individual contractual modifications are likely to be inevitable. Secondly, there are some disagreements between the involved parties. According to the consultation process which was undertaken by EBF (European Banking Federation), banks agree that no transitory measures are needed in the first place, whereas lawyers welcomed and ask for such measures.

C.3.4. International Capital Markets Association (ICMA)

The legal stand point of the International Capital Markets Association (ICMA) is that market participants will need to look at the specific wording of the terms of the bonds and/or the agreements under which bonds are traded to determine whether the definitions or references to EURIBOR or other affected benchmarks continue to apply under any new calculation methodologies that are finally adopted.

C.4. Legal Questionnaires

In its analysis, the EUR Legal workstream drew on responses to two questionnaires.

4. EUR Outreach Questionnaire - The full questionnaire, which was used as a template letter for circulation to market participants, can be found in the Outreach Appendix below.
5. A questionnaire prepared by the EFMLG Task Force on implementation issues regarding benchmark transition in respect of EURIBOR. The template questionnaire is attached below.

C.4.1. EFMLG Task Force Questionnaire

Please answer the questions below based on the following alternative scenarios and relevant product categories. When drafting your response you may assume that EURIBOR+ as referred to below is a truly new benchmark (draft documents from the MPG are attached below):

- A. Disappearance of the reference rate, calibration not possible (because the issuer is not authorised to issue it anymore) – cessation of current EURIBOR.
- B. Disappearance of some tenors of the reference rate, calibration possible (because from the remaining tenors one can calibrate the discontinued one) – EURIBOR scenario from November 1st 2013.
- C. The calculation of the reference rate is modified – EURIBOR calculation and fixing methodology will be modified migrating to "EURIBOR+".
- D. The calculation of the reference rate remains unaffected ("Scenario B") but a new reference rate ("EURIBOR+") is established in parallel.

The four product categories are:

- over-the-counter (OTC) derivatives;
 - repurchase agreements (repos) , securities lending;
 - floating rate bonds; and
 - loans (including syndicated loans).
1. Please describe your local documentation standards per product in respect of EURIBOR definitions and replacement/fall-back provisions. Please indicate if your standard documentation is either an industry standard type or your in-house standard including which law governs it.

| Definition | Fall-back | Master Agreement / Industry type (e.g. ISDA, LMA) | Tailor – made/ In-house standard | Comments (if any) |
|---------------------|-----------|---|----------------------------------|-------------------|
| OTC | | | | |
| Repos/ SecLending | | | | |
| Floating Rate Bonds | | | | |
| Loans | | | | |

2. Based on your answers above can you please briefly describe the contractual / legal consequences per scenario.

| | Scenario A | B | C | D |
|---------------------|------------|---|---|---|
| OTC | | | | |
| Repos/SecLending | | | | |
| Floating Rate Bonds | | | | |
| Loans | | | | |

3. Do you see any other legal impact (force majeure, breach of contract, frustration) in light of 1 and 2 worth to consider? E.g.
- a. Assuming that EURIBOR and EURIBOR+ run in parallel but have a spread. Would that cause any issues under your local law?
 - b. Should there be a distinction also in respect of the parties to financial contracts or instruments (e.g. consumers, professionals, issuers)?
 - c. Do you see a basis risk (e.g. Loan – Hedge)?
 - d. Other comments

C.5. Allen & Overy Memorandum on Germany

1. Introduction and scope of the memorandum

On 5 February 2014, we have been asked by the chairperson of the legal sub-group of the Market Participants Group (MPG) in charge of continuity of contract issues set-up by the Official Sector Steering Group (OSSG), the latter having been established by the Financial Stability Board (FSB) in relation to the above mentioned Project, to consider in relation to Italian law until 7 February 2014 (COB) the following two questions:

- (a) If the fixing methodology for EURIBOR is significantly altered, are there legal doctrines according to which existing contracts may be flexibly interpreted so as to facilitate contractual continuity (using the common law doctrine of implied terms by way of an example);³⁹ and
- (b) Is legislation desirable to guarantee this kind of contractual continuity and, if so, what would it look like?

In answering these questions, we have confined our review to the civil law of the Republic of Italy presently in force, as currently applied and construed by the courts in Italy. We have not, for the purposes of this memorandum, made any investigations of, and express no view as to, the laws of any jurisdiction other than Italy. Furthermore, in light of the extremely tight deadline, we were not able to perform a full legal research. Hence, our findings are subject to the reservation that a full legal research might result in different findings, even though we do not believe this to be the case.

2. Assumptions

For the purposes of this memorandum, we have made the following assumptions:

- (i) Any agreement containing EURIBOR as a financial benchmark is governed by Italian law with the exclusion of international private law.
- (ii) Any agreement containing EURIBOR as a financial benchmark is not subject to existing statutory or contractual fall-back provisions.⁴⁰
- (iii) The fixing methodology of the EURIBOR is significantly altered, affecting the economic equivalence existing between the parties immediately prior to the introduction of the new EURIBOR.

³⁹ We understand this question to be based on a scenario, where existing contracts, making reference to the EURIBOR, are affected by a significant alteration of the EURIBOR fixing methodology. Alternatively, it would – of course – be possible to apply the new EURIBOR only to new contracts.

⁴⁰ Many contracts contain fall-back provisions dealing with a scenario, where a reference interest rate is no longer published on a particular screen page of a particular information provider, in which case typically quotes will be obtained from a number of banks. In our view, there is no certainty that such clauses would enable an automatic transition from the old EURIBOR to the new EURIBOR.

It should be noted that this memorandum expresses Italian legal concepts in English terms. Such English terms may not be fully identical in their meaning with the corresponding Italian terms.

3. Executive Summary

On the basis of the above [and the reservations set out below], our summary findings are as follows:

- A. While the frustration of contract rules in section 313 German Civil Code would not result in an automatic replacement, they would – in principle and on a case by case basis - allow for an amendment of an existing contract leading to the introduction of the new EURIBOR into the contract and to the payment of a compensation restoring the pre-existing economic equivalence, if such equivalence would be disturbed by introducing the new EURIBOR.
- B. While reliance on certain legal contractual interpretation concepts is technically possible under German law in individual cases, such reliance would necessarily lead to high fragmentation, an increased risk of legal mismatches and increased litigation activity. Hence, it is not desirable to leave the resolution of this issue to individual parties. As a consequence, the best way to introduce the new EURIBOR would be by guaranteeing contract continuity through appropriate legislative action.

These findings are based on the legal considerations set-out in the next paragraph.

4. Continuity of Contracts

4.1 Facts

It must be understood, that a very large number of all sorts of contracts contain a reference to the EURIBOR in order to determine the payment obligation of the debtor. In particular, this is the case with loan agreements, deposits, the terms and conditions of bonds and notes, derivative contracts. These contracts can exist between enterprises or between enterprises and consumers. The parties to such contracts may be easily identifiable or it may be difficult (e.g. if contract positions are traded in a secondary market) or close to impossible (e.g. in case bearer bonds and notes held through multiple layers of depositories) to identify the counterparties to such contracts. The contracts might contain bespoke terms or might follow a defined market standard. The obligation linked to the EURIBOR might be the contractual core obligation (e.g. in the case of an interest rate swap) or it might be an ancillary payment obligation. Finally, it is also frequently the case that one contract making reference to the EURIBOR is just one element in a longer chain of contracts referring to the EURIBOR, where such individual contracts may be governed by different laws (i.e. the laws of Eurozone member states or of non-Eurozone states, typically English law or New York law).

In each of the above cases, the obligation linked to the EURIBOR may be seriously affected, if the existing EURIBOR is discontinued also in relation to existing contracts. Absent a fall-back rule, the parties to the contract or any agent acting for the parties would no longer be able to calculate the precise amount payable under the payment obligation linked to the EURIBOR. It needs to be considered whether the new EURIBOR, using a fixing methodology which is materially altered, would contractually replace the discontinued EURIBOR. It needs to be further considered whether such replacement would give rise to a right of the affected

party to either prematurely terminate the existing contract or to demand an amendment of the agreement restoring the economic equivalence existing prior to such replacement (assuming that the introduction of the new EURIBOR would affect the economic equivalence).

4.2 Legal Analysis

A replacement without any further preconditions would be feasible, if an existing contract could be interpreted in this way. On the other hand, a replacement by way of amendment and adaption of an existing contract would be possible, if the preconditions of the frustration of contract rules set-out in section 313 German Civil Code (Bürgerliches Gesetzbuch - BGB), laid down below, are met. Where the envisaged objective is reachable through an interpretation of the contract, it is not necessary to amend or adapt the contract, i.e. interpretation of a contract prevails over an adaption and amendment of the contract pursuant to section 313 BGB. Hence, first it has to be examined, whether a replacement is possible through an interpretation of the relevant contract.

(a) Contract Interpretation

An interpretation of a contract is performed in accordance with the principles set out in sections 133 and 157 BGB. The standard test to be applied is how a reasonable party could have and should have understood the relevant wording in a contract. The standard test, however, will not work where the contract contains a gap. While in our case no gap existed initially, such gap would be created as a result of a significant alteration of the EURIBOR, disturbing the economic equivalence. In most cases the parties would not have envisaged that the fixing methodology of the EURIBOR could be altered significantly. Hence, an interpretation of the contract will in most cases not be suitable.

However, under German law a gap in an agreement, which exists unintentionally, can be filled by applying a so-called supplementary interpretation of the agreement (ergänzende Vertragsauslegung). In this regard, the hypothetical intentions of the parties at the time of entering into the agreement are decisive to fill the gap by implied terms. The test to be applied is what reasonable parties would have agreed with reference to the gap taking into account principles of good faith. The result of such supplementary interpretation must not be contrary to the principles and the risk distribution stipulated in the contract. However, it is at least questionable whether in the great majority of cases a replacement of the reference to the old EURIBOR by a reference to the new EURIBOR would be possible by means of a supplementary interpretation, if such significant alteration disturbs the economic equivalence pre-existing between the parties. At the time of entering into the contract the parties had referred to a specific interest rate representing a specific economic deal. Had they thought about the disappearance of the EURIBOR reference rate at a later point in time, they probably would have agreed alternative terms to preserve the economic deal and the risk distribution agreed between them. The subsequent automatic adaption of the contract to include a reference to the new EURIBOR without at the same time applying provisions preserving the economic equivalence would in our view be contrary to the existing contract.

(b) Adaption of the contract pursuant to section 313 BGB

Going beyond contract interpretation, an adaption of a contract is possible, where the basis of the contract is seriously disturbed. Under German law the legal principle of "frustration of contract" according to section 313 BGB provides for the adaption of a contract, if the following preconditions for an application of this provision are met:

Both parties have the same understanding in respect of circumstances that are important for the contract and that form the basis of the contract,

such circumstances have changed significantly during the life of the contract;

the parties had not foreseen this change;

one party or both of the parties cannot reasonably be expected to uphold the contract without alteration.

In our view the above mentioned precondition should be met in an number of th scenario described above. From the perspective of the parties the existing EURIBOR forms the basis of the contract, as it is a *conditio sine qua non* for the calculation of the payment obligation of one of the parties. If the fixing methodology is changed significantly affecting the economic equivalence existing between the parties, the basis of the contract has been changed substantially. On the assumption that the contract does not contain fall-back provisions, the parties would not have foreseen this change. It should be noted that an application of section 313 BGB is not possible, where one of the parties has to bear the risk that is now subject to change. Clearly, the fluctuation of the agreed floating rate would have to be borne by the floating rate payer. In our case, however, it cannot not be assumed that the floating rate payer or the fixed rate payer would have to bear the risk of an unexpected and unforeseen alteration of the EURIBOR fixing methodology resulting in a disturbance of the economic equivalence. In such case, it cannot be reasonably expected to uphold the contract without alteration, if adherence would lead to unacceptable results. Taking into account the interests of the parties, subject to all the circumstances of the individual case, it cannot reasonably expected to replace the reference to the old EURIBOR with a reference to the new EURIBOR without at the same time providing for an amendment preserving the economic deal that was struck between the parties. Hence, the introduction of the significantly altered EURIBOR pursuant to section 313 BGB generally should work on a case by case basis.

However, it should be noted that pursuant to section 313 para. 3 BGB, if an adaptation of the contract is not possible or one party cannot reasonably be expected to accept such adaption, the disadvantaged party may revoke the contract, or – if the contract contains continuing obligations - terminate the contract prematurely. When the fixing methodology of the EURIBOR is significantly altered it is not inconceivable that in some cases it will be unavoidable to give the party a right to terminate the contract.

4.3 Practical considerations

As pointed out above, the frustration of contract rules in section 313 German Civil Code would not result in an automatic replacement, but would – in principle - allow for an amendment of an existing contract leading to the introduction of the new EURIBOR into the contract and to the payment of a compensation restoring

- (a) A consistent approach and result would only be achievable where, in case of standardised contracts among enterprises (such as derivatives based on the ISDA Master Agreement), a market organisation (such as ISDA) would introduce all relevant amendments by way of a uniform amendment (e.g. by way of an ISDA protocol).⁴¹ It should be noted, though, that there is no similar uniform amendment mechanism available as far as the German Master Agreement is concerned. This approach, however, may also not work in the case of standardised agreements among enterprises on the one hand and consumers on the other hand. While consistent rules might be introduced by way of revised general business terms, there is a significant risk that such general business term would be tested before the courts. Moreover, in cases where individual contracts are affected, no consistency could be achieved at all, and disagreement about the compensation to be paid might result in frequent litigation.
- (b) Also in cases, where the contract parties cannot be easily identified, in particular in the case of an issue of bearer bonds and notes, which have been placed and are traded in the market, it will be extremely difficult to achieve consistency. As far as bonds and notes are concerned, this is due to the fact that under German law it is not possible to amend the terms and conditions, unless 100 % consent is achieved (in cases where the German Debt Securities Act (“Schuldverschreibungsgesetz”) does not apply) or a 75 % majority is achieved in a bond- or noteholders meeting (in cases where the German Debt Securities Act is applicable). This creates an enormous administrative burden on the issuer and entails the risk that hold-out creditors might challenge the adopted resolutions before court and blackmail the issuer (which, unfortunately, has recently been the case in the German market)
- (c) Finally, in cases of contract chains governed by different national laws (including laws from non-Eurozone states) it cannot be foreseen with certainty, if and how an interaction of contract interpretation rules and/or frustration of contract rules of different national laws in a contract chain (e.g. in case of back-to-back hedging arrangements subject to different laws) would work. As a consequence, the mismatch risk to which parties might be exposed would be increased.

⁴¹ We understand that such an approach is currently discussed for the Asia Pacific Markets by ISDA.

5. Legislation guaranteeing continuity

As the analysis under paragraph 4 has revealed, reliance on contractual interpretation concepts alone will not result in full legal certainty and consistency under German law. As a consequence, it is desirable that legislation guaranteeing contractual continuity shall be introduced.

Provided the national legislator or the European legislator, as the case may be, has the required legislative competence (which we have not reviewed), such legislation should, in our view, stipulate at least the following principles:

- 5.1 Where a contract (including any calculation agency agreement) refers to the EURIBOR as the method to determine a periodic payment in relation to a defined payment period (e.g. 3 months EURIBOR), such reference shall be replaced by a reference to the new EURIBOR as per the beginning of the payment period immediately following the introduction of the new EURIBOR, which is in economic terms the closest resemblance to the original contractual EURIBOR.
- 5.2 A transition provision should deal with the question whether a payment period, to which a EURIBOR reference relates and which has not yet elapsed at the time of introduction of the new EURIBOR, shall be entirely dealt with by the existing EURIBOR reference or whether e.g. a new (short) payment period automatically starts on the business day following the first fixing after the introduction of the new EURIBOR, which would result in a "big bang" and would reduce the arbitrage potential. In such case, the provisions in a contract dealing with the duration of the affected payment period and the corresponding day count fraction would have to be deemed to be amended.
- 5.3 Where a contract refers to the EURIBOR as the method to determine a periodic payment in relation to a defined payment period (e.g. 3 months EURIBOR), the replacement of such EURIBOR by the equivalent new EURIBOR shall not give rise to a right of any party to prematurely terminate the contract or to require the cancellation or the amendment of such contract. However, the right of the parties to cancel, novate or amend the contract by mutual consent shall remain unaffected.
- 5.4 It should be considered whether such legislation should contain a provision to ensure that the economic equivalence existing between the parties prior to the replacement of the EURIBOR (also in light of hedging arrangements) shall be maintained and how this can be achieved.
- 5.5 As far as bonds and notes are concerned, upon the replacement of the EURIBOR the terms and conditions of the bonds or notes issued under a particular ISIN shall be deemed to be amended accordingly without any need to exchange global instruments or definitive instruments (each of which shall remain in full force and effect) or to call a bond- or noteholders meeting. However, the issuer shall publish a notice setting out the affected ISIN and the amended wording of affected provisions contained in the terms and conditions of the bonds or notes.

- 5.6 Even if the EURIBOR transition is done by way of legislation, it cannot be avoided that there is room for dispute resulting in legislation. In order to ensure consistency as much as possible also in this respect, litigation should be concentrated at a specific court in just one venue in each jurisdiction, which preferably should be located in the financial centre of such jurisdiction.

6. Reliance

This memorandum is submitted solely to the FSB and solely for FSB's own benefit in relation to the Project. It must not be used or relied upon by any other person or for any other purpose. This memorandum is confidential. Except with our prior written consent, it is not to be transmitted or disclosed to any other person or used or relied upon by any such person for any other purpose. We agree that copies of this memorandum may be made available to the members of the OSSC and the MPG for purposed of the Project.

Allen & Overy LLP

C.6. Allen & Overy Memorandum on Italy

1. Introduction and scope of the memorandum

On 5 February 2014, we have been asked by the chairperson of the legal sub-group of the Market Participants Group (MPS) in charge of continuity of contract issues set-up by the Official Sector Steering Group (OSSG), the latter having been established by the Financial Stability Board (FSB) in relation to the above mentioned Project, to consider in relation to Italian law until 7 February 2014 (COB) the following two questions:

- (a) If the fixing methodology for EURIBOR is significantly altered, are there legal doctrines according to which existing contracts may be flexibly interpreted so as to facilitate contractual continuity (using the common law doctrine of implied terms by way of an example); and
- (b) Is legislation desirable to guarantee this kind of contractual continuity and, if so, what would it look like?

In answering these questions, we have confined our review to the civil law of the Republic of Italy presently in force, as currently applied and construed by the courts in Italy. We have not, for the purposes of this memorandum, made any investigations of, and express no view as to, the laws of any jurisdiction other than Italy. Furthermore, in light of the extremely tight deadline, we were not able to perform a full legal research. Hence, our findings are subject to the reservation that a full legal research might result in different findings, even though we do not believe this to be the case.

2. Assumptions

For the purposes of this memorandum, we have made the following assumptions:

- (i) Any agreement containing EURIBOR as a financial benchmark is governed by Italian law with the exclusion of international private law.
- (ii) Any agreement containing EURIBOR as a financial benchmark is not subject to existing statutory or contractual fall-back provisions.
- (iii) The fixing methodology of the EURIBOR is significantly altered, affecting the economic equivalence existing between the parties immediately prior to the introduction of the new EURIBOR.

It should be noted that this memorandum expresses Italian legal concepts in English terms. Such English terms may not be fully identical in their meaning with the corresponding Italian terms.

2. CONTINUITY OF CONTRACTS

2.1 Facts

It must be understood, that a very large number of all sorts of contracts contain a reference to the EURIBOR in order to determine the payment obligation of the debtor. In particular, this is the case with loan agreements, deposits, the terms and conditions of bonds and notes, derivative contracts. These contracts can exist between enterprises or between enterprises and consumers. The parties to such contracts may be easily identifiable or it may be difficult (e.g. if contract positions are traded in a secondary market) or close to impossible (e.g. in case bearer bonds and notes held through multiple layers of depositories) to identify the counterparties to such contracts. The contracts might contain bespoke terms or might follow a defined market standard. The obligation linked to the EURIBOR might be the contractual core obligation (e.g. in the case of an interest rate swap) or it might be an ancillary payment obligation. Finally, it is also frequently the case that one contract making reference to the EURIBOR is just one element in a longer chain of contracts referring to the EURIBOR, where such individual contracts may be governed by different laws (i.e. the laws of Eurozone member states or of non-Eurozone states, typically English law or New York law).

In each of the above cases, the obligation linked to the EURIBOR may be seriously affected, if the existing EURIBOR is discontinued. Absent a fall-back rule, the parties to the contract or any agent acting for the parties would have to face the question of whether reference to EURIBOR can be considered as a reference to the new EURIBOR. It needs to be considered whether the new EURIBOR, using a fixing methodology which is materially altered, would contractually replace the discontinued EURIBOR. It needs to be further considered whether such replacement would give rise to a right of the affected party to either prematurely terminate the existing contract or to demand an amendment of the agreement restoring the economic equivalence existing prior to such replacement (assuming that the introduction of the new EURIBOR would affect the economic equivalence).

2.2 Legal considerations

Under the Italian Civil Code (Article 1467), if the performance by one of the parties in a contract becomes substantially more onerous as a result of unpredictable and unforeseeable circumstances, then that party is entitled to terminate the contract unless the counterparty offers to amend the contract in order to reinstate the economic equivalence of the two performances. As a result, the amendment of EURIBOR could either (a) if not causing a substantial alteration of the parties performances, be effected with no right to terminate the contract or (b) if causing a substantial alteration of one of the parties performances, would not cause termination if the other party is willing to re-establish economic equivalence. However, reliance on these legal concepts would have numerous practical disadvantages:

- (a) A consistent approach and result would only be achievable where, in case of standardised contracts among enterprises (such as derivatives based on the ISDA Master Agreement), a market organisation (such as ISDA) would introduce all relevant amendments by way of a uniform amendment (e.g. by way of an ISDA protocol). This approach, however, may not work in the case of standardised agreements among enterprises on the one hand and consumers on the other

hand. While consistent rules might be introduced by way of revised general business terms, there is a significant risk that such general business term would be tested before the courts. Moreover, in cases where individual contracts are affected, no consistency could be achieved at all, and disagreement about the compensation to be paid might result in frequent litigation.

- (b) Also in cases, where the contract parties cannot be easily identified, in particular in the case of bonds and notes, it will be extremely difficult to achieve consistency. As far as bonds and notes are concerned, this is due to the fact that under Italian law it is not possible to amend the terms and conditions, unless a consent by a qualified majority is achieved in a bond - or noteholders meeting. This creates an enormous administrative burden on the issuer and entails the risk that hold-out creditors might challenge the adopted resolutions before courts.
- (c) Finally, in cases of contract chains governed by different national laws (including laws from non-Eurozone states) it cannot be foreseen with certainty, if and how an interaction of different national laws in a contract chain (e.g. back-to-back hedging arrangements subject to different laws) would work. As a consequence, the mismatch risk to which parties might be exposed would be increased.

3. LEGISLATION GUARANTEEING CONTINUITY

As the analysis above has revealed, reliance on contractual interpretation concepts alone will not result in full legal certainty under Italian law. As a consequence, it is desirable that legislation guaranteeing contractual continuity shall be introduced.

Provided the national legislator or the European legislator, as the case may be, has the required legislative competence, such legislation should, in our view, stipulate at least the following principles:

- 3.1 Where a contract (including any calculation agency agreement) refers to the EURIBOR as the method to determine a periodic payment in relation to a defined payment period (e.g. 3 months EURIBOR), such reference shall be replaced by a reference to the new EURIBOR as per the beginning of the period immediately following the introduction of the new EURIBOR, which is in economic terms the closest resemblance to the original contractual EURIBOR.
- 3.2 A transition provision should deal with the question whether a payment period, to which a EURIBOR reference relates and which has not yet elapsed at the time of introduction of the new EURIBOR, shall be entirely dealt with by the existing EURIBOR reference or whether e.g. a new (short) payment period automatically starts on the business day following the first fixing after the introduction of the new EURIBOR, which would result in a "big bang" and would reduce the arbitrage potential.
- 3.3 Where a contract refers to the EURIBOR as the method to determine a periodic payment in relation to a defined payment period (e.g. 3 months EURIBOR), the replacement of such EURIBOR by the equivalent new EURIBOR shall not give rise to a right of any party to prematurely terminate the contract or to require the cancellation

or the amendment of such contract including any right of termination arising out of Article 1467 of the Italian Civil Code. However, the right of the parties to cancel, novate or amend the contract by mutual consent shall remain unaffected.

- 3.4 As far as bonds and notes are concerned, upon the replacement of the EURIBOR the terms and conditions of the bonds or notes issued under a particular ISIN shall be deemed to be amended accordingly without any need to exchange global instruments or definitive instruments (each of which shall remain in full force and effect) or to call a bond - or noteholders meeting. However, the issuer shall publish a notice setting out the affected ISIN and the amended wording of affected provisions contained in the terms and conditions of the bonds or notes.

4. RELIANCE

This memorandum is submitted solely to the FSB and solely for FSB's own benefit in relation to the Project. It must not be used or relied upon by any other person or for any other purpose. This memorandum is confidential. Except with our prior written consent, it is not to be transmitted or disclosed to any other person or used or relied upon by any such person for any other purpose. We agree that copies of this memorandum may be made available to the members of the OSSC and the Market Participants Group for purposes of the Project.

Allen & Overy LLP

Appendix D. Outreach to Market Participants

D.1. List of participants

| | Companies | Associations |
|---|---|---|
| Banks | | |
| Insurance Companies | <ul style="list-style-type: none"> • Aegon • Allianz • Aviva • AXA • Generali • Munich Re • Zurich | <ul style="list-style-type: none"> • Insurance Europe • CFO Forum. |
| Asset Managers | <ul style="list-style-type: none"> • AXA IM • State Street | <ul style="list-style-type: none"> • EFAMA. |
| Corporate Companies / Treasurers | <ul style="list-style-type: none"> • Bayer AG • Daimler • MAN AG • SAP • Volkswagen AG • xxx (prefers to remain anonymous). | <ul style="list-style-type: none"> • DAI (Deutsches Aktieninstitut) • EACT (European Association of Corporate Treasurers) |

D.2. Full questionnaire

Full questionnaire (or script if conducted by phone) sent to participants

Dear Market Participant:

The Financial Stability Board (FSB) has established a high-level Official Sector Steering Group (OSSG) of regulators and central banks, with responsibility for coordinating reviews of existing interest rate benchmarks. The OSSG has established a Market Participants Group (MPG) charged with examining the feasibility and viability of adopting additional reference rates and potential transition issues.

For more information about these efforts and the membership of the OSSG and MPG, please see: http://www.financialstabilityboard.org/publications/r_130829f.pdf

The MPG has concluded its recommendations to the OSSG would benefit from direct outreach to a diverse set of market participants, organized by region. We ask that you response to the questions in this short questionnaire to help inform the MPG about the views of market users on additional reference rates and potential transition issues.

CURRENT INDICES

Question 1: Please list the EUR Benchmarks currently used by your organization for what products and what tenor. How relevant is Euribor in particular in relative terms?

Question 2: Please specify if you are trading the index itself or if you are only investing (ex-floating rate notes) or exposed (ex through derivatives positions) to linked products

POTENTIAL CANDIDATES

Question 3: Potential candidates identified as new euro short term benchmarks are:

For Overnight rate : EONIA

First feedback from market participants is that it is transaction based, has a solid fixing and is widely utilized amongst users.

Do you share the same view?

For 1W to 3M :

First feedback from market participants is that Eurepo and other parameters based on repos does not seem suitable as it is they are a rates based on secured transactions and relying on EUR government debt as collateral which is not seen as homogeneous, in terms of credit quality, across the Euro zone.

Instead at this stage potential and promising candidates envisaged are a new version of Euribor based on real transactions and extended to a wider base of instruments and investors, and OIS, as it is. On the opposite side, OIS seems to be a promising candidate as based on a very liquid market, trade on several Multi Trading Platforms.

Do you share the same views?

How do you see the fact that rates based on OIS do not contain liquidity and credit spreads, but are pure rates, or better expectations of the future path of EONIA, not containing the actual term banks' funding level?

Are you currently using those OIS based indices?

Or make alternative proposals?

Over 3M:

First feedback from market still ongoing

Do you have views to share in that respect?

How important are indices with maturities over 3M for your activity?

Are these new indices already existing?

Are you currently using those OIS based indices?

Moving to transaction based indices (both up to 3M and above 3M) could in line of principle increase the daily volatility of the benchmarks. Is something to be avoided (e.g via statistical smoothing techniques) or do you think it can be managed by users?

Moving to transaction based indices could in line of principle increase the daily volatility of the benchmarks, due to the fact that unavailability of data from a country closed for a holiday or temporary reductions/increases in volumes in a market segment whose rate is systematically lower (eg short term paper vs interbank) or higher could alter the average. Is this something to be avoided (e.g. via statistical smoothing techniques) or can it be managed?

OTHER BENCHMARKS

Question 4: If not developed in the above section, are there other potential Benchmarks that could be replacement Benchmarks if further market evolution were to occur or if certain actions were taken to make this particular Benchmark more useful or viable (including, a minimum number of contributors, the fact that it is or not transaction based)

IDEAL BENCHMARK

Question 5: Please specify the criterion this index shall respect for it to be usable (data source, pricing specificities, market makers...)

LEGAL

Question 6: What will be the potential legal effects in your jurisdiction when benchmark methodologies are changed?

Question 7: Please indicate what legal issues might arise in existing contracts if a switch to new reference is implemented?

TRANSITION

Question 8: What issues will arise in transitioning from a legacy Benchmark to a replacement Benchmark. Should we keep two Benchmarks, leaving time for the legacy Benchmark related trades to mature?

Question 9: What type of constraints would prevent you from changing the Index (accounting, legal...)

Question 10: Could you detail any specific case where you could not change index and assess the time it would take to operate a full switch?

Question 11: Could you describe what you think would be an ideal transition methodology?

Question 12: Hedge ability: Please indicate possible issues when hedging certain exposures if hedging instruments would refer to benchmarks with different implied credit quality than existing ones.

Question 13: Hedge accounting: Please indicate possible issues in hedge accounting (e.g. hedge effectiveness) if there would be the need to switch to alternative reference rates also in existing contracts.

Question 14: Auditors / Tax: Please indicate what issues would arise with regard to tax and auditing if a switch to new reference rates in existing contracts would lead to (even slightly) different MTM valuations.

Question 15: IT / Systems: Please indicate what issues would arise with regard to your Treasury Systems if a transition to new reference rates would be mandatory also for existing contracts. Please also indicate how long such a (technical) transition would last.

OTHER

Question 16: Any other remark

Appendix E. Market Footprint Sources and Assumption

[See Below]



cutting through complexity

MPG – Accounting and Tax Topics Overview

Preliminary potential impact overview

25 February 2014

DRAFT

Disclaimer

Our work commenced on 10 February 2014 and our fieldwork was completed on 24 February 2014. We have not undertaken to update our report for events or circumstances arising after that date.

The scope of our work is to assist the Market Participants Group (“MPG”) by providing information about the accounting and tax implications of changes in reference rates or changes in fixing methods for existing reference rates.

This scope was focused on those accounting and tax implications identified by the MPG and that have been considered relevant for the MPG. Our work did not include an assessment of whether this scope is indeed sufficient as a basis for your decisions. The procedures carried out by us may not necessarily have covered all issues which may be relevant to your decision. Had we performed additional analysis, other matters might have come to our attention that would have been reported to you.

You should not rely on our work and our report as being comprehensive as we may not have become aware of all facts or information that you may regard as relevant. We accept no responsibility for matters not covered by our report or omitted due to the limited nature of our work.

In preparing our report, our primary source has been information and representations provided by the MPG. We do not accept responsibility for such information which remains the sole responsibility of the MPG.

We have satisfied ourselves, so far as possible, that the information presented in our report is consistent with other information which was made available to us by the MPG in the course of our work. We have not, however, sought to establish the reliability of the sources by reference to other evidence. We draw your attention to the significant limitations in the information available to us at the date of this document. Our work has been based on the relevant information obtained from the MPG, namely “MPG Interim Report”, “Transition Meeting slide Pack 29 Jan 14” and “FSB Press Release status Update”.

This engagement is not an assurance engagement conducted in accordance with any general accepted assurance standards and, consequently, no assurance opinion is expressed.

The contents of our report have not been reviewed in detail by members of the MPG who have confirmed in writing the factual accuracy of this report.

We accept no responsibility or liability for the findings or reports of legal and other professional advisors even though we have referred to their findings and/or reports in our report.

We have not performed any legal or compliance analysis, which has been carried out by another advisor.

- **Context overview**
- Potential accounting issues
- Potential tax issues
- Annexes

Context overview

Introduction and objectives

Introduction

We were informed that the Financial Stability Board (FSB) has been tasked by the G20 to promote consistency in the assessments on the processes of benchmark rates and to ensure that national/regional authorities adopt a coordinated approach.

To this end, the FSB has established a high-level Official Sector Steering Group (OSSG) of regulators and central banks. The OSSG is responsible for coordinating and maintaining the consistency of reviews of existing interest rate benchmarks and for guiding the work of a Market Participants Group which will examine the feasibility and viability of adopting additional reference rates and potential transition issues.

As requested by the FSB, the OSSG is establishing a Market Participants Group (MPG). The MPG is chaired by Darrell Duffie, Professor of Finance at Stanford University; the terms of reference for the group fall into two main areas:

- **proposing options for robust reference interest rates** that could serve as potential alternatives to the more widely-used, existing benchmark rates. The proposed rates should be consistent with the IOSCO Principles; and
- **proposing strategies** (testing, protocols, and timing) **for any transition to new reference rates and for dealing with legacy contracts in the national or regional currency**. This should include identifying problems that could arise in moving to new benchmark rates, and how these can be addressed.

We were informed that **the MPG was asked to provide an interim report and draft recommendations to the OSSG by the end of December 2013 and its final report to the OSSG by mid-March 2014.**

Objectives

Within this framework, **we have been asked to assist the MPG** by providing information **about the accounting and tax implications of changes in reference rates or changes in fixing methods for existing reference rates.**

Context overview

Possible scenarios

During the meeting we had on 10 February 2014, we were also informed that **four possible scenarios** have to be considered by the MPG at this preliminary stage, as described below:

| | |
|--|---|
| A <i>SEAMLESS</i> | Transition to new benchmark rates would be managed as a change in the calculation methodology, without significant emphasis or announcement. |
| B <i>SUCCESSOR RATE</i> | Transition to new benchmark rates would be announced and considered as replacements of the old ones and no parallel phase would be scheduled. |
| C <i>PARALLEL AND CUT OVER</i> | Transition would consider a period during which both new benchmark rates and old ones would be published and used by market participants; at the end of that period, a cutover phase would be put in place similarly to the “Successor Rate” described above. |
| D <i>MARKET LED</i> | The transition period would be driven by market participants and practices; as no hard deadline would be set up, the extension and relevance of the parallel phase would be defined by market practices. |

We were also informed that another workstream is assessing the feasibility of the above described scenarios and, as a consequence, such assessment is out of the scope of this report.

Agenda

- Context overview
- **Potential accounting issues**
- Potential tax issues
- Annexes

Potential accounting issues

Introduction

Under IFRS, the interest rate benchmark could significantly impact the financial statements, as it is referred to in several standards.

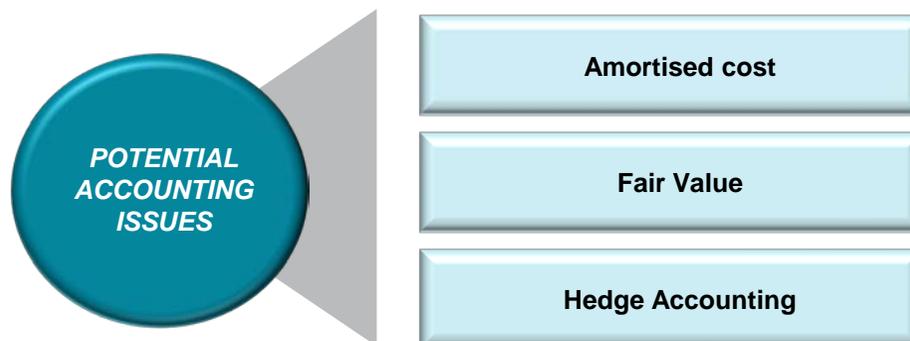
In more detail, IFRS emphasizes the relevance of “fair value” and “current value” both for the measurement of assets and liabilities and for disclosure purposes.

Furthermore, financial assets and liabilities would reasonably be the items most significantly affected by the transition.

Under IAS 39, financial assets are recognised and measured as follows:

- Loans and Receivables, Held to Maturity and liabilities that not meet the definition of derivatives and are not held for trading are recognised and measured at amortised cost, calculated under the effective interest method;
- Available for Sale financial assets are measured at their fair value with changes recognised in other comprehensive income;
- Held for Trading assets or liabilities, assets or liabilities recognised for under the Fair Value Option and derivative financial instruments are accounted for at their fair value with changes recognised through profit or loss.

Relevant disclosure about the fair value of assets and liabilities is required under IFRS.





Amortised cost

Fair Value

Hedge Accounting

Assets and liabilities measured at **amortised cost** calculated under the effective interest method can be either at a fixed interest rate or indexed to a floating interest rate.

- For floating-rate financial assets and liabilities, periodic re-estimation of cash flows to reflect movements in market rates of interest alters the effective interest rate. If a floating-rate financial instrument is initially recognised at an amount equal to the principal receivable or payable on maturity, re-estimating the future interest payments normally has no significant effect on the carrying amount of the asset or liability. Therefore, in such cases, for practical reasons the carrying amount of a floating-rate instrument would not generally need to be adjusted at each repricing date because the impact would not generally be significant. In this case, interest income or expense is recognised based on the current market rate.
- For a floating-rate financial asset or financial liability that is initially recognised at a discount or premium, the interest income or expense is recognised based on the current market rate plus or minus amortisation or growth of the discount or premium.



As a consequence, no significant accounting impact is expected for benchmark rate transition on amortised cost financial instruments. However, it could be more difficult to manage a scenario in which different products are indexed to different benchmarks.



Amortised cost

Fair Value

Hedge Accounting

Fair Value Measurement and Disclosure

IFRS 13 is to be applied for annual periods beginning on or after 1 January 2013 and it explains how to measure fair value for financial reporting.

IFRS 13 defines “**fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date (i.e. an exit price)**”.

That definition of fair value emphasises that fair value is a market-based measurement, not an entity-specific measurement. When measuring fair value, an entity uses the assumptions that market participants would use when pricing the asset or liability under current market conditions, including assumptions about risk. As a result, an entity’s intention to hold an asset or to settle or otherwise fulfil a liability is not relevant when measuring fair value.

Under the framework set up by IFRS 13, when a price for an identical asset or liability is not observable, an entity measures fair value using another valuation technique that maximises the use of relevant *observable inputs and minimises the use of unobservable inputs*. *Because fair value is a market-based measurement, it is measured using the assumptions that market participants would use when pricing the asset or liability, including assumptions about risk*. As a result, an entity’s intention to hold an asset or to settle or otherwise fulfil a liability is not relevant when measuring fair value.

Moreover, under IFRS 13, an entity shall measure the fair value of an asset or a liability using the assumptions that market participants would use when pricing the asset or liability, assuming that market participants act in their economic best interest.

In more detail, valuation techniques used to measure fair value shall be applied consistently. However, a change in a valuation technique or its application (e.g., a change in its weighting when multiple valuation techniques are used or a change in an adjustment applied to a valuation technique) is appropriate if the change results in a measurement that is equally or more representative of fair value in the circumstances. That might be the case if, for example, any of the following events take place:

- new markets develop;
- new information becomes available;
- information previously used is no longer available;
- valuation techniques improve;
- market conditions change.

Fair Value Measurement

Revisions resulting from a change in the valuation technique or its application shall be accounted for as a change in accounting estimates in accordance with IAS 8. However, the disclosures in IAS 8 for a change in accounting estimates are not required for revisions resulting from a change in a valuation technique or its application.



As a consequence, scenarios that consider valuation techniques adopting different input data for similar financial assets or liabilities are unlikely to satisfy all IFRS 13 requirements.

Furthermore, adopting different input data for similar financial assets or liabilities could result in economic effect in the case of early termination or settlement of the financial asset or liability.

Fair Value Disclosure

Under IFRS, significant disclosures about the fair value of assets and liabilities shall be provided in the notes to financial statements, even if such assets or liabilities are not measured at fair value.



As a consequence, the transition could result in a more complex process for preparing the required disclosure and with pros and cons similar to those expected for fair value measurement.

Similar conclusions may be reached under US GAAP due to convergence between IFRS and US GAAP on such topic



Under the fair value hedge accounting model

- The gain or loss from re-measuring the hedging instrument at fair value shall be recognised in profit or loss.
- The gain or loss on the hedged item attributable to the hedged risk shall adjust the carrying amount of the hedged item and be recognised in profit or loss, even if the hedged item is otherwise measured at cost.

As all changes in fair value due to the hedged risks would be recognised in profit or loss is usual and changes in the benchmark would impact as changes in curves usually do, the impact due to the changes in the benchmark rate is expected to be mitigated in profit or loss by the economic effect generated by the hedging instrument.

However, in certain scenarios, mismatches and inconsistencies could result in measuring different hedge items and/or hedging instruments with different curves and more ineffectiveness of the hedge relationships could arise. Moreover, specific disclosure about this fact should be provided to financial statements' users as well as further disclosure to explain management risk policies and procedures (as required by IFRS 7).

Under the cash flow hedge accounting model

- The portion of the gain or loss on the hedging instrument that is determined to be an effective hedge shall be recognised in other comprehensive income.
- The ineffective portion of the gain or loss on the hedging instrument shall be recognised in profit or loss.

Even if the re-measurement of the hedging instrument due to the changes in the benchmark rate is expected to be consistent with the effectiveness assessment, in certain scenarios, mismatches and inconsistencies could result from measuring different hedge items and/or hedging instruments with different curves and more ineffectiveness of the hedge relationships could arise. Moreover, specific disclosure about this fact should be provided to financial statements' users as well as further disclosure to explain management risk policies and procedures (as required by IFRS 7).

Potential accounting issues

Comparison drivers



- Amortised cost
- Fair Value
- Hedge Accounting

| | Seamless | Successor Rate | Parallel and cutover | Market led |
|--|----------|----------------|----------------------|------------|
| Amortised cost | Green | Green | Yellow | Yellow |
| Fair Value (Active market) | Green | Yellow | Red | Red |
| Fair Value (Valuation based on valuation techniques) | Green | Yellow | Red | Red |
| Hedge Accounting (Fair Value Hedge) | Green | Yellow | Red | Red |
| Hedge accounting (Cash Flow Hedge) | Green | Yellow | Red | Red |

● No significant accounting issues are expected
 ● Significant accounting issues are possible
 ● Significant accounting issues are highly probable

Agenda

- Contest overview
- Potential accounting issues
- **Potential tax issues**
- Annexes

Potential tax issues

The comments below summarise the potential impacts for all the tax jurisdictions involved, except where indicated otherwise (the US, the UK, France, Germany and Italy). For the specific comments raised with reference to each jurisdiction and for each of the scenarios proposed, please see the answers given to the attached tax questionnaire.

All the comments are raised on the basis of the current tax legislation and assuming that the tax legislator does not adopt specific rules governing the effects arising from the change in the benchmark rates.

In general terms, from a tax perspective, the higher or lower expense or income taken to profit or loss deriving from a change in the benchmark rates, will have an impact on the tax year when it is actually registered, in accordance with the relevant accounting accruals principle, and ordinary tax rules apply (i.e., such as those governing the deductibility of interest expenses and those related to the taxation of interest income), except where a specific tax rule states otherwise.

If the higher or lower income or expense arising from the change in the benchmark rates are recognised under equity (OCI), the taxation is consequently deferred, giving rise to DTA or DTL.

For Italy (depending on the financial instruments involved), the UK and the US, the amounts charged to OCI can have an effect on the current taxes.

However, the UK legislation will be reviewed shortly, so that only amounts charged to profit or loss would be subject to current taxation.

Agenda

- Contest overview
- Potential accounting issues
- Potential tax issues
- **Annexes**

Annex 1

Tax Questionnaire

Potential Tax Issues

Tax Questionnaire

| |  |  |  |  |  |  DRAFT |
|---|--|--|--|---|--|--|
| Interest calculation | From a tax perspective, the higher or lower amount of the interest income or expense charged to the profit or loss will have an impact on the current taxes only. In particular, the ordinary rules governing the deductibility of interest expenses and those related to taxation of the interest income will apply. | | From a tax perspective, if an instrument refers to the benchmark rate, and the benchmark rate changes, the FMV of the instrument will change. This will not impact the timing (e.g., mark to market, accrual, etc.) or geography (e.g., profit or loss, OCI, etc.) of gain/loss recognition. | From a tax perspective, the higher or lower amount of the interest income or expense charged to the profit or loss will have an impact on the current taxes only. In particular, the ordinary rules governing the deductibility of interest expenses and those related to taxation of the interest income will apply. | The new benchmark rate should only have an impact on the current taxes since, as a general principle, interest is taxed and deductible on an accruals basis (no deferred taxation is recognised either from local French GAAP and French tax perspectives). General taxation rules should apply. However, one may imagine that the French tax authorities may adopt specific tax rules to allow a staggering of the tax effect of the new benchmark. | From a tax perspective and depending on the position taken under a financial instrument issued (investor / issuer), the higher or lower amount of the interest income or expense charged to profit or loss will have impact on the current taxes only. In particular, the ordinary rules governing the deductibility of interest expense and those related to the taxation of interest income will apply. |
| Amortised cost | From a tax perspective, no significant issues arise. | | | | From a tax perspective, no significant issues should arise. | From a tax perspective, no significant issues should arise since, under German tax accounting principles, changes in the benchmark (apart from a current-value depreciation following particular rules) should not affect the principle recognition at historical acquisition costs. |
| Fair Value (Active market) | From a tax perspective, the amounts charged to profit or loss impact on the current taxes, and are taxable or deductible in accordance with the applicable ordinary rules. The amounts charged to OCI, increasing or decreasing equity, impact on the deferred taxation (DTA or DTL) only. | In general, Spanish taxation rules follow the applicable accounting treatment under Spanish GAAP, unless a specific tax rule provides otherwise. In principle, there is no specific tax rule governing this issue in the Spanish tax Law and, therefore, the higher or lower expense or income brought to profit or loss deriving from a change in the benchmark rate, will have an impact on the tax year when it is actually registered, in accordance with the accounting accruals principle. On the other hand, if such amounts were to be recognised under equity, the taxation is consequently deferred, giving rise to DTA or DTL, as the case may be. As a conclusion, the actual or deferred taxation will depend on whether the amount is recognised under profit or loss or equity as per Spanish GAAP. | | Under current UK tax law, amounts are taxed currently whether brought to profit or loss or to OCI. However, this aspect of the law is currently being reviewed and may well change within the next 1-2 years so that only amounts charged to P&L would be subject to current taxation. | From a tax perspective, changes in the fair market value of the instruments should generally be subject to taxation, as MTM principle applies for instruments traded on organised markets (conversely for OTC instruments, unrealised profits are generally taxable only at the termination of the contract - specific provisions apply to credit institutions). | Apart from the impact on current taxes (see above) and the impact on (existing) deferred taxes (caused by different valuations under local GAAP and German tax accounting rules) caused by the changes in benchmark rates, changes in fair value measurement should leave tax positions unaffected (in principle, recognition at historical acquisition costs). Special rules may apply for regulated financial institutions. |
| Fair Value (Valuation based on valuation techniques) | From a tax perspective, please see the comments raised above (see issue no. 3). | | | From a tax perspective, please see the comments raised above (see issue no. 3). | Please see our comments above for issue no. 3. | In principle, the same rules as those stated above under for issue no. 3 should apply. |
| Hedge Accounting (Fair Value Hedge) | From a tax perspective, the amounts arising from the adoption of the new benchmark rate can impact both the current and the deferred taxation, depending on whether the related amounts are charged to profit or loss or to OCI. The taxation or the deductibility of these amounts will follow the applicable ordinary tax rules. | | | | From a tax perspective, the amounts arising from the adoption of the new benchmark rate should only impact the current taxation depending on the type of hedging instruments. Ordinary taxation rules should apply. | |
| Hedge Accounting (Cash Flow Hedge) | | | From a tax perspective, if an instrument refers to the benchmark rate, and the benchmark rate changes, the FMV of the instrument will change. This will not impact the characterisation of the instruments as part of a hedging transaction. | See above | From a tax perspective, the amounts arising from the adoption of the new benchmark rate should only impact the current taxation depending on the type of hedging instruments. Ordinary taxation rules should apply. | In principle, impacts triggered by the adoption of new benchmark rates on existing hedging relationships may also impact the German tax position. Depending on the position taken under a financial instrument issued (investor / issuer), the amounts arising from the adoption of the new benchmark rate can impact both the current and the (existing effects of) deferred taxation. The taxation or the deductibility of these amounts will follow the applicable ordinary German tax rules. |
| Hedge Accounting (National GAAP) | Italian GAAP require measuring hedging derivatives in accordance with the accounting treatment adopted for the hedged item (cost or fair value). When the hedged item is measured at fair value, changes in the hedging instrument fair value are also recognised in the profit or loss. | | | | French GAAP requires measuring hedging derivatives in accordance with the accounting treatment adopted for the hedged item (cost or fair value). | |



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Section 1 | Summary perspectives

Euro Overview – EURIBOR

| Asset class | | Outstanding volume (\$ BN) | % EURIBOR related | % non-domestic | O/n | 1w | 1m | 2m | 3m | 6m | 12m |
|--------------------------------|--|----------------------------|-------------------|----------------|-----|----|--------|----|--------|--------|--------|
| Level 1 | Level 2 | | | | | | | | | | |
| Loans | Syndicated loans ¹ | 535 | 90% | 12% | | | | | Medium | Medium | |
| | Corporate loans (bilateral) ¹ | 4,322 | 60% | Low | | | | | High | High | |
| | SME loans | 1,518 | 60% | Low | | | Medium | | Medium | Low | |
| | CRE/Commercial mortgages ² | - | 60% | Low | | | Medium | | Medium | Low | |
| | Retail mortgages | 5,073 | 28% | Low | | | | | Medium | Medium | Medium |
| | Consumer loans | 800 | Low | Low | | | Low | | | | |
| | Other Loans to Households | 1082 | Low | Low | | | Low | | | | |
| Bonds | Floating/Variable Rate Notes | 2,645 | 70% | 14% | | | Low | | High | Medium | Low |
| | Covered Bonds | 2,557 | 23% | Low | | | Low | | Medium | Medium | Low |
| Securitisation | RMBS | 952 | 100% | 6% | | | Low | | Medium | | |
| | CMBS | 107 | 100% | 0% | | | | | Medium | | |
| | ABS | 197 | 91% | 10% | | | Medium | | Low | Low | |
| | CDO | 165 | 78% | 78% | | | | | Medium | Medium | |
| OTC | IR Swaps | 137,553 | High | Low | | | High | | High | High | Medium |
| Derivatives | FRAs | 25,559 | High | Low | | | High | | High | High | |
| | IR Options | 24,249 | High | Low | | | High | | High | High | |
| | X-currency swaps | 9,731 | High | Low | | | High | | High | High | |
| | ETD | IR Options | 12,439 | 100% | Low | | | | | High | |
| Derivatives | IR Futures | 4,905 | 100% | Low | | | | | High | | |
| Deposits | Retail deposits | 8,102 | Low | Low | | | | | | | |
| | Corporate deposits | 2,336 | Medium | Low | | | Medium | | Medium | | |
| | SME deposits | | Medium | Low | | | Medium | | Medium | | |
| Mutual funds | Money market funds | TBC | Indirect | | | | | | | | |
| | Bank loan funds | TBC | Indirect | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | | | |
| | Discount rates | | | | | | | | | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Significant overlap exists between Syndicated loans and Corporate business loans

2. CRE/Commercial mortgages included in Corporate and SME loans

EURIBOR contract maturity by asset class

| Asset class | | Outstanding volume (\$ BN) | % EURIBOR related | % Callable | % roll-of after x years | | | | | | | |
|-----------------------------------|---------------------------------------|----------------------------|-------------------|------------|-------------------------|-----|------|------|------|------|------|------|
| Level 1 | Level 2 | | | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| Loans | Syndicated loans | 535 | 90% | | 18% | 45% | 69% | 89% | 92% | 93% | 97% | 100% |
| | Corporate loans (bilateral) | 4,322 | 60% | | 25% | | | 42% | | | | |
| | SME loans | 1,518 | 60% | | | | | | | | | |
| | CRE/Commercial mortgages ² | - | 60% | | | | | | | | | |
| | Retail mortgages | 5,073 | 28% | | | | | | | | | |
| | Consumer loans | 800 | Low | | | | | | | | | |
| | Other Loans to Households | 1082 | Low | | | | | | | | | |
| Bonds | Floating/Variable Rate Notes | 2,645 | 70% | 10% | 23% | 44% | 59% | 76% | 81% | 84% | 87% | 89% |
| | Covered Bonds | 2,557 | 23% | | | | | | | | | |
| Securitisation¹ | RMBS | 952 | 100% | 63% | 0% | 0% | 1% | 1% | 2% | 2% | 5% | 32% |
| | CMBS | 107 | 100% | 55% | 4% | 10% | 16% | 37% | 53% | 66% | 76% | 86% |
| | ABS | 197 | 91% | 49% | 3% | 7% | 13% | 19% | 27% | 42% | 63% | 82% |
| | CDO | 165 | 78% | | | | | | | | | |
| OTC derivatives | IR Swaps | 137,553 | High | | 18% | 33% | 44% | 62% | 72% | 81% | 93% | 98% |
| | FRAs | 25,559 | High | | 90% | 99% | 100% | 100% | 100% | 100% | 100% | 100% |
| | IR Options | 24,249 | High | | 24% | 38% | 48% | 62% | 69% | 75% | 84% | 85% |
| | X-currency swaps | 9,731 | High | | 27% | 44% | 56% | 72% | 80% | 86% | 95% | 99% |
| ETD | IR Options | 12,439 | 100% | | | 95% | | | | | | |
| | IR Futures | 4,905 | 100% | | | | | | 95% | | | |
| Deposits | Retail deposits | 8,102 | Low | | 38% | 88% | | | | | | |
| | Corporate deposits | 2,336 | Medium | | 65% | 94% | | | | | | |
| | SME deposits | | Medium | | | | | | | | | |
| Mutual funds | Money market funds | TBC | Indirect | | | | | | | | | |
| | Bank loan funds | TBC | Indirect | | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | | | | |
| | Discount rates | | | | | | | | | | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Roll-off rates in this draft represent contractual maturity, actual roll-off is expected to be significantly faster due to prepayment.

Euro Overview – Euro-LIBOR

| Asset class | | Outstanding volume (\$ BN) | % EUROLIBOR-related | % non-domestic | O/n | 1w | 1m | 2m | 3m | 6m | 12m |
|--------------------------------|--|------------------------------|---------------------|----------------|-----|----|----|----|-----|-----|-----|
| Level 1 | Level 2 | | | | | | | | | | |
| Loans | Syndicated loans ¹ | 535 | 4% | 12% | | | | | Low | Low | |
| | Corporate loans (bilateral) ¹ | 4,322 | - | Low | | | | | | | |
| | SME loans | 1,518 | - | Low | | | | | | | |
| | CRE/Commercial mortgages ² | - | - | Low | | | | | | | |
| | Retail mortgages | 5,073 | - | Low | | | | | | | |
| | Consumer loans | 800 | - | Low | | | | | | | |
| | Other Loans to Households | 1082 | - | Low | | | | | | | |
| | Bonds | Floating/Variable Rate Notes | 2,645 | - | 14% | | | | | | |
| Covered Bonds | | 2,557 | - | Low | | | | | | | |
| Securitisation | RMBS | 952 | - | 6% | | | | | | | |
| | CMBS | 107 | - | 0% | | | | | | | |
| | ABS | 197 | - | 10% | | | | | | | |
| | CDO | 165 | - | 78% | | | | | | | |
| OTC | IR Swaps | 137,553 | 0.01% | Low | | | | | Low | Low | |
| Derivatives | FRAs | 25,559 | 0.01% | Low | | | | | Low | Low | |
| | IR Options | 24,249 | 0.01% | Low | | | | | Low | Low | |
| | X-currency swaps | 9,731 | 0.01% | Low | | | | | Low | Low | |
| | ETD | IR Options | 12,439 | 0.01% | Low | | | | | Low | Low |
| Derivatives | IR Futures | 4,905 | 0.01% | Low | | | | | Low | Low | |
| Deposits | Retail deposits | 8,102 | - | Low | | | | | | | |
| | Corporate deposits | | - | Low | | | | | | | |
| | SME deposits | 2,336 | - | Low | | | | | | | |
| Mutual funds | Money market funds | High | - | | | | | | | | |
| | Bank loan funds | Low | - | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | | | |
| | Discount rates | | | | | | | | | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Significant overlap exists between Syndicated loans and Corporate business loans
2. CRE/Commercial mortgages included in Corporate and SME loans

Appendix 1 | Sources and assumptions

EUR Corporate loans, Floating/Variable Rate Notes and bonds

| | Volume | Relation to EURIBOR/LIBOR | Sources |
|-------------------------------------|--|--|--|
| Syndicated loans | <ul style="list-style-type: none"> • Issuance volume in 2012: \$356 BN • Outstanding volume (Rough estimate) \$0.5 TN • 12% of the issuance volume is non-Euro Area¹ | <ul style="list-style-type: none"> • 90% EURIBOR linked¹ • 4% EuroLIBOR linked¹ • Primarily 3 and 6 month | <ul style="list-style-type: none"> • Volumes and reference rates and maturities: Dealogic (tenors not available) • Outstanding volume assumption: 1.5x issuance volume based on average maturity of loans • Tenors: Input from market participants, Company websites (e.g. <u>3 month</u>: Valeo, <u>6 month</u>: Sberbank) |
| Corporate loans (bilateral) | <ul style="list-style-type: none"> • Outstanding volume at the end of 2012: \$4.3 TN | <ul style="list-style-type: none"> • ~60% referenced to EURIBOR – Primarily 3 and 6 month | <ul style="list-style-type: none"> • Volumes and maturities: ECB statistics • SME/Corp. split assumption: SME loans 26% of corporate loans, based on proportion of new loans in 2012 under €1 MM (Source: ECB) • Relation to EURIBOR: ECB Response to consultation on the regulation of indices • Tenors: Input from market participants |
| SME loans | <ul style="list-style-type: none"> • Outstanding volume at the end of 2012: \$1.5 TN | <ul style="list-style-type: none"> • ~60% referenced to EURIBOR – Primarily 1 and 3 month – Some 6 month | |
| CRE/Commercial mortgages | <ul style="list-style-type: none"> • Included in the above (Corporate and SME loans) | <ul style="list-style-type: none"> • ~60% referenced to EURIBOR – Primarily 1 and 3 month – Some 6 month | |
| Floating/Variable Rate Notes | <ul style="list-style-type: none"> • Outstanding volume Dec. 2012: \$2.6TN | <ul style="list-style-type: none"> • >70% EURIBOR linked¹, of which: <ul style="list-style-type: none"> – 3 month: 91% – 6 month: 7% – 12 month: 2% • <1% linked to EuroLIBOR and Eonia¹ | <ul style="list-style-type: none"> • Volumes: ECB statistics, total floating rate notes and bonds outstanding, less 'Covered Bonds' and 'Securitisation' • Tenors and maturities: Dealogic |
| Covered Bonds | <ul style="list-style-type: none"> • Outstanding volume at end of 2012: \$2.6 TN | <ul style="list-style-type: none"> • 23% have floating rate coupons • 99% of floating rate bonds reference EURIBOR, of Which: <ul style="list-style-type: none"> – 3 month: 77% – 6 month: 23% | <ul style="list-style-type: none"> • Volumes: ECBC covered bond statistics • Tenors: Dealogic |

1. Based on 2012 issuance

Source: Dealogic, BIS quarterly review, ECBC, ECB, Company websites, Oliver Wyman analysis

EUR Syndicated Loans Relation to EURIBOR/LIBOR

Total global EUR denominated syndicated loan issuance USD BN, 2012

| | Euro Area | | Non Euro Area | | Total | | % of Specified Total |
|--------------------|-----------|------------|---------------|------------|-------|------------|----------------------|
| | \$ BN | % of Total | \$ BN | % of Total | \$ BN | % of Total | |
| EURIBOR | 121 | 38% | 5 | 13% | 126 | 35% | 90% |
| LIBOR | 12 | 4% | 2 | 6% | 14 | 4% | 10% |
| Unspecified | 182 | 58% | 33 | 81% | 216 | 60% | N/A |
| Total | 315 | | 41 | | 356 | | |

Euro Area Corporate Loans Volumes

Corporate loan volumes in the Euro Area

2.1 Sectoral breakdown of MFI loans and deposits vis-a-vis other euro area residents

(EUR billions and annual growth rates; not seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

1. Loans

| | Households ⁽¹⁾ | | | | Non-financial corporations | | | | Other financial intermediaries | Insurance corporations and pension funds | | |
|---------------------|---------------------------|-----------------|--------------------------|-------------|----------------------------|--------------|--------------------------|--------------|--------------------------------|--|-------|------|
| | Total | Consumer credit | Loans for house purchase | Other loans | Total | Up to 1 year | Over 1 and up to 5 years | Over 5 years | Total | Total | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Outstanding amounts | | | | | | | | | | | |
| 2011 | 5,242.8 | 628.5 | 3,784.4 | 829.9 | 419.7 | 4,720.0 | 1,139.9 | 859.5 | 2,720.5 | 1,117.0 | 155.6 | 83.4 |
| 2012 | 5,252.5 | 604.3 | 3,830.9 | 817.3 | 419.4 | 4,538.9 | 1,124.1 | 794.7 | 2,620.0 | 1,169.6 | 196.2 | 81.6 |
| 2013 Q1 | 5,240.5 | 590.9 | 3,837.9 | 811.6 | 415.2 | 4,507.2 | 1,135.9 | 778.8 | 2,592.5 | 1,203.9 | 234.9 | 91.4 |
| Q2 | 5,241.5 | 589.6 | 3,838.5 | 813.4 | 414.0 | 4,454.4 | 1,118.7 | 770.9 | 2,564.8 | 1,188.2 | 252.7 | 94.7 |
| 2013 May | 5,231.5 | 590.2 | 3,831.3 | 810.0 | 414.5 | 4,467.8 | 1,117.1 | 776.0 | 2,574.7 | 1,195.9 | 238.1 | 94.8 |
| June | 5,241.5 | 589.6 | 3,838.5 | 813.4 | 414.0 | 4,454.4 | 1,118.7 | 770.9 | 2,564.8 | 1,188.2 | 252.7 | 94.7 |
| July | 5,234.9 | 589.6 | 3,836.6 | 808.7 | 413.3 | 4,434.3 | 1,100.4 | 773.3 | 2,560.6 | 1,131.2 | 223.0 | 97.2 |
| Aug. ⁽ⁿ⁾ | 5,231.8 | 586.1 | 3,837.1 | 808.6 | 412.3 | 4,401.7 | 1,074.4 | 771.4 | 2,555.9 | 1,038.0 | 141.8 | 99.7 |

Conversion to USD

Corporate Loans

| | |
|---------------------------|--------------|
| In EUROS (€ BN) | 4,539 |
| | x |
| YE 2012 FX Rate (EUR/USD) | 1.3241 |
| In USD BN | 6,010 |

SME/Corp. Loan split estimation

New Loans to NFCs in the Euro Area, 2012 € MM

| | Up to €0.25 MM | €0.25 MM to €1 MM | Over €1 MM | Total | % under €1 MM |
|--------------|----------------|-------------------|------------------|------------------|---------------|
| Over 1 year | 85,581 | 69,874 | 226,046 | 381,291 | 41% |
| Up to 1 year | 367,438 | 393,010 | 2,416,383 | 3,176,835 | 24% |
| Total | 453,020 | 462,884 | 2,642,428 | 3,558,127 | 26% |

Source: ECB <http://sdw.ecb.europa.eu/reports.do?node=1000003155>

EUR Floating/Variable Rate Notes Relation to EURIBOR/LIBOR

EUR Floating Rate Notes issuance in 2012 USD BN

| Reference Rate | | USD MM | % of total |
|--------------------|------------|---------|------------|
| Euribor | | 160,791 | 69% |
| <i>Of which</i> | 3 – Month | 146,627 | 91% |
| | 6 – Month | 11,728 | 7% |
| | 12 – Month | 2,415 | 2% |
| | Other | 21 | 0% |
| Eonia | | 532 | 0% |
| Other | | 349 | 0% |
| Unspecified | | 71,237 | 31% |
| Total | | 232,909 | 100% |

FX rate: YE 2012 EURUSD=1.3241
Source: Dealogic, ECB Statistics

Euro Area floating rate bonds outstanding USD BN

| | Fixed rate | Floating rate | Total |
|---------------------------------------|------------|---------------|--------|
| General government | 7,285 | 768 | 8,053 |
| MFIs | 2,980 | 2,059 | 5,039 |
| Non-financial corporations | 871 | 108 | 979 |
| Non-MFI financial institutions | 1,302 | 1,945 | 3,247 |
| Total | 12,438 | 4,880 | 17,318 |

Total Floating rate **4,880**

Of which:

| | |
|-----------------------------------|--------------|
| Securitisation | 1,642 |
| Covered Bonds (see next slide) | 593 |
| Other FRNs | 2,645 |

EUR Covered Bonds

Covered Bonds outstanding 2012, EUR MM

| | € MM | USD MM | % of total |
|-----------------------------|-----------|-----------|------------|
| Total CB Outstanding | 2,813,411 | 3,725,238 | |
| <i>By collateral type:</i> | | | |
| Public Sector | 543,977 | 720,280 | 19% |
| Mortgage | 2,255,357 | 2,986,318 | 80% |
| Ships | 13,571 | 17,969 | 1% |
| Others | 506 | 670 | 0% |
| <i>By currency:</i> | | | |
| Euro | 1,930,894 | 2,556,697 | |
| Domestic currency | 691,480 | 915,589 | |
| Other currencies | 191,037 | 252,952 | |
| <i>By Coupon type:</i> | | | |
| Fixed coupon | 2,120,312 | 2,807,505 | 75% |
| Floating coupon | 652,968 | 864,595 | 23% |
| Other | 40,131 | 53,137 | 2% |

Reference rates of floating coupon Covered Bonds Based on 2012 issuance

| | USD MM | % total |
|--------------------|---------------|-------------|
| Euribor | 13,361 | 99% |
| <i>Of which:</i> | | |
| 1 – month | 24 | 0% |
| 3 – month | 10,236 | 77% |
| 6 – month | 3,012 | 23% |
| 12 – month | 89 | 1% |
| Unspecified | 142 | 1% |
| Total | 13,503 | 100% |

Euro Area Retail Loans

| | Outstanding volumes (Q4 2012) | Relation to EURIBOR/LIBOR | Sources |
|----------------------------------|-------------------------------|--|---|
| Retail mortgages | \$5.1 TN | <ul style="list-style-type: none"> • ~28% EURIBOR linked, of which: <ul style="list-style-type: none"> – 12 month: 64% (Spain and France) – 3 month: 25% (Italy, Ireland) – 6 month: 11% (Portugal) | <ul style="list-style-type: none"> • Volumes: ECB • Relation to EURIBOR: European Mortgage Federation Hypostat, ECB |
| Consumer loans | \$0.8 TN | <ul style="list-style-type: none"> • <i>Estimate: Low</i> – <i>Tenors: Primarily 1 month</i> | <ul style="list-style-type: none"> • Volumes: ECB • Tenors: Input from market participants |
| Other Loans to Households | \$1.0 TN | <ul style="list-style-type: none"> • <i>Estimate: Low</i> – <i>Tenors: Primarily 1 month</i> | <ul style="list-style-type: none"> • Volumes: ECB • Tenors: Input from market participants |

Euro Area Retail Loans Volumes

Outstanding loans in the Euro area € BN

I. Loans

| | Households ¹⁾ | | | | | Non-financial corporations | | | | Other financial intermediaries | Insurance corporations and pension funds | |
|---------------------|--------------------------|-----------------|--------------------------|-------------|-----------------------|----------------------------|--------------|--------------------------|--------------|---|--|------|
| | Total | Consumer credit | Loans for house purchase | Other loans | | Total | Up to 1 year | Over 1 and up to 5 years | Over 5 years | Total | Total | |
| | 1 | 2 | 3 | 4 | Sole proprietors 5 | 6 | 7 | 8 | 9 | Reverse repos to central counterparties 11 | 12 | |
| | Outstanding amounts | | | | | | | | | | | |
| 2011 | 5,242.8 | 628.5 | 3,784.4 | 829.9 | 419.7 | 4,720.0 | 1,139.9 | 859.5 | 2,720.5 | 1,117.0 | 155.6 | 83.4 |
| 2012 | 5,252.5 | 604.3 | 3,830.9 | 817.3 | 419.4 | 4,538.9 | 1,124.1 | 794.7 | 2,620.0 | 1,169.6 | 196.2 | 81.6 |
| 2013 Q1 | 5,240.5 | 590.9 | 3,837.9 | 811.6 | 415.2 | 4,507.2 | 1,135.9 | 778.8 | 2,592.5 | 1,203.9 | 234.9 | 91.4 |
| Q2 | 5,241.5 | 589.6 | 3,838.5 | 813.4 | 414.0 | 4,454.4 | 1,118.7 | 770.9 | 2,564.8 | 1,188.2 | 252.7 | 94.7 |
| 2013 May | 5,231.5 | 590.2 | 3,831.3 | 810.0 | 414.5 | 4,467.8 | 1,117.1 | 776.0 | 2,574.7 | 1,195.9 | 238.1 | 94.8 |
| June | 5,241.5 | 589.6 | 3,838.5 | 813.4 | 414.0 | 4,454.4 | 1,118.7 | 770.9 | 2,564.8 | 1,188.2 | 252.7 | 94.7 |
| July | 5,234.9 | 589.6 | 3,836.6 | 808.7 | 413.3 | 4,434.3 | 1,100.4 | 773.3 | 2,560.6 | 1,131.2 | 223.0 | 97.2 |
| Aug. ^(a) | 5,231.8 | 586.1 | 3,837.1 | 808.6 | 412.3 | 4,401.7 | 1,074.4 | 771.4 | 2,555.9 | 1,038.0 | 141.8 | 99.7 |

Conversion to USD

| Retail Loans | € BN | | EY 2012 EUR/USD FX rate | | \$ BN |
|---|-------|---|-------------------------|---|-------|
| Loans for house purchase (Retail Mortgages) | 3,831 | | 1.3241 | | 5,073 |
| Consumer Credit (Consumer Loans) | 604 | x | 1.3241 | = | 800 |
| Other Loans (to Households) | 817 | | 1.3241 | | 1,082 |

Source: <http://sdw.ecb.europa.eu/reports.do?node=1000003155>

Euro Area Retail Mortgages Relation to EURIBOR/LIBOR

Estimated of relation of Retail Mortgages in the Euro Area to EURIBOR

| | Mortgage volumes outstanding ¹ € BN (2011) | % variable rate ² (2007) | Estimated index linked volumes | Main index for adjusting variable interest rates ² | Estimated 3m EURIBOR-linked (€ BN) | Estimated 6m EURIBOR-linked (€ BN) | Estimated 12m EURIBOR-linked (€ BN) |
|-----------------------------|---|-------------------------------------|--------------------------------|---|------------------------------------|------------------------------------|-------------------------------------|
| Austria | 83 | 61% | 51 | 3 month EURIBOR | 51 | 0 | 0 |
| Belgium | 174 | 10% | 17 | 12 month treasuries | 0 | 0 | 0 |
| Cyprus | 13 | NA | NA | 3 month EURIBOR | 5 | 0 | 0 |
| Estonia | 6 | NA | NA | NA | Low | Low | Low |
| Finland | 82 | 96% | 79 | 3m and 12m EURIBOR | 30 | 0 | 37 |
| France | 843 | 15% | 126 | 12 month EURIBOR | 0 | 0 | 126 |
| Germany | 1163 | 15% | 174 | Long term market rates | 0 | 0 | 0 |
| Greece | 78 | 28% | 22 | ECB main refinancing rate/3 month EURIBOR | 11 | 0 | 0 |
| Ireland | 131 | 67% | 87 | ECB main refinancing rate/3 month EURIBOR | 44 | 0 | 0 |
| Italy | 362 | 47% | 170 | 3 month EURIBOR | 170 | 0 | 0 |
| Luxembourg | 20 | 90% | 18 | ECB main refinancing rate | 0 | 0 | 0 |
| Malta | 0 | 85% | 0 | ECB main refinancing rate | 0 | 0 | 0 |
| Netherland | 640 | 18% | 115 | Long term market rates | 0 | 0 | 0 |
| Portugal | 114 | 99% | 113 | 6 month EURIBOR | 0 | 113 | 0 |
| Slovakia | 11.7 | NA | NA | NA | Low | Low | Low |
| Slovenia | 5 | 80% | 4 | 6 month EURIBOR | 0 | 4 | 0 |
| Spain | 667 | 91% | 607 | 12 month EURIBOR | 0 | 0 | 607 |
| Euro Area | 4,393 | 36% | 1,583 | | 311 | 117 | 770 |
| % of Euro area total | | | | | 7% | 3% | 18% |

Source:

1. European Mortgage Federation Hypostat 2011 <http://www.hypo.org/Objects/6/Files/HYPOSTAT%202011.pdf>

2. Mortgage characteristics: ECB Report: Housing finance in the Euro Area <http://www.ecb.europa.eu/pub/pdf/other/housingfinanceeuroarea0309en.pdf>

Europe Securitised products

| | Volumes outstanding (Q4 2012) | Relation to EURIBOR/LIBOR | Assumptions/Sources |
|-------------|---|---|--|
| RMBS | <ul style="list-style-type: none"> • Volumes: \$952 BN • 6% is non-Euro Area¹ | <ul style="list-style-type: none"> • 100% EURIBOR linked¹, of which <ul style="list-style-type: none"> – 3 month: 97% – 1 month: 3% | <ul style="list-style-type: none"> • Outstanding volumes: SIFMA • % Domestic and tenors: Dealogic • Maturities: Dealogic, based on 2003-2013 data |
| CMBS | <ul style="list-style-type: none"> • Volumes: \$107 BN • None are non-Euro Area¹ | <ul style="list-style-type: none"> • 100% EURIBOR linked¹, of which <ul style="list-style-type: none"> – All 3 month | <ul style="list-style-type: none"> • Outstanding volumes: SIFMA • % Domestic and tenors: Dealogic • Maturities: Dealogic, based on 2003-2013 data |
| ABS | <ul style="list-style-type: none"> • Volume: \$197 BN • 10% is non-Euro Area¹ | <ul style="list-style-type: none"> • 91% EURIBOR linked¹, of which <ul style="list-style-type: none"> – 1 month: 84% – 3 month: 15% – 6 month: 1% | <ul style="list-style-type: none"> • Outstanding volumes: SIFMA • % Domestic and tenors: Dealogic • Maturities: Dealogic, based on 2003-2013 data |
| CDO | <ul style="list-style-type: none"> • Volumes: \$165 BN • 74% is non-Euro Area² | <ul style="list-style-type: none"> • 83% EURIBOR linked², of which: <ul style="list-style-type: none"> – 3 month: 52% – 6 month: 48% | <ul style="list-style-type: none"> • Outstanding volumes: SIFMA • % Domestic and tenors: Dealogic |

1. Based on 2010–2012 issuance

2. Based on average of 2010 and 2013 issuance

Source: Dealogic, SIFMA, Oliver Wyman analysis

Europe Securitised products Volumes



Outstanding Securitisation volumes Europe (USD MM)

| Year | ABS | | | | | CDO CDO | MBS | | | SME SME | WBS | | Total |
|------|-----------|-----------|--------------|-----------|-----------|------------|------------|-----------|--------------|------------|-----------|-----------|--------------|
| | Auto | Consumer | Credit Cards | Leases | Other | | CMBS | Mixed | RMBS | | Other | Pubs | |
| 2010 | 50,575.64 | 69,041.16 | 27,920.41 | 36,314.36 | 95,886.79 | 309,469.45 | 196,907.56 | 21,333.87 | 1,777,579.02 | 237,628.10 | 47,206.39 | 18,756.33 | 2,888,619.08 |
| 2011 | 50,326.83 | 74,950.83 | 23,736.45 | 38,789.19 | 91,258.39 | 261,293.85 | 170,403.63 | 15,201.29 | 1,655,262.10 | 247,816.45 | 48,042.50 | 18,376.66 | 2,695,458.16 |
| 2012 | 64,132.86 | 66,715.09 | 29,441.31 | 30,312.39 | 87,299.83 | 232,013.86 | 148,827.12 | 12,267.38 | 1,329,365.42 | 214,037.64 | 51,943.51 | 18,021.97 | 2,284,378.36 |

| Year | Belgium | France | Germany | Greece | Ireland | Italy | Multinational | Netherlands | Other | PanEurope | Portugal | Russian Federation | Spain | United Kingdom | Total |
|------|------------|------------|------------|------------|-----------|------------|---------------|-------------|------------|------------|------------|--------------------|------------|----------------|--------------|
| | 2010 | 108,858.00 | 48,263.56 | 125,950.21 | 53,375.85 | 100,367.79 | 304,513.41 | 225,730.34 | 433,192.96 | 20,386.85 | 112,900.91 | 79,121.67 | 11,502.92 | 400,942.43 | 863,512.18 |
| 2011 | 121,766.98 | 59,333.28 | 113,044.42 | 48,798.78 | 87,075.06 | 292,395.18 | 177,950.08 | 427,933.87 | 19,542.27 | 100,984.15 | 74,872.18 | 8,768.44 | 379,082.73 | 783,910.74 | 2,695,458.16 |
| 2012 | 126,281.51 | 58,019.34 | 98,262.58 | 45,997.68 | 75,387.49 | 268,751.59 | 150,475.24 | 388,759.72 | 14,516.40 | 77,775.24 | 54,676.17 | 4,440.21 | 278,049.54 | 642,985.64 | 2,284,378.36 |

Outstanding Securitisation volumes Adjustment for Euro Area (USD MM)

| | Outstanding volume 2012 (\$ MM) |
|--------------------------|------------------------------------|
| Europe Total | 2,284,378 |
| Excluded | 661,942 |
| Other | 14,516 |
| Russia | 4,440 |
| United Kingdom | 642,986 |
| Euro Area total | 1,622,436 |
| Euro Area as % of Europe | 71% |

Outstanding Securitisation volumes Euro Area¹ (USD MM)

| | Europe (\$ BN) | Euro Area estimate ¹ (\$ BN) |
|-----------------------|-------------------|---|
| ABS | 278 | 197 |
| CDO | 232 | 165 |
| CMBS | 150 | 107 |
| Core CMBS | 149 | 106 |
| CMBS from Mixed (10%) | 1 | 1 |
| RMBS | 1,340 | 952 |
| Core RMBS | 1,329 | 944 |
| RMBS from Mixed (90%) | 11 | 8 |

1. 71% of total Europe (Excluding UK, Russia and "other")
Source: <http://www.sifma.org/research/statistics.aspx>

EUR Securitised products

Relation to EURIBOR/LIBOR

Relation of LIBOR to securitised products issued in Euros 2010–2013 (\$ BN, % of Total)

| | Overall Issuance volume (\$ BN) | % Floating | % EURIBOR -related | % EURO LIBOR- related | 1m | 3m | 6m |
|-------------|------------------------------------|---------------|--------------------------|-----------------------------|-----|------|------|
| RMBS | 93.5 | 100% | 100% | - | 2% | 97% | - |
| CMBS | 6.3 | 100% | 100% | - | - | 100% | - |
| ABS | 75.4 | 91% | 91% | - | 76% | 14% | 1.2% |
| CLO | 3.3 | 78% | 78% | - | - | 55% | 23% |

Key market participants

- Securitisation market in Europe is predominantly RMBS and ABS
- Largest issuers of Euro RMBS include Rabobank, ABN AMRO, ING, Lloyds and Aegon, with most of them being based out of the Netherlands
- The 4 issuers of Euro CMBS in the last 3 years are Fortress Investment, BoAML, Vesteda Group and Round Hill Capital
- Largest issuers of Euro ABS include large continental car companies like Volkswagen (Porsche), Peugeot SA, Renault and BMW and banks e.g. Santander, Barclays, Credit Agricole, Societe Generale

EUR Derivatives

| | Outstanding volumes Q4 2012 | Relation to EURIBOR/LIBOR | Assumptions/Sources |
|------------------------|-----------------------------|---|---|
| OTC | | | |
| IR Swaps | \$137,553 BN | <ul style="list-style-type: none"> Majority EURIBOR linked <ul style="list-style-type: none"> – 72% 6-month – 26% 3-month – 1% 1-month – 0.6% 12-month ~0.01% EuroLIBOR linked | <ul style="list-style-type: none"> Volumes: BIS OTC IR statistics Relation to EURIBOR: Input from market participants Relation to EuroLIBOR and maturities: DTCC |
| FRAs | \$25,559 BN | <ul style="list-style-type: none"> Majority EURIBOR linked <i>Tenor TBC</i> ~0.01% EuroLIBOR linked | <ul style="list-style-type: none"> Volumes: BIS OTC IR statistics Relation to EURIBOR: Input from market participants Relation to EuroLIBOR and maturities: DTCC |
| IR Options | \$24,249 BN | <ul style="list-style-type: none"> Slightly less than half EURIBOR linked <i>Tenor TBC</i> ~0.01% EuroLIBOR linked | <ul style="list-style-type: none"> Volumes: BIS OTC IR statistics Relation to EURIBOR: Input from market participants Relation to EuroLIBOR and maturities: DTCC |
| X-currency swaps | \$9,731 BN | <ul style="list-style-type: none"> Majority EURIBOR linked <i>Tenor TBC</i> ~0.01% EuroLIBOR linked | <ul style="list-style-type: none"> Volumes: BIS OTC FX statistics Relation to EURIBOR: Input from market participants Relation to EuroLIBOR and maturities: DTCC |
| ETD¹ | | | |
| IR Options | \$12,439 BN | <ul style="list-style-type: none"> 100% EURIBOR linked <ul style="list-style-type: none"> – All 3 month ~0.01% EuroLIBOR linked | <ul style="list-style-type: none"> Volumes, relation to EURIBOR and maturities: LIFFE Statistics Relation to EuroLIBOR: DTCC |
| IR Futures | \$4,905 BN | <ul style="list-style-type: none"> 100% EURIBOR <ul style="list-style-type: none"> – All 3 month ~0.01% EuroLIBOR linked | <ul style="list-style-type: none"> Volumes, relation to EURIBOR and maturities: LIFFE Statistics Relation to EuroLIBOR: DTCC |

1. ETD are aggregates for Europe, including UK
Source: BIS, Euronext, Oliver Wyman analysis

EUR OTC Interest Rate Derivatives Volumes

Interest rate derivatives by instrument, counterparty and currency¹ Notional amounts outstanding at end December 2012, USD MM

| Instrument/counterparty | Total | US dollar | Euro | Japanese yen | Pound sterling | Swiss franc | Canadian dollar | Swedish krona | Residual |
|-----------------------------------|--------------------|--------------------|--------------------|-------------------|-------------------|------------------|------------------|------------------|-------------------|
| Forward rate agreements | 71,352,616 | 29,044,477 | 25,559,982 | 51,630 | 8,964,972 | 943,057 | 248,940 | 2,984,344 | 3,555,214 |
| with reporting dealers | 11,507,040 | 3,021,215 | 3,462,884 | 8,150 | 2,714,713 | 176,285 | 136,797 | 909,065 | 1,077,931 |
| with other financial institutions | 57,387,854 | 25,155,400 | 21,027,401 | 34,276 | 6,034,139 | 668,022 | 106,187 | 2,017,919 | 2,344,510 |
| with non-financial institutions | 2,457,723 | 867,863 | 1,069,697 | 9,204 | 216,121 | 98,750 | 5,956 | 57,360 | 132,772 |
| Interest rate swaps | 369,998,614 | 106,680,617 | 137,553,787 | 48,702,355 | 30,187,646 | 4,334,175 | 7,193,563 | 2,978,231 | 32,368,240 |
| with reporting dealers | 75,466,171 | 20,363,728 | 20,349,704 | 16,249,248 | 4,259,114 | 658,644 | 1,715,465 | 886,471 | 10,983,797 |
| with other financial institutions | 264,707,067 | 78,006,962 | 107,534,156 | 27,140,358 | 23,505,597 | 2,776,654 | 4,579,163 | 1,813,857 | 19,350,320 |
| with non-financial institutions | 29,825,376 | 8,309,929 | 9,669,928 | 5,312,748 | 2,422,934 | 898,877 | 898,933 | 277,903 | 2,034,124 |
| Options sold | 39,771,786 | 10,348,010 | 20,253,297 | 5,195,875 | 2,438,899 | 64,696 | 41,930 | 164,738 | 1,264,341 |
| with reporting dealers | 29,626,605 | 7,050,171 | 15,874,449 | 4,078,946 | 1,820,416 | 36,650 | 14,704 | 76,384 | 674,885 |
| with other financial institutions | 8,783,493 | 2,791,906 | 3,849,811 | 987,121 | 545,819 | 19,895 | 16,993 | 52,302 | 519,646 |
| with non-financial institutions | 1,361,688 | 505,933 | 529,038 | 129,808 | 72,664 | 8,152 | 10,233 | 36,052 | 69,808 |
| Options bought | 38,502,089 | 9,768,138 | 19,979,779 | 4,967,457 | 2,579,875 | 51,243 | 37,844 | 137,394 | 980,359 |
| with reporting dealers | 30,218,406 | 7,281,197 | 16,093,381 | 4,131,468 | 2,033,643 | 35,541 | 16,149 | 67,566 | 559,461 |
| with other financial institutions | 7,197,419 | 2,184,803 | 3,333,030 | 748,428 | 485,619 | 10,645 | 13,514 | 42,541 | 378,839 |
| with non-financial institutions | 1,086,264 | 302,138 | 553,369 | 87,561 | 60,613 | 5,057 | 8,181 | 27,287 | 42,058 |
| Total options | 48,351,377 | 12,950,469 | 24,249,166 | 6,058,134 | 3,091,751 | 79,848 | 64,350 | 230,160 | 1,627,499 |
| Total contracts | 489,702,595 | 148,675,557 | 187,362,928 | 54,812,107 | 42,244,359 | 5,357,072 | 7,506,848 | 6,192,731 | 37,550,993 |

¹ While data on total options are shown on a net basis, separate data on options sold and options bought are recorded on a gross basis, ie not adjusted for interdealer double counting.

EUR OTC Currency Swap Derivatives Volumes

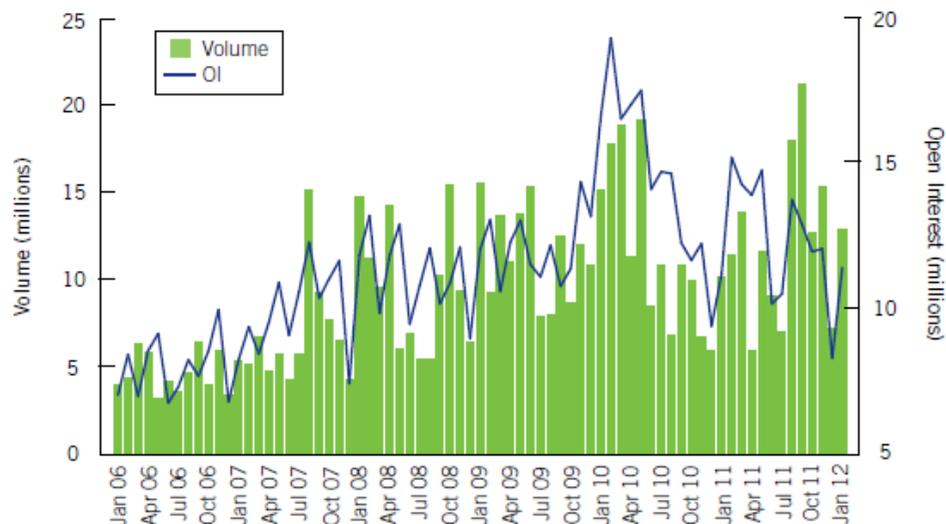
Foreign exchange derivatives by instrument, counterparty and currency¹ Notional amounts outstanding at end December 2012, USD MM

| Instrument/counterparty | Total | US dollar | Euro | Japanese yen | Pound sterling | Swiss franc | Canadian dollar | Swedish krona | Residual |
|---|-------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|-------------------|
| Outright forwards and foreign exchange swaps | 31,718,023 | 27,273,698 | 10,509,813 | 5,316,135 | 3,819,501 | 2,065,551 | 1,733,310 | 876,607 | 11,841,431 |
| with reporting dealers | 11,083,369 | 10,203,431 | 3,291,044 | 2,193,821 | 1,166,300 | 790,503 | 542,453 | 196,872 | 3,781,514 |
| with other financial institutions | 14,860,151 | 12,711,881 | 4,733,117 | 2,168,747 | 1,845,433 | 920,776 | 758,073 | 339,449 | 6,242,826 |
| with non-financial institutions | 5,774,504 | 4,358,386 | 2,484,853 | 953,568 | 807,767 | 354,270 | 432,785 | 340,285 | 1,817,094 |
| Total including gold | 32,013,296 | | | | | | | | |
| Currency Swaps | 25,420,032 | 22,471,257 | 9,731,489 | 5,324,630 | 3,503,985 | 1,169,310 | 1,094,635 | 496,621 | 7,048,137 |
| with reporting dealers | 12,895,136 | 12,101,089 | 4,482,038 | 3,124,124 | 1,716,023 | 548,175 | 443,224 | 215,340 | 3,160,259 |
| with other financial institutions | 9,809,144 | 8,347,553 | 3,912,407 | 1,697,023 | 1,340,754 | 469,981 | 428,969 | 202,663 | 3,218,938 |
| with non-financial institutions | 2,715,754 | 2,022,616 | 1,337,043 | 503,483 | 447,207 | 151,151 | 222,442 | 78,618 | 668,948 |
| Options sold | 7,236,919 | 5,796,703 | 2,358,582 | 2,654,762 | 368,290 | 459,970 | 190,858 | 55,649 | 2,589,024 |
| with reporting dealers | 4,438,779 | 3,515,538 | 1,447,126 | 1,743,066 | 218,512 | 321,049 | 114,272 | 31,672 | 1,486,323 |
| with other financial institutions | 2,209,970 | 1,790,290 | 660,796 | 750,689 | 101,669 | 123,599 | 55,524 | 12,458 | 924,915 |
| with non-financial institutions | 588,175 | 490,874 | 250,661 | 161,009 | 48,109 | 15,323 | 21,062 | 11,518 | 177,794 |
| Total including gold | 7,351,038 | | | | | | | | |
| Options bought | 7,839,407 | 5,586,508 | 3,040,758 | 2,580,162 | 351,623 | 462,452 | 194,360 | 57,531 | 3,405,420 |
| with reporting dealers | 5,273,166 | 3,540,505 | 2,240,194 | 1,785,530 | 218,299 | 329,346 | 114,988 | 34,392 | 2,283,078 |
| with other financial institutions | 1,951,871 | 1,559,568 | 561,546 | 614,215 | 92,746 | 111,280 | 54,265 | 11,907 | 898,215 |
| with non-financial institutions | 614,375 | 486,433 | 239,018 | 180,417 | 40,577 | 21,825 | 25,107 | 11,232 | 224,141 |
| Total including gold | 7,958,335 | | | | | | | | |
| Total options | 10,220,361 | 7,855,195 | 3,555,684 | 3,470,631 | 501,517 | 597,231 | 270,595 | 80,154 | 4,109,715 |
| All instruments | 67,358,399 | 57,600,136 | 23,796,979 | 14,111,391 | 7,824,989 | 3,832,081 | 3,098,534 | 1,453,375 | 22,999,313 |
| Total contracts including gold | 67,844,186 | | | | | | | | |

¹ While data on total options are shown on a net basis, separate data on options sold and options bought are recorded on a gross basis, ie not adjusted for interdealer double counting.

EUR Exchange Traded Options Relation to EURIBOR/LIBOR

Euribor Options (Inc Mid-Curves) Volume & Open Interest (OI)



Euribor® Futures and Options

Exceptional Liquidity and Depth of Market - The Most Heavily Traded STIR Derivatives Contracts in the World

With one of the world's leading portfolios of Short-Term Interest Rate (STIR) derivative contracts, NYSE Liffe has everything you need for the European interest rate market.

Euribor®: A Benchmark Contract

NYSE Liffe's three-month Euro (Euribor) interest rate contract suite comprises a futures contract, an option on the futures contract, and a one-year mid-curve option on the futures contract. You are assured the liquidity and depth of market required to fulfill your trading and risk management objectives.



Euribor is referenced to the European Banking Federation's (FBE) EURIBOR (Euro Inter-Bank Offered Rate), the benchmark of the euro money market since 1999. The NYSE Liffe suite provides an easily accessible and liquid means of gaining exposure to this important and increasingly used benchmark.

Our Euribor contracts account for over 99% of euro-denominated STIR exchange-traded derivative money market activity. As our flagship STIR portfolio product and an internationally used benchmark, Euribor offers a wealth of opportunities.

Exchange Traded IR Options in Europe

Dec 2012

Referencing EURIBOR¹ (LIFFE)

Euro denominated non-EURIBOR¹ (LIFFE)

Referencing LIBOR¹ (LIFFE)

Sterling denominated non-LIBOR¹ (LIFFE)

Total IR Options Outstanding on LIFFE¹

Total IR Options Outstanding in Europe² (BIS)

% of EUR-Denominated ETD Options Linked to EURIBOR

Notional outstanding (LC)

FX rate (EY 2012)

Notional outstanding (\$ BN)

€ 9,394 BN

1.3241

12,439

-

X

-

=

0

£ 1,040 BN

1.6043

1,668

-

-

0

14,107

14,225

100%

1. Only Short term interest rate derivatives reference EURIBOR, all of them reference the 3 month EURIBOR

Source: <https://globalderivatives.nyx.com/en/stirs/nyse-liffe/euribor-futures-options>

https://globalderivatives.nyx.com/sites/globalderivatives.nyx.com/files/eu-12028_euribor_fo_120224.pdf

http://www.bis.org/statistics/r_qa1309_hanx23a.pdf

Europe Exchange Traded Options Volumes

Table 23A: Derivative financial instruments traded on organised exchanges

By instrument and location

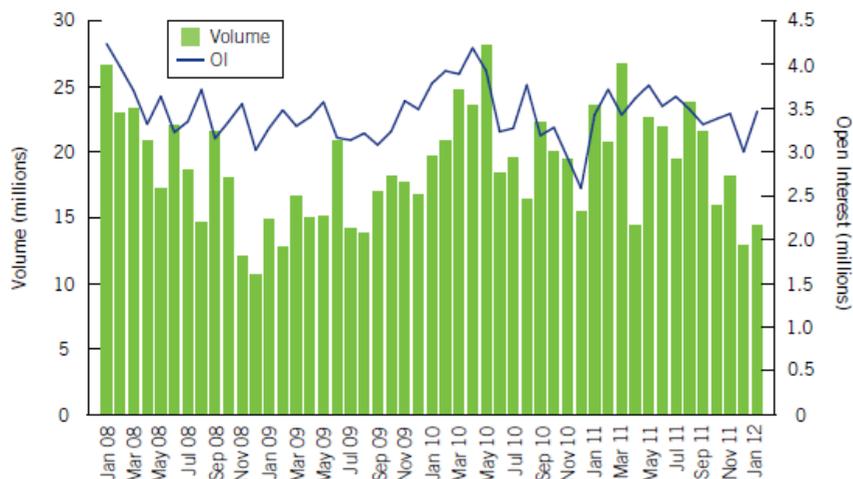
Notional principal in billions of US dollars

| Instrument / location | Amounts outstanding | | | | Turnover | | | | | |
|-------------------------|---------------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|-----------------|------------------|------------------|
| | Dec 2011 | Dec 2012 | Mar 2013 | Jun 2013 | 2011 | 2012 | Q3 2012 | Q4 2012 | Q1 2013 | Q2 2013 |
| Options | | | | | | | | | | |
| All markets | 35,418.0 | 30,313.1 | 35,796.2 | 43,003.9 | 635,363.4 | 408,690.1 | 94,087.6 | 77,343.4 | 118,258.1 | 125,808.9 |
| Interest rate | 31,579.6 | 25,909.7 | 31,019.6 | 38,373.5 | 466,281.3 | 308,603.9 | 72,239.7 | 54,308.5 | 93,477.2 | 98,730.8 |
| Currency | 87.2 | 105.3 | 114.0 | 116.1 | 2,525.1 | 2,382.7 | 565.8 | 606.0 | 972.9 | 946.6 |
| Equity index | 3,750.8 | 4,298.1 | 4,662.4 | 4,514.3 | 166,556.9 | 97,703.6 | 21,282.1 | 22,428.9 | 23,808.0 | 26,131.5 |
| North America | 19,804.2 | 12,641.1 | 13,557.2 | 19,844.8 | 262,514.8 | 194,065.2 | 43,965.2 | 35,776.2 | 39,255.7 | 57,877.0 |
| Interest rate | 17,779.1 | 10,280.3 | 11,067.1 | 17,461.1 | 218,368.1 | 154,328.8 | 33,861.0 | 24,028.9 | 27,381.7 | 43,151.0 |
| Currency | 49.1 | 68.6 | 86.3 | 83.2 | 1,510.4 | 1,513.5 | 363.6 | 377.0 | 544.8 | 516.6 |
| Equity index | 1,976.0 | 2,292.3 | 2,403.8 | 2,372.4 | 42,636.4 | 38,222.9 | 9,740.6 | 11,370.3 | 11,329.2 | 14,209.3 |
| Europe | 14,280.8 | 15,636.3 | 20,636.1 | 21,560.0 | 258,265.4 | 157,061.9 | 39,464.0 | 31,331.8 | 68,051.4 | 57,864.3 |
| Interest rate | 12,879.8 | 14,225.4 | 19,065.4 | 20,017.2 | 237,541.6 | 144,243.9 | 36,127.9 | 28,175.1 | 64,040.2 | 54,095.6 |
| Currency | 0.3 | 0.6 | 0.5 | 0.4 | 3.4 | 4.3 | 1.1 | 1.5 | 2.1 | 1.6 |
| Equity index | 1,400.6 | 1,410.2 | 1,570.2 | 1,542.3 | 20,720.4 | 12,813.6 | 3,335.0 | 3,155.2 | 4,009.1 | 3,767.0 |
| Asia and Pacific | 349.6 | 563.0 | 659.2 | 642.0 | 102,912.5 | 48,132.3 | 8,551.1 | 8,142.4 | 8,829.0 | 8,515.5 |
| Interest rate | 15.6 | 1.8 | 4.3 | 2.1 | 2,719.3 | 3,182.8 | 656.5 | 692.1 | 704.6 | 683.8 |
| Currency | 0.8 | 1.4 | 1.9 | 2.1 | 257.0 | 237.6 | 59.9 | 76.3 | 97.3 | 117.9 |
| Equity index | 333.3 | 559.8 | 653.0 | 637.8 | 99,936.1 | 44,711.9 | 7,834.6 | 7,374.0 | 8,027.1 | 7,713.8 |
| Other Markets | 983.1 | 1,472.6 | 944.9 | 957.2 | 11,670.6 | 9,430.8 | 2,107.2 | 2,093.0 | 2,122.1 | 1,552.2 |
| Interest rate | 905.1 | 1,402.2 | 882.9 | 893.0 | 7,652.3 | 6,848.4 | 1,594.2 | 1,412.4 | 1,350.8 | 800.4 |
| Currency | 37.0 | 34.6 | 25.3 | 30.4 | 754.3 | 627.3 | 141.2 | 151.2 | 328.7 | 310.4 |
| Equity index | 40.9 | 35.8 | 36.8 | 33.8 | 3,264.0 | 1,955.1 | 371.9 | 529.4 | 442.6 | 441.3 |

Source: http://www.bis.org/statistics/r_qa1309_hanx23a.pdf

EUR Exchange Traded Futures Relation to EURIBOR/LIBOR

Euribor Futures Volume & Open Interest (OI)



Euribor® Futures and Options

Exceptional Liquidity and Depth of Market - The Most Heavily Traded STIR Derivatives Contracts in the World

With one of the world's leading portfolios of Short-Term Interest Rate (STIR) derivative contracts, NYSE Liffe has everything you need for the European interest rate market.

Euribor®: A Benchmark Contract

NYSE Liffe's three-month Euro (Euribor) interest rate contract suite comprises a futures contract, an option on the futures contract, and a one-year mid-curve option on the futures contract. You are assured the liquidity and depth of market required to fulfill your trading and risk management objectives.



Euribor is referenced to the European Banking Federation's (FBE) EURIBOR (Euro Inter-Bank Offered Rate), the benchmark of the euro money market since 1999. The NYSE Liffe suite provides an easily accessible and liquid means of gaining exposure to this important and increasingly used benchmark.

Our Euribor contracts account for over 99% of euro-denominated STIR exchange-traded derivative money market activity. As our flagship STIR portfolio product and an internationally used benchmark, Euribor offers a wealth of opportunities.

Exchange Traded IR Futures in Europe Dec 2012

Referencing EURIBOR¹ (LIFFE)

Euro denominated non-EURIBOR¹ (LIFFE)

Referencing LIBOR¹ (LIFFE)

Sterling denominated non-LIBOR¹ (LIFFE)

EUROSWISS futures

Total IR Futures Outstanding on LIFFE¹

Total IR Futures Outstanding in Europe² (BIS)

% of EUR-Denominated ETD Futures Linked to EURIBOR

Notional outstanding (LC)

FX rate (EY 2012)

Notional outstanding
(\$ BN)

| | Notional outstanding (LC) | FX rate (EY 2012) | Notional outstanding (\$ BN) |
|---|---------------------------|-------------------|------------------------------|
| Referencing EURIBOR ¹ (LIFFE) | € 3,705 | 1.3241 | 4,905 |
| Euro denominated non-EURIBOR ¹ (LIFFE) | - | X - | 0 |
| Referencing LIBOR ¹ (LIFFE) | £ 1,110 | 1.6043 | 1,781 |
| Sterling denominated non-LIBOR ¹ (LIFFE) | £ 35 | 1.6043 | 56 |
| EUROSWISS futures | CHF 279 | 1.1322 | 316 |
| Total IR Futures Outstanding on LIFFE¹ | | | 7,058 |
| Total IR Futures Outstanding in Europe² (BIS) | | | 7,560 |
| % of EUR-Denominated ETD Futures Linked to EURIBOR | | | 100% |

1. Only Short term interest rate derivatives reference EURIBOR, all of which reference the 3 month EURIBOR

Source: <https://globalderivatives.nyx.com/en/stirs/nyse-liffe/euribor-futures-options>

https://globalderivatives.nyx.com/sites/globalderivatives.nyx.com/files/eu-12028_euribor_fo_120224.pdf

http://www.bis.org/statistics/r_qa1309_hanx23a.pdf

Europe Exchange Traded Futures Volumes

Table 23A: Derivative financial instruments traded on organised exchanges

By instrument and location

Notional principal in billions of US dollars

| Instrument / location | Amounts outstanding | | | | Turnover | | | | | |
|-------------------------|---------------------|-----------------|-----------------|-----------------|--------------------|--------------------|------------------|------------------|------------------|------------------|
| | Dec 2011 | Dec 2012 | Mar 2013 | Jun 2013 | 2011 | 2012 | Q3 2012 | Q4 2012 | Q1 2013 | Q2 2013 |
| Futures | | | | | | | | | | |
| All markets | 22,924.1 | 24,121.3 | 26,074.6 | 25,188.2 | 1,524,140.6 | 1,159,867.4 | 279,408.6 | 261,471.1 | 352,087.1 | 395,347.2 |
| Interest rate | 21,718.9 | 22,641.3 | 24,630.5 | 23,804.0 | 1,359,130.6 | 1,026,136.8 | 245,574.9 | 226,458.6 | 312,537.9 | 350,565.6 |
| Currency | 221.2 | 230.7 | 237.1 | 224.7 | 37,627.6 | 31,916.2 | 7,766.5 | 7,336.3 | 8,940.4 | 9,717.1 |
| Equity index | 984.0 | 1,249.4 | 1,207.0 | 1,159.5 | 127,382.4 | 101,814.4 | 26,067.2 | 27,676.2 | 30,608.8 | 35,064.5 |
| North America | 13,107.9 | 12,894.7 | 13,743.2 | 12,997.0 | 822,958.4 | 619,897.0 | 145,635.0 | 132,887.5 | 161,576.0 | 208,738.2 |
| Interest rate | 12,568.1 | 12,297.0 | 13,134.9 | 12,464.3 | 740,210.8 | 553,546.2 | 129,269.9 | 116,169.4 | 143,769.6 | 188,097.5 |
| Currency | 150.6 | 157.6 | 165.5 | 127.2 | 30,188.7 | 25,486.7 | 6,233.7 | 5,884.5 | 7,217.4 | 7,632.1 |
| Equity index | 389.2 | 440.1 | 442.9 | 405.5 | 52,558.8 | 40,864.1 | 10,131.4 | 10,833.6 | 10,588.9 | 13,008.6 |
| Europe | 6,531.1 | 8,087.2 | 8,857.0 | 8,767.8 | 565,184.8 | 414,844.8 | 101,758.7 | 96,663.2 | 152,835.7 | 142,969.1 |
| Interest rate | 6,100.0 | 7,560.2 | 8,333.7 | 8,233.7 | 525,692.3 | 387,886.6 | 95,223.1 | 89,882.8 | 145,344.1 | 134,775.0 |
| Currency | 2.7 | 3.4 | 4.1 | 2.9 | 363.3 | 438.9 | 134.7 | 128.5 | 125.5 | 163.0 |
| Equity index | 428.4 | 523.7 | 519.3 | 531.3 | 39,129.2 | 26,519.3 | 6,400.9 | 6,651.8 | 7,366.0 | 8,031.1 |
| Asia and Pacific | 2,339.1 | 2,100.9 | 2,437.1 | 2,336.1 | 107,489.9 | 98,660.0 | 25,909.2 | 25,754.5 | 30,869.7 | 34,248.2 |
| Interest rate | 2,181.9 | 1,822.4 | 2,203.2 | 2,121.4 | 71,504.0 | 64,084.9 | 16,347.7 | 15,501.0 | 18,103.9 | 20,182.2 |
| Currency | 8.1 | 11.3 | 10.1 | 11.2 | 2,001.9 | 1,560.2 | 397.5 | 411.6 | 456.0 | 503.1 |
| Equity index | 149.1 | 267.2 | 223.7 | 203.4 | 33,984.0 | 33,015.0 | 9,164.0 | 9,841.9 | 12,309.8 | 13,563.0 |
| Other Markets | 946.1 | 1,038.5 | 1,037.2 | 1,087.2 | 28,507.6 | 26,465.6 | 6,105.7 | 6,165.9 | 6,805.8 | 9,391.7 |
| Interest rate | 868.9 | 961.7 | 958.7 | 984.6 | 21,723.5 | 20,619.2 | 4,734.1 | 4,905.3 | 5,320.2 | 7,511.0 |
| Currency | 59.9 | 58.4 | 57.4 | 83.4 | 5,073.7 | 4,430.5 | 1,000.7 | 911.7 | 1,141.4 | 1,418.9 |
| Equity index | 17.4 | 18.4 | 21.1 | 19.3 | 1,710.5 | 1,416.0 | 370.9 | 348.9 | 344.1 | 461.8 |

Source: http://www.bis.org/statistics/r_qa1309_hanx23a.pdf

OTC and Exchange Traded Derivatives Relation to LIBOR

Notional amount of outstanding contracts recorded by DTCC referencing LIBOR USD BN Equivalent, Nov 2012

| | s/n-o/n | 1w | 2w | 1m | 3m | 6m | 12m | Total |
|--------------|---------|----|----|--------|---------------|---------------|---------------|----------------|
| AUD | 0 | 0 | 0 | 0 | 0 | <10 Contracts | 0 | 0 |
| CAD | 0 | 0 | 0 | 0 | <10 Contracts | 0 | 0 | 0 |
| CHF | 0 | 0 | 0 | 22 | 1,408 | 3,062 | <10 Contracts | 4,492 |
| DKK | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EUR | 0 | 0 | 0 | 0 | 3 | 19 | <10 Contracts | 23 |
| GBP | 0 | 0 | 0 | 960 | 11,860 | 19,373 | 1 | 32,193 |
| JPY | 0 | 0 | 0 | 82 | 5,897 | 40,447 | 0 | 46,426 |
| NZD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SEK | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| USD | 0 | 0 | 0 | 11,160 | 106,386 | 1,052 | 5 | 118,602 |
| Total | | | | | | | | 201,736 |

Note

- This table represents the gross notional amounts (in USD equivalent) for all IRS trades referencing LIBOR by ten major currencies and common reset frequencies
- Aggregate summary based on a subset of Interest Rate derivative transactions (IRS) that have been registered in DTCC Derivatives Repository Ltd's (DDRL's) Global Trade Repository (GTR). "LIBOR" contract count and notional amount provided are derived from all trades where either leg of the transaction references LIBOR
- For EUR, LIBOR in this case refers to EUR LIBOR, not EURIBOR

Source: www.dtcc.com/products/derivserv/data/rates.php

EUR OTC and Exchange Traded derivatives

Maturities

Contractual roll-off of outstanding Interest Rate Derivatives
 EUR IR derivative trades reported to DTCC Global Trade repository

| November 2013 | Notional outstanding (\$BN) | % roll-off after x years | | | | | | | |
|--------------------------------|--|---------------------------------|----------|----------|----------|----------|-----------|-----------|-----------|
| | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| Swap | 128,330 | 17% | 32% | 43% | 62% | 72% | 81% | 93% | 98% |
| FRA | 33,215 | 90% | 99% | 100% | 100% | 100% | 100% | 100% | 100% |
| BasisSwap | 1,727 | 29% | 44% | 55% | 69% | 76% | 84% | 93% | 97% |
| OIS | 29,648 | 80% | 92% | 94% | 97% | 98% | 99% | 99% | 100% |
| CrossCurrencySwap | 4,278 | 27% | 44% | 56% | 73% | 80% | 86% | 95% | 99% |
| CapFloor | 5,335 | 27% | 42% | 56% | 72% | 81% | 88% | 98% | 100% |
| InflationSwap | 1,742 | 16% | 25% | 33% | 51% | 64% | 76% | 91% | 99% |
| CallableSwaps | 150 | 2% | 5% | 8% | 20% | 31% | 41% | 69% | 91% |
| CrossCurrencySwapExotic | 22 | 14% | 33% | 41% | 58% | 68% | 71% | 89% | 100% |
| SwapExotic | 2,311 | 16% | 27% | 36% | 57% | 65% | 72% | 90% | 96% |
| Swaption | 12,954 | 25% | 39% | 48% | 61% | 69% | 74% | 83% | 84% |
| OptionExotic | 959 | 17% | 32% | 46% | 67% | 76% | 83% | 97% | 99% |
| DebtOption | 32 | 24% | 31% | 36% | 49% | 55% | 58% | 67% | 100% |

Source: DTCC Global Trade Repository (8 November 2013)

EUR Deposits

| | Outstanding volume Q4 2012 | Relation to EURIBOR/LIBOR | Sources |
|---------------------------|----------------------------|---|--|
| Retail deposits | \$8.1 TN | <ul style="list-style-type: none"> Estimated low proportion linked to EURIBOR | <ul style="list-style-type: none"> Volumes and maturities: ECB Relation to EURIBOR: Input from market participants |
| Corporate deposits | \$2.4 TN | <ul style="list-style-type: none"> Estimated medium proportion EURIBOR linked <ul style="list-style-type: none"> – Primarily in 3 month and 6 month tenors | <ul style="list-style-type: none"> Volumes and maturities: ECB Relation to EURIBOR: |
| SME deposits | \$2.4 TN | <ul style="list-style-type: none"> Estimated medium proportion EURIBOR linked <ul style="list-style-type: none"> – Primarily 3 month and 6 month tenors | <ul style="list-style-type: none"> Relation to EURIBOR: Input from market participants |

EUR Deposits Volumes

2.1 Sectoral breakdown of MFI loans and deposits vis-a-vis other euro area residents

(EUR billions and annual growth rates; not seasonally adjusted; outstanding amounts and growth rates at end of period; transactions during period)

2. Deposits

| | Households ⁽¹⁾ | | | | | | Non-financial corporations | | | | | | Other financial intermediaries | | Insurance corporations and pension funds | | | |
|---------------------|---------------------------|-----------|-----------------------------|--------------|--------------------------|---------------|----------------------------|---------|-----------|-----------------------------|--------------|--------------------------|--------------------------------|-------|--|-----------------------------------|-------|-------|
| | Total | Overnight | With an agreed maturity of: | | Redeemable at notice of: | | Repos | Total | Overnight | With an agreed maturity of: | | Redeemable at notice of: | | Repos | Total | | Total | |
| | | | Up to 2 years | Over 2 years | Up to 3 months | Over 3 months | | | | Up to 2 years | Over 2 years | Up to 3 months | Over 3 months | | Financial vehicle corporations | Repos with central counterparties | | |
| | | | | | | | | | | | | | | | | | | 3 |
| Outstanding amounts | | | | | | | | | | | | | | | | | | |
| 2011 | 5,894.0 | 2,255.7 | 948.1 | 723.7 | 1,837.1 | 106.7 | 22.7 | 1,686.9 | 1,054.3 | 444.3 | 97.7 | 72.3 | 2.0 | 16.3 | 2,221.0 | 880.2 | 260.0 | 703.8 |
| 2012 | 6,119.1 | 2,346.4 | 979.1 | 747.8 | 1,937.3 | 98.0 | 10.4 | 1,764.1 | 1,150.8 | 408.3 | 106.8 | 85.4 | 2.0 | 10.9 | 2,015.8 | 727.2 | 256.7 | 691.9 |
| 2013 Q1 | 6,166.2 | 2,377.3 | 966.0 | 758.1 | 1,963.5 | 93.1 | 8.3 | 1,750.7 | 1,125.5 | 409.7 | 110.8 | 91.8 | 1.7 | 11.2 | 2,110.8 | 726.4 | 314.1 | 697.4 |
| Q2 | 6,209.8 | 2,446.4 | 928.9 | 770.3 | 1,970.0 | 88.2 | 6.1 | 1,762.4 | 1,151.9 | 389.7 | 116.2 | 92.4 | 1.7 | 10.6 | 2,123.7 | 708.1 | 343.4 | 678.8 |
| 2013 May | 6,188.0 | 2,410.0 | 942.5 | 768.7 | 1,970.7 | 89.4 | 6.7 | 1,761.5 | 1,146.4 | 392.0 | 115.6 | 92.6 | 1.6 | 13.2 | 2,086.6 | 719.0 | 310.2 | 696.3 |
| June | 6,209.8 | 2,446.4 | 928.9 | 770.3 | 1,970.0 | 88.2 | 6.1 | 1,762.4 | 1,151.9 | 389.7 | 116.2 | 92.4 | 1.7 | 10.6 | 2,123.7 | 708.1 | 343.4 | 678.8 |
| July | 6,211.2 | 2,450.4 | 920.9 | 774.9 | 1,971.0 | 87.1 | 6.9 | 1,763.9 | 1,148.5 | 392.6 | 117.3 | 93.3 | 1.9 | 10.3 | 2,049.6 | 699.4 | 287.5 | 683.4 |
| Aug. ⁽ⁿ⁾ | 6,222.3 | 2,464.7 | 914.8 | 778.1 | 1,971.3 | 86.8 | 6.6 | 1,786.6 | 1,164.6 | 395.8 | 117.5 | 94.7 | 1.8 | 12.3 | 1,967.6 | 697.8 | 217.2 | 675.4 |

Conversion to USD

| Retail Loans | € BN | EY 2012 €/USD FX rate | \$ BN |
|--|-------|--------------------------|-------|
| Household Deposits (Retail) | 6,119 | 1.3241 | 8,102 |
| Non-financial corporations deposits (Corporate incl. SMEs) | 1,764 | 1.3241 | 2,336 |

Source: <http://sdw.ecb.europa.eu/reports.do?node=1000003155>

Market Participants Group on Reforming Interest Rate Benchmarks

GBP Currency Report

March 2014

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Executive Summary

Background and Objectives

Sterling remains a major currency area and the availability of reference rates for both cash and derivative based transactions is critical for the markets and for the economy. The Market Footprints section of this report highlights the \$30 TN market in Libor contracts, many of which are long term in nature.

The UK market has undertaken substantial reform of Libor setting to meet with the Wheatley principles and to restore market confidence. We seek to promote benchmarks that will be consistent with IOCSO principles and be practical in supporting markets whilst keeping disruption to the minimum.

Summary of Major Findings and Priorities

The Libor market is so deeply embedded that it is critical that any transition is not disruptive to the functioning of the markets. Libor is used as a reference rate in both cash and derivative markets and stands at the centre of the UK banking system.

A key risk in any reform is that of market disruption and legality as highlighted in the Transitions and Legal Analysis workstreams.

Given the substantial reforms already introduced by Wheatley, a move to Libor+ can build on established reform and we would not expect to see major distortions so that the transition would not be disruptive. The Legal Analysis and Transitions workstreams support the view that a move to Libor+ would be most likely to minimize disruption while at the same time moving into line with IOSCO principles. The banking industry would still be able to use a reference rate that is reflective of true funding costs and continue to support clients with minimum disruption.

The key risk in such a transition is whether the volume of transactions and market activity going forward in the sterling markets are substantive enough to be sufficiently anchored in transactions to meet IOSCO requirement. Given the volume of trading and the aggregation of all data, we expect tenors up to 3-months to be supported. However, in the case of longer tenors such as 6- and 12-months this may be problematic and their future role may need to be reviewed and phased out over time if an acceptable solution is not available.

The transition path into a reference rate based on OIS is more challenging in sterling given both lack of market flow and it's disconnect from a liquidity and credit perspective from the underlying funding markets. Such an approach would require a significant amount of official sector support and guidance. It may be that the OIS curve is used to drive the off balance sheet market but it is not ideal as a direct replacement for sterling Libor. There would be concern that given low trading volumes in Sterling, participants could manipulate fixings by dealing volumes ahead of settlement dates and distort the true market.

The other potential reference rate is Bank of England Bank Rate. It would seem a logical basis for fixings, consistent and transparent and credible on an ongoing basis.

Bank Rate could be used as the GBP Benchmark one month rate. Longer tenors would be accommodated as lending institutions could simply use the Bank Rate plus a spread for loan documentation with their customers.

Should longer tenors such as 3-month and 6-month be required, a system could be developed based on brokers' prices in Base Rate swaps and perhaps collated by the Wholesale Markets Brokers Association in a similar way to RONIA. Base Rate swaps are anchored on the Bank Rate which can only change at MPC meetings.

An additional benefit, should this methodology be embraced, is that a futures strip market could be created organically, again based on the market's forecasts of future interest rate changes. By using Bank Rate as the basis and rate swaps for pricing of longer tenors, the element of bank credit risk is removed, the benchmark has the credibility it so badly needs and users of the fixings will have the benefit of a pure interest rate hedge for their treasury activities.

Using the Bank Rate would remove the opportunity for any potential accusations of manipulation or impropriety and would immediately re-establish the reputation of the Sterling Benchmark, provide permanent fixing for transactions and create a derivatives market in futures strips which are relevant to the whole market.

This approach would need explicit support and agreement from the central bank and be documented in contracts so that changes in future central bank policy would not disrupt the base rate market

Banks and lending institutions would be more likely to establish and publish their own lending rates, again based on the Bank Rate.

In summary

- Moving to a Libor+ solution with a central administrator looks viable and given it is not possible to back test against the current Libor a parallel running would give time to assess stability and ease of transition. It seems to be the proposal that ensures maximum continuity and least legal and transition risk. It would also be in line with the other currency summaries and thus global in application. The current Wheatley bank panel process can be kept as a backup for times of market disruption.
- The OIS market is problematic in terms of both posing a significant transition risk and not reflecting the cost of balance sheet funding that is fundamental to the construct. Its role as a market for off balance sheet transactions should remain its major focus and footprint.
- The use of Bank of England bank rate as the market reference point offers a potential alternative to Libor, although it would mean the market needs to make a major shift in practices. It would require precise definition and be documented to allow for any changes in official rate monetary regimes that may change from time to time.

1. Market Footprint

1.1. Approach

The Pound Sterling (GBP) Market Footprint analysis aims to quantify the volumes and estimate the projected maturities of key classes of financial instruments that reference GBP-LIBOR by asset class and by LIBOR tenor.¹ This information is intended to inform the MPG Workstreams tasked with choosing reference rate menus and designing transition strategies.

Wherever possible, volume data was taken from official public sources. However, public data is not sufficient to provide a complete picture and so this was complemented with a combination of private data and opinions of market participants gathered through the outreach exercise and a series of bilateral discussions.² Wherever possible, attempts were made to corroborate non-official data by making use of multiple sources such as reports by market analysts, news reports and bank websites.

The main data sources used are summarized in Table 1 below:

Table 1 Key data sources

| Asset Class | Key data sources |
|-----------------------------------|--|
| Syndicated Loans | <ul style="list-style-type: none"> • Dealogic • Input from market participants |
| Corporate and retail Loans | <ul style="list-style-type: none"> • Bank of England statistics • ECB statistics • Input from market participants |
| Bonds | <ul style="list-style-type: none"> • Dealogic • BIS quarterly review |
| Securitised products | <ul style="list-style-type: none"> • SIFMA • Dealogic |
| Derivatives | <ul style="list-style-type: none"> • BIS derivatives statistics • DTCC • LIFFE |
| Deposits | <ul style="list-style-type: none"> • Bank of England statistics • ECB statistics • Input from market participants |

A number of early versions of these results were circulated to members of the MPG for comment and to feed into their respective analysis. All feedback from MPG members was incorporated into the final version of this analysis.

¹ Outstanding volumes were estimated as of Year-end 2012. Where data was not available at this date, the most recent available data was used

² Due to confidentiality obligations, all non-public input from market participants has been cited as "Input from market participants".

1.2. Summary of Findings

The notional volume of outstanding financial contracts indexed to GBP-LIBOR is estimated to be greater than \$30 TN³. The main types of contracts indexed to GBP-LIBOR include Over-the-Counter (OTC) and exchange traded derivatives, corporate loans, retail mortgages, floating rate bonds and securitized products. 1-month and 3-month are the most commonly referenced tenors across all product groups, with 6-month used across a subset of products and the 12-month tenor used only in a limited number of cases. Other GBP-LIBOR tenors are rarely used.

It is important to note that in addition to the above analysis of financial contracts which directly reference GBP-LIBOR, there is also a range of other important applications where LIBOR is used. These include:

- Late payment clauses in commercial contracts often refer to LIBOR as an interest rate.
- LIBOR is often used as a discount rate for valuation purposes – although less so for cleared OTC derivatives, where OIS rates are primarily used.
- LIBOR is sometimes used as a performance benchmark for money market funds and other asset managers.

Although it is difficult to estimate the volume of contracts involved, the 'Impact on Corporates' Workstream provides a view of the various uses based on market outreach.

An overview of the Market Footprint findings is presented in Figures 1 and 2 below. Detailed sources and assumptions can be found in Appendix C.

³ \$ figures in this report refer to US Dollar; where values have been converted from GBP, the exchange rate used is from Year-end 2012 (£/\$=1.6043)

Figure 1: GBP-LIBOR Market Footprint overview

| Asset class | | Overall volume (\$ BN) | % LIBOR-related | % non-domestic | O/n | 1w | 1m | 2m | 3m | 6m | 12m |
|--------------------------------|--|------------------------|-----------------|----------------|-----|----|--------|----|--------|--------|-----|
| Level 1 | Level 2 | | | | | | | | | | |
| Loans | Syndicated loans ¹ | 125 | 100% | 9% | | | Low | | Medium | Low | |
| | Corporate loans (bilateral) ¹ | 305 | 90% | Low | | | Low | | Medium | Low | |
| | SME loans | 181 | 31% | Low | | | Low | | Low | Low | |
| | CRE/Commercial mortgages | 272 | Low | Low | | | Low | | Low | Low | |
| | Retail mortgages | 1,662 | 1–2% | Low | | | | | Low | | |
| | Credit cards | 80 | Low | Low | | | Low | | | | |
| | Auto loans ² | Low | Low | Low | | | | | | | |
| | Consumer loans | 99 | Low | Low | | | Low | | Low | | |
| | Student loans | 75 | 0% | Low | | | | | | | |
| Bonds | Floating/Variable Rate Notes | 800 | 54% | 27% | | | Low | | Medium | | Low |
| Securitisation | RMBS | 377 | 100% | 25% | | | Low | | Medium | | |
| | CMBS | 42 | 100% | 0% | | | | | Low | | |
| | ABS | 78 | 67% | 22% | | | Low | | | | |
| | CDO | 65 | 100% | 0% | | | | | Low | | |
| OTC | IR Swaps | 30,187 | 63% | Low | | | Medium | | High | High | |
| Derivatives | FRAs | 8,965 | 63% | Low | | | Medium | | High | High | |
| | IR Options | 3,091 | 63% | Low | | | Medium | | High | Medium | |
| | X-currency swaps | 3,504 | 63% | Low | | | Medium | | High | Medium | |
| | | IR Options | 1,668 | 100% | Low | | | | | High | |
| ETD | IR Futures | 1,836 | 97% | Low | | | | | High | | |
| Deposits | Retail deposits | 1,756 | Low | Low | | | | | TBC | | |
| | Corporate deposits | | TBC | Low | | | | | TBC | | |
| | SME deposits | 1,574 | Low | Low | | | Low | | Medium | Low | |
| Mutual funds | Money market funds | TBC | Indirect | | | | | | | | |
| | Bank loan funds | TBC | Indirect | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | TBC | TBC | |
| | Discount rates | | | | | | | | | | |

 Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Significant overlap exists between Syndicated loans and Corporate business loans
 2. Auto loans included within consumer loans

Figure 2: Projected roll-off of LIBOR linked contracts

| Asset class | | Outstanding volume (\$ BN) | % LIBOR-related | % Callable | % roll-off after x years | | | | | | | |
|--------------------------------|--|----------------------------|-----------------|------------|--------------------------|-----|------|------|------|------|------|------|
| Level 1 | Level 2 | | | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| Loans | Syndicated loans ¹ | 125 | 100% | | 23% | 53% | 69% | 89% | 91% | 92% | 98% | 100% |
| | Corporate loans (bilateral) ¹ | 305 | 90% | | 30% | | | 40% | | | | |
| | SME loans | 181 | 31% | | | | | | | | | |
| | CRE/Commercial mortgages | 272 | Low | | | | | | | | | |
| | Retail mortgages | 1,662 | 1–2% | | | | | | | | | |
| | Credit cards | 80 | Low | | | | | | | | | |
| | Auto loans ² | Low | Low | | | | | | | | | |
| | Consumer loans | 99 | Low | | | | | | | | | |
| | Student loans | 75 | 0% | | | | | | | | | |
| Bonds | Floating/Variable Rate Notes | 800 | 54% | 16% | 10% | 23% | 35% | 49% | 51% | 60% | 70% | 73% |
| Securitisation | RMBS | 377 | 100% | 42% | 0% | 0% | 1% | 1% | 2% | 2% | 5% | 30% |
| | CMBS | 42 | 100% | 14% | 23% | 31% | 43% | 62% | 78% | 83% | 91% | 100% |
| | ABS | 78 | 67% | 51% | 5% | 9% | 13% | 24% | 36% | 42% | 67% | 84% |
| | CDO | 65 | 100% | | | | | | | | | |
| OTC derivatives | IR Swaps | 30,187 | 63% | | 17% | 30% | 40% | 57% | 65% | 74% | 88% | 96% |
| | FRAs | 8,965 | 63% | | 87% | 99% | 100% | 100% | 100% | 100% | 100% | 100% |
| | IR Options | 3,091 | 63% | | 34% | 48% | 59% | 71% | 76% | 81% | 88% | 89% |
| | X-currency swaps | 3,504 | 63% | | 26% | 41% | 51% | 66% | 73% | 79% | 92% | 98% |
| ETD | IR Options | 1,668 | 100% | | | 95% | | | | | | |
| | IR Futures | 1,836 | 97% | | | | | | 95% | | | |
| Deposits | Retail deposits | 1,756 | Low | | 55% | 91% | | | | | | |
| | Corporate deposits | | TBC | | 72% | 95% | | | | | | |
| | SME deposits | 1,574 | Low | | | | | | | | | |
| Mutual funds | Money market funds | TBC | Indirect | | | | | | | | | |
| | Bank loan funds | TBC | Indirect | | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | | | | |
| | Discount rates | | | | | | | | | | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. 1. Roll-off rates in this draft represent contractual maturity, actual roll-off is expected to be significantly faster due to prepayment

\$83 BN of GBP syndicated loans were originated globally in 2012, according to Dealogic, with an estimated notional outstanding of \$125 BN. Nearly all GBP syndicated loans reference LIBOR, mostly at the 1-month and 3-month tenors. Few syndicated loans reference other LIBOR tenors. 90% of current outstanding loans are expected to roll off over a 5-7 year period.

Domestic UK retail and corporate loan and deposit volumes are taken from the Bank of England Bankstats. The relation to LIBOR for business loans is based on proprietary data from market participants. The data shows that larger exposures are more likely to be linked to LIBOR, with ~30% of SME loans and ~90% of large corporate loans indexed to LIBOR. The main tenors used are 1-month and 3-months with some referencing 6-months. There will be some double-counting between corporate business loans and syndicated loans. According to ECB statistics, 60% of business loans in the UK have a maturity of over 5 years.

Of the \$1.6 TN outstanding Retail mortgages in the UK, Only 1-2% are indexed to LIBOR. The bulk of these were issued pre-2008. Student loans and other retail lending (e.g., Credit card, Auto) are generally not indexed to LIBOR.

Floating and Variable rate notes volumes were taken from BIS quarterly review and issuance data was extracted from Dealogic. About 50% of issued notes were indexed to LIBOR, over 90% of which were indexed to the 3-month tenor. Outstanding volumes of securitized products were taken from SIFMA. The relation to LIBOR is based on issuance data from Dealogic. ~50% of these contracts are expected to mature over a 7 year period.

Exchange traded and OTC derivatives are by far the largest class of contract linked to LIBOR. Derivatives linked to LIBOR include Interest Rate Swaps and Options, Forward rate agreements and cross currency swaps. Data from the DTCC Global Trade Repository (GTR) shows \$32 TN of notional contract outstanding linked to GBP-LIBOR. Of these, 60% (\$19 TN) are linked to 6-month LIBOR, 37% (\$12 TN) to 3-month and 3% (\$1 TN) to 1-month. Maturity data for outstanding OTC interest rate derivatives from DTCC shows that ~70% of outstanding LIBOR contract will mature over a 7-year period. Data from LIFFE shows that effectively all GBP denominated Short Term Interest Rate derivatives are linked to 3-month LIBOR.

2. Reference Rate Menu

2.1. Introduction and Approach

This chapter of the MPG report summarizes our recommended GBP reference rates. We reviewed four classes of term reference rates, based respectively on unsecured bank debt (Libor+), Sterling Overnight Index Swaps (OIS) Bank of England Bank rate and Sterling treasury bills. We recommend three of these as potential benchmarks but reject treasury bills.

We have sought to build on initiatives already in progress in the UK such as the Wheatley report. We reviewed research papers from the banking industry and examined market structures over a number of calls and one to one meetings.

The first approach based on unsecured bank debt is anchored in real transactions and would be seen as an overlay to current Libor and would facilitate the easiest transition. We have worked on the principle that actual transactions best meet transparency issues and executable quotes are supportive. There will remain areas of judgement that the benchmark administrator will need to review such as treatment of outliers and interpolation of rates to create the curve.

Feedback received suggested strongly that concerns over legal issues, frustration of contract, systems and accounting issues meant there was support for a Libor+ approach. The UK authorities had been fast to remedy legacy issues with Libor thus giving it a strong grounding.

The OIS curve has credibility as a platform for effective short term off balance sheet risk management and was seen as complementing and possibly being extended in the future. However, its ability to replace Libor is constrained by the fact it is not cash, not so familiar in the market and volumes are not large.

Bank of England Bank Rate provides very transparent anchoring for overnight rates. Its lack of term structure is a drawback and counterparts would need to add in margins for anticipated changes in short end to their expected funding rates. For longer tenors then a new market would need to be developed in base rate swaps based on a broker market in a way similar to Ronia

All of our recommended GBP reference rates are based on market data, quotes or official rates and we believe would meet the IOSCO criteria.

2.2. Recommended Rates

2.2.1. *Libor+ unsecured bank rates*

Tenors: O/N, 1w, 1m, 2m, 3m (also 6m & 12m subject to data validation)

The process for banks submitting Libor rates is much improved following the Wheatley review with submitters working under a strong governance framework. The Libor+ based approach is the one that best reflects the actual costs for banks to finance lending and

would have the cleanest transition. The workstream was mindful of the footprint analysis showing the large market size and that that Libor is used for both asset and liability products for long terms.

We propose that the setting of rates is primarily driven by transactions in interbank, CD and CP trades, widening the panel of contributors and looking for brokers to submit data.

There are two ways the fixing could be administered using a benchmark administrator:

1. Bank panel submissions.

Using the strict rules applied following the Wheatley report, individual banks and brokers will contribute their own costs of funds to the administrator who will aggregate and publish the results using defined algorithms

We discuss in more depth in the Fixings Methodologies section the mechanics for supporting this approach based in "anchored transactions" In essence this method would be based on the panel banks submitting Libor fixings based on all actual transactions in interbank, CD and CP markets booked as the key driver. Each panel bank is to be subject to external audit to ensure practices are strictly adhered to.

One of the positives of this approach will be the ability to publish Libor+ at 12.00 based on rates submitted right up until 11.00 on the same day.

2. Administrator calculated

The banks and brokers would be instructed to submit all deals to a central clearing benchmark administrator NYSE Euro next Rate Administration Limited "NEuRAL".

This approach would also be anchored in transactions. We need to explore more how the time cycle under which the Libor+ would be published under this method. It removes the need for Banks to submit rates and just data that may be supportive in showing its independence and arm's length nature.

Under either approach the data collected should be used with an algorithm to fix rates along the curve.

It was felt that there would be sufficient volumes up to 3 months for this to provide reliable fixings that would not be at significant variance with current Libor. The data would need to be carefully screened to avoid double counting of deals between brokers and the banks.

In order to cross check and validate Libor submissions looking at rates and trends, the calculating agent can take into account trends in pricing from FX Forwards, Financial Futures and Sonia curves. This is to give a perspective on trends and rates from different markets to help verify the veracity and robustness and calculations of Libor+.

With respect to 6- and 12-month settings it is not evident at this stage that sufficient depth of transactions exists to support the settings. Given that 6-month Libor is widely used in legacy contracts this is a key consideration. We propose at this stage to make the inclusion of 6- and 12-month points provisional on the collection of further data that we are seeking from the BBA and Bank of England.

Should the data not show sufficient robustness at the 6- and 12-month points we will review if there is any interpolation method from other markets that might be applicable to price discovery. If it is deemed not viable to create 6- and 12- month points that were IOSCO compliant we would need to consider dropping them as reference rates, cogniscent of the considerable legal and transition issues this would create.

It may be that market participants will look to move more into 1- and 3-month Libor+ fixings that would mitigate some of the concerns we have around price discovery in the 6- and 12-month parts of the curve. However, we would need to manage the legacy books as 6-month durations are common, unless counterparts also wanted to change to shorter tenors.

2.2.2. *Sterling Overnight Index Swaps (SONIA)*

Tenors: O/N, 1m, 3m

The advantage for users of Sonia is that it is seen as a clean and pure curve because it does not have any liquidity or credit premium built into its structure. However, this is also its drawback in that it would not replace Libor in reflecting the true costs faced by financial intermediaries in raising funds. The curve would thus need a credit spread to reflect actual funding costs.

Setting rates in OIS would need to be driven by transactions based on bank submissions with a need to drive activity to support real flow. It may take some time to build up a sufficient track record but as a recognised index, it already has market traction. The move toward centralised clearing counterparties and the enhanced use of collateral are changing market dynamics. The market has the opportunity to develop in volumes and this would help support price transparency.

The OIS curve does not carry credit or liquidity margin, making it a useful benchmark for a risk free rate but not reflective of bank funding credit risk. It may be used as a reference rate for derivative based contracts only where there is no principal exchanged.

There is over time the potential to develop maturity beyond the overnight from reporting of transactions as the market develops We understand that Telbor in Israel uses an approach on these lines and might usefully be reviewed and adapted if possible.

The most significant issue with SONIA is that with daily volumes of just £4-10bn a large trade can influence the fixing level and the market has seen such instances. In contrast the majority of cash is left on reserve at the bank of England with some £300bn of balances. There is a concern that market participants could move the rate in Sonia due to low volumes and consideration is needed how to avoid this outcome.

As with the Libor+ proposal, an independent administrator should collect data and apply the methodology for fixings. SONIA is currently captured by the WMBA (Wholesale Markets Brokers Association) with contributing member firms capturing deals of £25m+ to four decimal places until 4.15 pm close and the index published at 17.00.

We consider that overnight SONIA referencing would have the potential for compliance if the level of market activity could be stimulated with the support of the Bank of England and the regulators. In the first instance this would be for the overnight rate. The 1 and 3-month

tenors would need to be developed or possibly priced off related instruments such as futures. We believe if the level of market activity can be stimulated in conjunction with the WMBA data capture process then this can qualify as IOSCO compliant. If this does not meet requirements then a system based on executable quotes may be proposed.

2.2.3. *Bank of England Bank Rate*

Tenor: Official Overnight rate and potential term market

The Bank of England Bank Rate is the official benchmark rate and thus benefits from the independence and transparency of its setting. The banks do not fund at bank rate and it has no term structure, but it can act as an anchor reference point with banks negotiating a bilateral margin with clients and accepting the basis risk then arising.

It is a reliable and durable index and some markets have used such a reference rate for pricing loans and overnight it was a popular index in France in the 1980's.

The Bank of England Bank Rate is set by the monetary policy committee of the Bank of England and is an independent and transparent process for the purposes of IOSCO compliance. The documentation of contracts would need to be mindful of any changes in monetary policy structure impacting on the use of Bank Rate

The use of the official Bank Rate would have permanence in a way that other reference rates do not as we cannot know how transaction levels will evolve in the future. The lack of term structure may be obviated over time as a base rate swap market could develop in a way similar to Ronia. Over time a futures market could be developed to further underpin the use of this as a reference rate.

Bank Rate could be used as the GBP Benchmark one month rate. Longer tenors would be accommodated as lending institutions could simply use the Bank Rate plus a spread for loan documentation with their customers.

Should longer tenors such as 3-month and 6-month be required a then a system could be developed based on brokers' prices in Base Rate swaps at perhaps collated by the Wholesale Markets Brokers Association in a similar way to RONIA and use these rates for longer tenors. Base Rate swaps are anchored on the Bank Rate which can only change at MPC meetings.

An additional benefit should this methodology be embraced is that a futures strip market could be created organically, again based on the market's forecasts of future interest rate changes. By using Bank Rate as the basis and rate swaps for pricing of longer tenors, the element of bank credit risk is removed, the benchmark has the credibility it so badly needs and users of the fixings will have the benefit of a pure interest rate hedge for their treasury activities.

Using the Bank Rate would remove the opportunity for any potential accusations of manipulation or impropriety and would immediately re-establish the reputation of the Sterling Benchmark, provide permanent fixing for transactions and create a derivatives market in futures strips which are relevant to the whole market.

This approach would need explicit support and agreement from the central bank and be documented in contracts so that changes in future central bank policy would not disrupt the base rate market

Banks and lending institutions would be more likely to establish and publish their own lending rates, again based on the Bank Rate.

2.3. Considered but not recommended

2.3.1. *GBP Treasury Bill Market*

Tenors: 1m, 3m, 6m

The Treasury bill market offers some opportunity to provide a risk free anchor rate. The debt management Office undertakes weekly auctions and issue £2 BN in 1-, 3-, and 6-month maturities. The limitation of the approach is the limited secondary market meaning that prices may be stale and it does not have the depth of activity of the Libor markets.

This market does not reflect bank funding costs and that is another limitation in adapting its use for more widespread loan or deposit pricing.

This approach is not recommended because it is not deep or liquid enough to allow meaningful daily settings across the curve.

It could only be considered and if additional volume and trading were to become market norm this will offer a reference point into the market. We do not consider this is a feasible solution today but could offer the potential to develop if it was given official status and central bank support.

The paucity of richness of data constrains price discovery in accordance with the principles and this would need more consideration as part of an overall reform of the T bill market.

We do not think for the GBP market this would pass IOSCO principles.

3. Fixing Methodology

3.1. Approach

Libor is the key reference rate used in the UK interbank market and used as a key pricing reference for UK corporate and commercial lending.

The volumes in the bank unsecured funding market have decreased following the financial crisis as banks have adapted their balance sheets to more deposit reliance and Basel III liquidity regulations reduce the value of shorter term funding. In looking at a Libor+ fixing methodology this is a factor and means that expert judgment, experience and observation of trends from other markets will be relevant. We consider two approaches to the fixing of GBP Libor may be viable on the understanding that there is at least sufficient transaction data in business as usual times to provide sufficient underpinning. We seek data from the Bank of England and BBA to substantiate this proposition.

The two approaches are either to follow and reinforce the Wheatley panel system or to have the market submit trades directly to an administrator such as NYSE.

1. Bank panel

Following the publication of the Wheatley report in the UK the process for setting Libor means the rate setting process is the most robust and transparent than it has ever been and each bank is subject to external audit.

This approach would rely on taking all deals being taken into account including Commercial paper and certificates of deposits. The advantages of this approach include its continuity; the direct input of market expertise into the rate setting process and robustness under stress, with banks knowing market circumstances. However, from a reputational perspective some may argue that having the banks involved in the setting process is prone to manipulation.

2. Central Administrator

This would aggregate all market data and could include submissions from brokers and other market counterparties. It misses out the filter of the banks which will mean it is arm's length from the banks and perceived as less subject to any manipulation.

The drawback to this approach is that the administrators are not as close to the market and it will become a "calculation" exercise only. The judgment required when putting together submissions using other market data and trends and in particular in stressed markets may not be as well informed.

The key issue however under either of the approaches is the need for a continuation of publishing a rate Libor+ rate. The Transitions workstream have highlighted the belief that it will be easier to facilitate the transition from the current Libor rates. Given how dependent the UK market is on Libor rates and fixings it is vital to minimise disruption so as not to impact real market and economic activity.

3.2. Fixing Methodology

We propose that the setting of rates is primarily driven by transactions in interbank, CD and CP trades, widening contributors and looking for brokers to submit data.

There are two ways in which the fixing could be administered using a benchmark administrator.

1. Bank panel submissions.

Using on the strict rules applied following the Wheatley report individual banks and brokers will contribute their own costs of funds to the administrator who will aggregate and publish the results using defined algorithm

In essence this method would be based on the panel banks submitting Libor fixings based on all actual transactions in interbank, CD and CP markets booked as the key driver. Each panel bank is to be subject to external audit to ensure practices are strictly adhered with.

One of the positives of this approach will be the ability to publish Libor+ at 12.00 based on rates submitted right up until 11.00 on the same day.

Given the decreased volumes in the interbank market and the potential for disruption, maintaining the panel means that the contributors are close to the market when judgment needs to be applied. The downside of this approach may be the perception of independence given the rate process passes through the banking panel.

2. Administrator Calculated

The banks and brokers would be instructed to submit all deals to a central clearing benchmark administrator NYSE Euro next Rate Administration Limited "NEuRAL".

This approach would also be anchored in transactions .we need to explore more how the time cycle under which the Libor+ would be published under this method. It removes the need for Banks to submit rates and just data that may be supportive in showing its independence and arm's length nature.

3.3. Data and Extrapolation

It was felt that there would be sufficient volumes up to 3 months for this to provide reliable fixings that would not be at significant variance with current Libor. The data would need to be carefully screened to avoid double counting of deals between brokers and the banks.

In order to satisfy minimum data requirements to support fixings we would propose:

- Minimum aggregate volume per maturity
- Minimum contributors per maturity

The quantification of these minimum limits remains to be established.

In order to cross check and validate Libor submissions looking at rates and trends, the calculating agent can take into account trends in pricing from FX Forwards, Financial Futures and Sonia curves. This is to give a perspective on trends and rates from different markets to help verify the veracity and robustness and calculations of Libor+.

With respect to 6-month and 12-month settings, it is not evident at this stage about the depth of transactions to support the settings. Given that 6-month Libor is widely used in legacy contracts this is a key consideration. We propose at this stage to make the inclusion of 6 and 12 month points provisional on the collection of further data that we are seeking from the BBA and Bank of England.

Should the data not show sufficient robustness at the 6 and 12 month points we will review if there is any interpolation method from other markets that might be applicable to price discovery.

3.4. Back Up Process

If there is no or insufficient transactions data then there should be a mix of back up algorithms and judgment based on other market activity and expert opinion. This may take the form of:

- If first attempt fixing fails the see if a delayed time fixing is possible
- Extending the use of lagged data or widening maturity inclusion for a particular bucket
- Reviewing trends in related markets and inferring historical relationships
- Expert judgment of market participants about where the market could actually trade. If we retain the Wheatley panel process this is readily facilitated.

4. Transitions – Debt Products

4.1. Overview

This report considers the proposed alternative reference rates put forward by the MPG and discusses four possible paths for transitioning GBP Debt Products from the current LIBOR framework. The efficacy of each path in managing transition risk ultimately depends on the final choice of reference rate. This report highlights the advantages and disadvantages of each path.

In designing transition plans, the eligible reference rates, prevalence of LIBOR tenors, size and maturity structure of the Sterling cash market, transition precedents, input from market participants, and legal ramifications have been considered.

Four possible transition paths – Seamless, Successor Rate, Market-Led and Parallel with Cut-Over – are discussed, leading to the following conclusions:

- A *Seamless* transition to a reformed LIBOR (LIBOR_{SL}) is the least challenging transition operationally and the preferred route, subject to an IOSCO-compliant LIBOR_{SL} being available
- For transitions to a similar, but not equivalent, LIBOR-like rate (LIBOR_{SR}), a *Successor Rate* transition is recommended
- For transitions to other reference rates (SONIA, BoE), a *Market-Led* transition is preferred (with no forced final discontinuation of LIBOR)
- A *Parallel with Cut-Over* transition is recommended for transitions to SONIA, BoE where a forced discontinuation of legacy LIBOR is necessary as a policy choice, though this transition path would not be preferred overall
- Action should be taken to promote the availability of IOSCO-compliant fixings of LIBOR_{SL} or LIBOR_{SR} at 6m and 12m tenors (to eliminate the need to forcibly transition these tenors to different rates or shorter tenors)
- No transition solution was found for securitised products (as voluntary transition may not be possible due to the potential for conflicting incentives amongst tranches, and a forced transition may lead to legal challenges)

4.2. Background

A wide range of LIBOR-referenced products exist in GBP debt markets. A full overview of GBP LIBOR-linked markets can be found in the Market Footprints report. Here, we note the notional volume of financial contracts linked to GBP LIBOR is estimated at \$30tn equivalent and includes a wide variety of GBP cash instruments including loans, commercial mortgages, consumer debt products, floating rate notes (FRNs), securitised products, deposits and mutual funds.

Contractual references to 3m LIBOR are most common, though 1m, 6m, and 12m tenors are also prevalent. Maturity distributions of outstanding contracts provide some indication of contract run-off schedules, which are useful when considering transition timelines and attrition of legacy contracts.

While contracts referencing LIBOR typically contain “fall-back provisions” should LIBOR become unavailable, such provisions are not considered robust enough to support a permanent discontinuation of LIBOR, and reliance on these fall-back provisions could lead to widespread legal challenges.⁴

Transition Precedents

Given the scale of the challenge involved in a transition away from LIBOR, any lessons that can be learnt from historical precedents are particularly useful.

The transition from national reference rates (e.g. FIBOR, PIBOR etc.) to EURIBOR/EONIA is the most relevant historical precedent and is discussed in detail in the EUR Legal and Transitions reports.

The recent transition away from certain Libor tenors and currencies as a result of the Wheatley Review is the most recent precedent. The BBA reduced the number of tenors and discontinued two currencies. The eliminated tenors and currencies already had viable alternatives or could be determined by interpolation so the process was accepted by the market with negligible disruption. ISDA issued guidance and an Amendment Letter to help with the transition to new tenors but parties were not obliged to follow. For the discontinued currencies, the Amendment letter did not apply. Instead, the guidance simply stated that counterparties would need to agree bilaterally how to deal with transactions that referenced discontinued LIBOR rates.

The recommendations provided herein draw from such transition precedents, though it should be noted that unprecedented challenges arise in transitioning to the proposed alternative reference rates.

4.3. Transition Recommendations

The MPG’s final reference rates proposals for GBP are as follows:

- LIBOR_{+SL}/LIBOR_{+SR}, (1w, 1m, 2m, 3m, 6m, 12m, subject to availability)
- SONIA (O/N, 1m, 3m)
- Bank of England Official Bank Rate (O/N)

For the purposes of this report:

LIBOR_{+SL} is defined as a reformed LIBOR that is IOSCO-compliant and closely resembles legacy LIBOR in both value and definition.

LIBOR_{+SR} is defined as an IOSCO-compliant benchmark rate based on unsecured transactions that is similar to, but differs from, legacy LIBOR in value and/or definition (for example, it may include non-interbank transactions, or is a rate that is systematically different to legacy LIBOR in value).

⁴ See Legal Analysis Section of this report.

This report treats **LIBOR+_{SL}** and **LIBOR+_{SR}** as distinct reference rates and provides separate transition recommendations for each.

In the paragraphs that follow, four possible transition paths are outlined. The above reference rates are paired with the transition path that is thought to minimize the costs of transition.

Figure 3 - Potential Transition Paths

| Transition Path | | Description | Recommended Reference Rate |
|------------------------|--|--|--|
| Seamless | | <ul style="list-style-type: none"> ▪ Terminate LIBOR after a notice period (12-18 months) ▪ New rate “seamlessly” replaces legacy LIBOR on screen | ▪ LIBOR+ _{SL} |
| Successor Rate | | <ul style="list-style-type: none"> ▪ Terminate LIBOR after a notice period (>2years) ▪ Commence publishing new reference rate one day later ▪ All contracts automatically default to successor rate | ▪ LIBOR+ _{SR} |
| Market-led | | <ul style="list-style-type: none"> ▪ Launch new reference rate (after lead-in) ▪ Retain LIBOR indefinitely ▪ Allow the market to decide which is preferable ▪ Incentives to transition likely to be required | <ul style="list-style-type: none"> ▪ SONIA ▪ Bank of England |
| Parallel with Cut-Over | | <ul style="list-style-type: none"> ▪ Launch new reference rate ▪ Run rates in parallel during transition period (5-7 years) ▪ Discontinue LIBOR after transition period ▪ May require the use of a conversion factor | <ul style="list-style-type: none"> ▪ SONIA ▪ Bank of England |

4.3.1. *Seamless Transition*

Recommended for: LIBOR+_{SL}

It is the impression of the Legal work stream that the risk of legal challenges and contract frustration claims will be low for a transition that implements only marginal changes to LIBOR⁵. A transition to such a rate may be enacted “behind the scenes” by replacing the published LIBOR screen rate with the new LIBOR+_{SL} rate, at which point all contracts would be converted to the new rate automatically. Arguably, this has already happened with the implementation of some of the changes recommended by the Wheatley Review.

In light of this, a Seamless transition to LIBOR+_{SL} is the preferred option, should an IOSCO-compliant fixing be available. It must be stressed, however, that such a transition would require a LIBOR+_{SL} that is i) similar in both value and definition to legacy LIBOR and ii) supported by sufficient transaction data to provide an IOSCO-compliant fixing. As such,

⁵ The difficulty here is where to draw the line between material and immaterial changes to LIBOR. That is, when are changes to LIBOR significant enough to require the “Seamless” transition as opposed to the “Successor Rate” transition? It has been suggested that back-testing could be useful in this regard but Legal notes that it is not necessarily the case that LIBOR is not equivocal to LIBOR+ just because historical data shows some variance. In that respect, we merely acknowledge the possibility of two transition paths and leave it to Legal and the OSSG to determine the best path for the chosen reference rate.

there may be tenors (particularly 6m and 12m) where an IOSCO-compliant LIBOR+_{SL} fixing is not available, and therefore a Seamless transition is not viable.

Timescale

Due to the simplicity of the transition path, a short lead-in period is required for a Seamless transition. A period of 12-18months between the announcement date and start date of the new rate should be sufficient.

Protocol for transition period

The main purpose of the Seamless lead-in period would be to clearly communicate to the market the changes that will be implemented. Infrastructure development needs should be minimal.

Not recommended for: Any materially different rate (SONIA, BoE, LIBOR+_{SR})

Attempting an immediate transition from LIBOR to a materially different rate will require a forcible conversion of existing contracts. Such a course of action is highly inadvisable as it could incur significant legal and operational challenges including contract frustration claims and non-PV neutral conversion. The latter complication could be averted with the application of a conversion factor. However, the application of conversion factors is non-trivial and additional problems arise from their use (see Derivatives Transition report for a detailed discussion).

4.3.2. **Successor Rate Transition**

Recommended for: LIBOR+_{SR}

A reformed LIBOR or similar unsecured benchmark rate that differs in both definition and value to legacy LIBOR (here defined as **LIBOR+_{SR}**) is better viewed as a successor rate to LIBOR than as a continuation of the same rate.

Attempting a Seamless transition would entail too much legal risk given the possible differences in definition and/or value between the two benchmarks and would not be recommended. From both legal and operational perspectives, running legacy LIBOR and LIBOR+_{SR} in parallel is not recommended, as there may be confusion as to what the two rates represent. Therefore, the Market-Led and Parallel with Cut-Over transitions (see below) are not recommended for such a rate.

The Successor Rate transition would be enacted by discontinuing legacy LIBOR on a certain date, and on the following day commencing publication of a successor rate (LIBOR+_{SR}). This transition expects the legal doctrine of implied terms would allow the courts to imply a successor rate into contracts that reference legacy LIBOR. From the GBP Legal Report:

"The question for a court is whether such a provision would spell out in express words what the instrument, read against the relevant background, should reasonably be understood to mean. The implied term contended for must "go without saying": i.e. although the instrument does not say so, that is what a reasonable person would understand it to mean."

By utilising this doctrine, a transition similar to the Seamless transition (in that it would apply to all contracts simultaneously) would be available, although the legal argument is

more complex. As the success of this transition cannot be known definitively until after the switch to LIBOR+_{SR} has occurred and any challenges through the courts have failed, the key risk for this transition is that it would have to be implemented without prior knowledge of whether it will cause significant disruption or not.

Any methods that can be used to align LIBOR+_{SR} to the various features of legacy LIBOR will help its acceptance as the successor rate. For example, timing and mode of publishing and rate administrator should all be kept consistent if possible. The risk of failure can be further mitigated by:

- Publishing legal opinions
- Legislation
- Industry support (including market-wide protocols and opinions)

Timescale

A Successor Rate transition would require a longer lead-in period than a Seamless transition due to the increased need to mitigate any legal risk. This transition would be expected to require at least 2 years lead-in time before switching to the successor rate.

Protocol for transition period

Clear communication to the market would be required. Published legal opinions and non-binding guidance/amendment letters would ease the passage of a successor rate transition.

Not recommended for: LIBOR+_{SL}, SONIA or BOE

Pursuing the Successor Rate transition path is not recommended for any of the other GBP reference rates. The doctrine of implied terms is not strong enough for SONIA or BOE. That is, it does not “go without saying” that these rates should be successors to LIBOR. LIBOR+_{SL} can be considered a continuation of the same rate and hence does not require the doctrine of implied terms for legal risks to be contained.

4.3.3. Market-Led

Recommended for: SONIA, BoE

Running LIBOR in parallel with a new reference rate indefinitely would circumvent any legal issues and market disruption that would arise from a forced final conversion to a different reference rate.

However, should the process be left entirely to participants, significant inertia is envisioned and debt contracts referencing the new reference rate may not attain sufficient liquidity to reach critical mass. For example, the Corporate Impact work stream suggests corporations will have difficulty justifying the cost/benefit of transition and thus are likely to remain with legacy LIBOR if given the choice.

Several debt product types (e.g. residential mortgages, non-linear products, structured products) may not be able to transition voluntarily from legacy LIBOR to a new reference rate. Such products would either need a forced final conversion (with the potential for disruption that would imply) or would need to be grandfathered.

Incentives to write contracts on the new reference rate and disincentives to maintain contracts based on legacy LIBOR may increase the probability of success of the new rate and mitigate inertia. Incentives could include preferential tax, accounting or capital treatment for contracts referencing the new rate. Disincentives could include prohibiting new debt contracts referencing legacy LIBOR (though not recommended due to expected negative effects on derivatives markets) or disadvantageous tax, accounting or capital treatment for residual legacy LIBOR contracts.

Over time, attrition would reduce the outstanding stock of LIBOR based contracts, possibly allowing for the eventual discontinuation of LIBOR, whilst minimising unquantifiable legal consequences. However a gradual approach where legacy contracts become illiquid could be detrimental to some participants.

The primary concern with this transition path is that legacy LIBOR would need to continue for a very long period. Therefore, the maintenance of a robust LIBOR submission framework is critical, although the framework has been strengthened considerably from the implementation of the Wheatley Review's recommendations.

Timescale

A lead-in time of at least two years would allow market participants to develop the required infrastructure to support the new reference rate. The parallel transition period would be indefinite, though a discontinuation of legacy LIBOR may eventually be possible.

Protocol for transition period

Primarily market driven though incentives may be required to combat inertia.

Not recommended for: LIBOR+SL/SR

A market led transition to a non-materially different rate is not recommended because LIBOR+_{SL/SR} rates already lend themselves to simpler transition paths. Whilst a market led approach would be beneficial to a transition to SONIA or BOE, the uncertainty and complexity would be unnecessary for LIBOR+_{SL/SR}.

4.3.4. *Parallel Transition with Cut-over*

Recommended for: SONIA, BoE, where a final discontinuation of LIBOR is required

Should the OSSG decide it is a policy goal, and therefore a necessity, to discontinue legacy LIBOR, running a new reference rate in parallel to LIBOR for a specified transition period before a final discontinuation of legacy LIBOR is the preferred solution for any transition to SONIA or BoE rates.

In essence, this transition path is a market-led transition with the additional feature of a final discontinuation of legacy LIBOR (a "cut-over"). After some lead-in period, the extended transition period allows market participants to voluntarily transition their portfolios to the new reference rate. Inertia is reduced as the announcement of a discontinuation date of legacy LIBOR acts as a strong disincentive to write contracts referencing a rate that will be discontinued. Other incentives such as restricting or prohibiting new debt contracts referencing legacy LIBOR can assist during this period (though neither is recommended as

they may impede liquidity in derivatives markets). This path also reduces the tail of legacy contracts that need to be transitioned at the LIBOR discontinuation date.

On the discontinuation date, in the absence of specific legislation to force conversion, residual outstanding contracts would not automatically convert to the new rate. It may be possible to convert residual outstanding contracts using a conversion factor approach, though this would have to be negotiated bilaterally or take place as part of a protocol (only available for some markets). Contracts that do not convert voluntarily before, or at, the discontinuation date would not necessarily become unenforceable, as they may have some success using fall-back provisions, though such an approach is seen as highly risky.

The benefits of this transition path mainly relate to the long parallel transition period:

- A large proportion of outstanding contracts mature, reducing the tail of legacy contracts that need to be transitioned at the LIBOR discontinuation date
- Liquidity develops in contracts referencing the new rate
- Market participants have time to voluntarily renegotiate or transition their portfolios via basis swaps
- Infrastructure / IT has ample time to adapt to the new reference rate

However, the following challenges arise with this transition path:

- The choice of final conversion factor is non-trivial and may lead to non-zero PV changes for some products, the application of which may lead to legal challenges
- It may not be viable to forcibly transition some contract types (e.g. securitised products), legal challenges may result
- Any final discontinuation date will need to be coordinated on a global basis to ensure cross-currency hedges remain effective
- Maintenance of the LIBOR submission process during the parallel transition period would be required
- Development and support for new basis markets would be required

Timescale

A lead-in time of at least two years is recommended followed by a parallel transition period of five to seven years for two reasons:

1. The maturity distribution of outstanding GBP debt contracts suggests that approximately 80% of outstanding contracts would mature during this period. Reducing the amount of residual contracts at the LIBOR discontinuation date will minimise the administrative, operational and legal costs of a final transition.
2. Stakeholders including financial institutions, service providers (Reuters, Bloomberg) and investors will have ample time to upgrade infrastructure and renegotiate contracts expected to remain outstanding beyond the LIBOR discontinuation date.

Taking the ongoing implementation of Basel III as a precedent, a five to seven year transition period is not unreasonable in absolute terms given such a large-scale transition.

Protocol for transition period

The purpose of the parallel transition period is to provide a run-off period so that LIBOR-based contracts outstanding at the LIBOR discontinuation date are minimised. Increasing or maintaining the existing stock of LIBOR-based contracts at the discontinuation date may reduce the effectiveness of a parallel transition period so participants should be encouraged to use the new benchmark rate as early as possible and discouraged from entering contracts referencing legacy LIBOR.

A market-wide protocol for transitioning residual cash contracts referencing LIBOR to the new framework should be proposed to ensure the operational burden of bilateral contract amendments and contract frustration claims are minimised. However, this is unlikely to work for securitised products as it may interfere with distributions from cashflow waterfalls.

Role of the official sector

A successful transition will require active participation from the official sector. First, there will be a disincentive for LIBOR contributors to continue to publish quotes during the transition period. Therefore, contributing submissions to LIBOR must be mandatory for submitters during this period and enforced by regulators.

Second, it will be important for the new reference rates to reach viability quickly and basis markets to develop between LIBOR and the new reference rate. The official sector has a role to play in providing incentives for dealers to quote the new contracts.

Third, it may be beneficial for changes in reference rate to be written into national legislation as was the case with the transition to EMU.

Fourth, the official sector may be influential in mitigating contract frustration claims. In its December 2012 paper *Benchmark Transition - Observations on proposals for benchmark reform*, the FMLC suggests that published legal opinions arguing against the case for contract frustration could help mitigate such claims.

Finally, the official sector should enlist the help of industry institutions (e.g. ISDA, LMA) to co-ordinate transition protocols across currencies and products such that disruption can be minimised and allowing, where possible, for residual contracts to be modified en masse.

Conversion factors

In transitioning residual contracts to the new reference rate through a market-wide protocol or forced final transition, a conversion factor between LIBOR and the new rate may have to be established. The Transitions work stream has discussed a number of methods for determining such a conversion factor however no consensus was reached. Detailed discussion on this topic can be found in the Derivatives Transition report.

Not recommended for: LIBOR+SL/SR

A market led transition to a similar reference rate is not recommended because LIBOR+_{SL/SR} already lend themselves to simpler transition paths. The uncertainty and complexity of a Parallel with Cut-over transition would be unnecessary for a LIBOR+_{SL/SR} rate.

4.3.5. *Additional Recommendations***4.3.5.1. *6m and 12m tenors***

Should IOSCO-compliant 6m and 12m LIBOR+_{SL}/LIBOR+_{SR} fixings not be available, there are three options for contracts referencing these tenors:

- 1) Transition to 3m LIBOR+_{SL}/LIBOR+_{SR}
- 2) Transition to a different reference rate entirely (SONIA, BoE)
- 3) Pursue a market-led transition

Options 1) and 2) incur the same challenges as those presented in the parallel transition and would require a potentially disruptive forced transition. This is mitigated to a certain extent by the low number of GBP debt contracts referencing 6m and 12m tenors. Conversion factors could also be applied to minimise the PV impact and hence detrimental consequences of any transition.

If it is concluded that a forced final transition is not possible for some products, a market-led transition would be required, and legacy LIBOR would need to continue at these tenors indefinitely.

To reduce the number of contracts outstanding that reference longer tenors, the official sector should strongly encourage participants to write contracts based on shorter tenors, commencing as soon as possible.

Rather than attempt to forcibly transition to a shorter tenor or a materially different reference rate, taking action to ensure an IOSCO-compliant LIBOR+_{SL}/LIBOR+_{SR} fixing is available may turn out to be the more palatable option for the official sector and market participants. This may be achievable if sufficient depth in interbank transactions can be incentivised (for example with preferential liquidity or capital treatment) or if an official administrator is tasked with setting the rate based on interbank transaction data. Refer to the Reference Rate Menu and Fixing Methodology work stream reports.

4.3.5.2. *Product and jurisdictional coordination*

Given the interconnectedness of cash and derivatives products, it is strongly recommended that transition plans for cash and derivatives products proceed simultaneously. Furthermore, for any transition path chosen by the OSSG, global coordination is key to ensure that cross-currency products transition simultaneously and hedges remain effective.

4.3.5.3. *Convergence between LIBOR+_{SR} and legacy LIBOR*

In the event that a LIBOR+_{SR} framework is chosen, contract frustration claims may be mitigated by convergence between LIBOR and LIBOR+_{SR} prior to transition. Such convergence may be achieved via a public observation period of the new rate whereby banks are encouraged to base submissions upon the new fixing methodology. This would help align the two rates and may assist with contractual continuity.

4.3.6. *Treatment of high transition-risk products*

Three groups of GBP debt products – retail products, securitised products and non-linear products – present additional challenges in transition because of either additional complexity or greater legal constraints. This section discusses transition issues by product, and provides specific recommendations for these higher risk products.

4.3.6.1. *Retail products*

Section 1.2 (c) of the GBP Legal report discusses the legal background for GBP retail products. Given the particularly low prevalence of LIBOR-linked retail products in the UK, transition risk for retail products is not anticipated to be significantly greater than for other products. For mortgages with contractual references to LIBOR, lenders would be expected to renegotiate outstanding contracts. However, some inertia is expected on behalf of retail customers and additional encouragement or incentives to transition may be required.

4.3.6.2. *Non-linear products*

The prevalence and maturity structure of non-linear products such as FRNs with embedded options is unclear. Without this information it is difficult to assess the true impact of a transition to an alternative benchmark. Achieving a PV neutral transition, with or without the use of conversion factors, will be difficult for non-linear products (unless the absolute value and volatility of the new reference rate is similar to legacy LIBOR).

For a Market-Led transition, either party to the contract may not consent to a transition if the new reference rate is deemed detrimental. Forcible transition through Successor Rate or Parallel with Cut-over paths may incur legal challenges if parties consider the new rate detrimental to their original position.

4.3.6.3. *Securitised Products*

Securitized products including floating rate ABS and RMBS, CLOs and CDOs will arguably be the most challenging products to transition.

First, a change in the benchmark rate is likely to impact cashflow waterfalls and may alter assumptions about pre-payment levels and default probabilities. A change in benchmark rate could influence the behavior of assets in the underlying pool. For example, if the new benchmark rate is markedly higher than LIBOR, pre-payments may increase in advance of the transition. This could dramatically alter the assumptions used to structure and value vehicles and may result in disruption to cashflows to certain tranches and/or PV changes. Applying a conversion factor to the new benchmark could help avert this problem, although testing should be undertaken to understand the full impact of this option.

Second, a change in the benchmark rate may qualify as a restructuring event, which would generally have to be voted through by a supermajority of noteholders. Given the potential for different tranches to have different incentives, in many cases it may be unlikely that such a supermajority will be achievable.

Before attempting to forcibly transition these products, extensive testing should be undertaken to understand the impact of a new benchmark on cashflow waterfalls (for example, using transaction modelling software such as Intex). If cashflow waterfalls are affected, testing should be undertaken to determine whether the use of a conversion factor could minimise any such affect. If testing concludes that a transition with the application of a conversion factor would still be disruptive, then a Market-Led approach should be strongly considered for these products.

4.4. Conclusions

The MPG has identified LIBOR+_{SL/SR}, SONIA, and Bank of England rates as the feasible and viable reference rate alternatives for the Sterling market. This report has identified four paths for the transition to the proposed reference rates and recommends the path that minimizes the costs of transition for each proposed alternative reference rate.

A transition to LIBOR+_{SL} is the preferred choice given its potential to circumvent many, if not all, legal and operational challenges associated with transition. However, sufficient transaction data may not be available to create an IOSCO-compliant fixing for LIBOR+_{SL}, particularly for 6m and 12m tenors. Given the potential ease of this transition compared to other transition paths, action should be taken to promote the availability of IOSCO-compliant fixings at all tenors.

Should the end state alternative reference rate be a rate that is similar but not equivalent in definition and value, i.e. LIBOR+_{SL}, then a Successor Rate transition is recommended. The official sector and market participants would need to take action to minimise the risk of legal challenges before proceeding with this transition.

A Market-Led approach is preferred for other reference rates (SONIA, BoE) as this would avoid a disruptive forced final conversion of outstanding contracts. However, incentives to transition would be needed to combat expected inertia. In this transition path, LIBOR may need to run indefinitely to accommodate contract types that have additional transition challenges and may not be able to transition voluntarily (such as securitised products). Albeit on a much longer time horizon, this approach would still allow a full transition eventually due to attrition of contracts referencing legacy LIBOR.

For any transition to SONIA, or the Bank of England rate where a discontinuation of legacy LIBOR is necessary, a five to seven year parallel run is recommended after a two year lead-in period. This parallel period will allow a large proportion of outstanding contracts to roll off or be renegotiated, minimizing the tail of contracts that would need to be transitioned via a forced final transition or market-wide protocol and thereby reducing the legal risk of transition. Conversion factors may be required, though determining a conversion factor is non-trivial and their forced application may lead to legal challenges.

The interaction between cash and derivatives is of critical importance therefore the transition of both product groups must coincide. The Derivatives Transitions group's plan for a dual transition from LIBOR to SONIA and LIBOR+_{SL/SR} is complementary to the recommendations herein. Furthermore, to ensure hedges remain effective and there are no

unintentional cross-currency effects, transition must be coordinated globally with industry bodies enlisted for support.

References

- “Announcement of LIBOR Changes” refer to:
<http://www.bbalibor.com/news/announcement-of-libor-changes>
- “Benchmark Transition – Observations on proposals for benchmark reform”, FMLC, Dec 2012
- ISDA – EMU Protocol (1998). Refer to <http://www.isda.org/protocol/emufaqs.html>
- “LIBOR Currency/Maturities Discontinuations – Guidance Note”. ISDA, 25 March

5. Legal Analysis

5.1. Overview

Introduction

The work of the GBP Legal Analysis team was divided into two “phases” and an individual report was produced at each of those stages. This final report combines both work products. It is divided into two sections: Phase 1 and Phase 2. The remit of the GBP Legal Analyses team was to (i) identify possible legal risk for contracts incorporating market standard terms which refer to LIBOR and are governed by English law and (ii) supplement its earlier analysis of legal issues arising from benchmark transition for financial products denominated in GBP Sterling by focusing on specific reference rate alternatives and the legal risks that these alternatives may represent for legacy financial contracts.

Phase 1: overview of findings

The Phase 1 section represents the performance of the first objective outlined above: it provides general analysis of legal risk in the context of benchmark transition and an analysis of the commonest financial contracts and instruments linked to Sterling LIBOR. In particular, Phase 1 sets out in great detail the implications for key existing contracts incorporating standard market terms which refer to Sterling LIBOR for derivatives and debt markets. These terms are discussed in some greater detail in Appendix A.1.

A number of hypotheses for transition to a new benchmark, a new methodology and other revisions to the existing LIBOR reference rate are outlined. The contractual implications of benchmark transition are examined; in particular, the triggering of “fall-back” provisions which are widely incorporated in contracts on market standard terms. Whilst fall-back provisions are identified as a potential safety net in certain circumstances, it is suggested that the usefulness of this safety net is reduced in circumstances where a systemically important benchmark is permanently withdrawn. Further, fall-back provisions may arguably undermine the benefits of some legal risk mitigants, such as the doctrine of implied terms, and this is examined in detail in the Phase 2 section of this report.

Phase 2: overview of findings

The Phase 2 section relates to the second objective identified above: it provides focused analysis of the reference rate alternatives and transition paths considered by the MPG in Sterling and the ways in which certain legal risk mitigants might be applied within the UK, with particular reference to the English legal system. It considers the reference rate alternatives postulated by the GBP Fixing Methodologies and Transitions teams: LIBOR+, Overnight Index Swap and the Bank of England rate. Attributes of the existing LIBOR benchmark, as set out in the Phase 1 section, are contrasted with the attributes envisaged for the alternative reference rates. This allows for an assessment of the degree to which the alternative reference rates can be classified as (i) a continuation of LIBOR, (ii) a successor to LIBOR or an (iii) alternative reference rate. The greater the disjunction, the more likely transition will need to be carefully managed and certain legal risk mitigants would need to be applied. The mitigants considered include: market-led solutions such as the introduction of successor rate language; the application of legal doctrines, legal opinions and market guidance; and legislation.

5.2. Phase 1 – Identification of possible legal risks

5.2.1. *Introduction*

5.2.1.1. *Background and objectives*

The legal analysis of the GBP Sterling horizontal work stream identifies possible legal risk for contracts incorporating market standard terms which refer to LIBOR and are governed by English law.

Research and analysis were carried out on the basis of informal meetings and interviews with a variety of market participants, trade association representatives and expert legal practitioners. This information was collated and this report prepared by legal experts.⁶

5.2.1.2. *Overview*

The report considers legal risk in the context of benchmark transition and an analysis of the commonest financial contracts and instruments linked to Sterling LIBOR is provided. It examines specific market standard terms incorporated in contracts for derivatives and debt markets in Appendix A.1. A number of hypotheses for transition to a new benchmark, a new methodology and other revisions to the existing LIBOR reference rate are outlined in Appendix A.2. In section 5.2.2 the contractual implications of benchmark transition are examined; in particular, the triggering of “fall-back” provisions which are widely incorporated in market contracts on standard terms. The potential for legal risk is examined on a product-by-product and hypothesis-by-hypothesis basis.

5.2.1.3. *Summary*

Overall, market participants and legal experts reported that the fall-back provisions would provide comfort to the markets following benchmark transition. Legal risk would be mitigated at least for an interim period through the operation of these provisions. In addition, contractual continuity may benefit from the courts’ reluctance to conclude that commercial contracts have been frustrated (i.e. terminated). It is greatly to be doubted, however, whether fall-back provisions could be relied upon universally and abidingly, i.e. in the circumstances of benchmark withdrawal, and the courts’ approach is hard to predict with absolute certainty. Therefore, all possible efforts should be made to structure as smooth a transition as possible. In this regard, market-led solutions, *inter alia*, are desirable to promote uniformity. Correspondents and interviewees considered the use of protocols established by relevant trade associations to be particularly important. Strong legal opinions may also be helpful.

⁶ Joanna Perkins and Sherine El-Sayed on behalf of the Financial Markets Law Committee, with the assistance of Michael Duncan (Allen & Overy LLP) and Simon Firth (Linklaters LLP).

Legal risk is assessed below against various hypotheses for benchmark transition (a move to another unsecured rate, a move to a secured rate and modifications to the benchmark methodology). The probability and impact of the risk of litigious claims being brought before an English court and the potential for parties successfully arguing that their contracts have been terminated (i.e. frustrated) are analysed. Market participants noted that certain factors—such as continuity as to the page on which the new or revised benchmark is published—may significantly reduce the prospects of claims arising or being successfully pursued.

The paragraphs immediately below outline doctrinal features of the governing law and legal risk profiles.

5.2.2. *Legal risk profile for legacy contracts*

This section provides an account of applicable legal doctrine and legal risk profile for each of the financial products and contracts outlined in Appendix A.1 as against the hypothetical cases of transition considered in Appendix A.2.

5.2.2.1. *Doctrinal features of the governing law*

(a) Contractual construction and fall-back

Market participants report that heavy reliance on the contingency provisions (discussed in Appendix A.1 at A.1.4) across multiple markets over a lengthy period would be unworkable. That is likely to be all the more so if fall-backs are expected to apply permanently (i.e. following the withdrawal of LIBOR or a contractually-material change in its identity). In these circumstances, it is unlikely that the nominated Reference Banks, who are not parties to the contract in question, would be willing to commit to the daily exercise of calculating and disseminating their cost of funds over the remaining term of the contract. Equally, it is uncertain that the Agent in a syndicated loan would be able to coordinate the application of the “cost of funds” provisions among all lenders in the syndicate and make the necessary calculation (in effect acting as a private benchmark administrator) on a daily basis over the life of the loan.

Notwithstanding the practical difficulty—or even impossibility—of implementing Reference Bank fall-back arrangements indefinitely, it should not be assumed that fall-back provisions will play no useful role in ensuring contractual continuity in the event of a benchmark transition. An English court will infer from these terms an intention on the part of the contracting parties’ to avoid as far as possible the frustration of their contract and it will endeavor, within the bounds of what is reasonable, to uphold that intention. Thus, fall-back provisions lend support to the argument that a term should be implied into the parties’ contract incorporating another closely-related reference rate—e.g. a replacement benchmark—in the unforeseen event of LIBOR’s permanent withdrawal (see [below](#) for further discussion of implied terms). An implied term of this kind would ensure contractual continuity.

Not only do loans on Loan Market Association (“LMA”) terms have an additional contingency provision—the applicable rate may fall back first to Reference Banks and then to “cost of funds” as discussed in Appendix A.1 at A.1.4 – but they also provide for an alternative contractual “trigger” for the fall-back arrangements. The cost of funds provision will apply

when either (i) the Screen Rate is unavailable and the requisite number of Reference Banks are unable to provide a quote or (ii) *where the Agent receives notification from the lenders that the cost to it of obtaining matching deposits in the relevant inter-bank market would be in excess of LIBOR.*

One can infer from this additional trigger that the character of LIBOR as a reflection of the cost of unsecured interbank borrowing is an important feature of the benchmark for parties entering into contracts on LMA terms. It should, in light of this inference, be strongly arguable—so long as any proposed new benchmark or revised methodology remains linked to the cost of unsecured interbank borrowing—that the parties would have agreed (if asked at the outset of their agreement) that the new/revised benchmark should apply in place of LIBOR in the event of the latter’s withdrawal or elimination. If that argument prevails, the court will imply a term into the parties’ contract linking it to the new/revised benchmark (see [below](#)).

(b) Frustration

The doctrine of frustration operates to discharge a contract where, after the formation of the contract, something occurs which i) renders performance of contractual obligations impossible; ii) destroys the subject-matter of the contract, or iii) renders either performance or the subject-matter radically different from that which was in the contemplation of the parties at the time of entry into the contract.

If the doctrine is applied, the contract will automatically be brought to an end, irrespective of the wishes of the parties, and both parties will be released from their obligations to perform the contract. Demonstrating a concern for commercial certainty, the courts have adopted a restrictive approach to the operation of this doctrine.⁷

Parties report that they expect to rely on the fallback provisions for as long as feasible in the event that LIBOR becomes unavailable. However, at the point at which such reliance proves no longer feasible (for example, because Reference Banks and Agents are unable to carry out private benchmarking) it is clear that some parties to contracts may consider applying to court for a declaration that the contract has been frustrated.

Where a contract is found to be frustrated under English law, both parties are released from their obligations under the contract and neither party may sue for breach.⁸

⁷ For further detail, see cases regarding the conditions (impossibility, illegality, and frustration of purpose) which must be satisfied for the doctrine of frustration to apply: i) impossibility and/or destruction of the subject-matter: *Taylor v. Caldwell* (1863) 3 B & 826, ii) illegality: *Fibrosa Spolka Akcyjna v. Fairbairn Lawson Combe Barbour Ltd* [1943] AC 32 and iii) frustration of purpose: *Krell v Henry* [1903] 2 KB 740.

⁸ The allocation of loss is then determined under the Law Reform (Frustrated Contracts) Act 1943 which provides:

Section 1(2): All money payable under the contract ceases to be payable and any money already paid may be recovered. Where expenses have been incurred this may be deducted from the amounts payable or paid. This is at the discretion of the court and is subject to what is just and equitable in the circumstances of the case. There is

It should be noted that LIBOR definitions are not currently synchronised perfectly across loans and derivatives (see Appendix A.1, sections A.1.1 and A.1.2 below for further details) but share certain common features, including an emphasis on the publication venue and the "unsecured" element implicit in the references to cost of funds/rate for deposits. Given these similarities it is unlikely that court cases on frustration would create a legal risk for one type of instrument but not the other.

(c) Implied terms

It is well-established that the English courts are reluctant to accept that a commercial agreement has been frustrated. From this it can be inferred that a court would likely make every effort to find a means by which contractual continuity could be preserved following the withdrawal of LIBOR or the introduction of a new methodology or other contractually-relevant revision.

One way in which contractual continuity could be preserved would be by the courts' implying a term into the contract to the effect that in the event of the withdrawal of LIBOR the nearest substitute benchmark should apply to the parties' agreement.

Changes contemplated in Appendix A.2 of this report would not represent the first occasion on which the authorities have acted to revise a benchmark. In 1981, the Minimum Lending Rate ("MLR")—the minimum rate at which the Bank of England announced that it would make short-term money available to the market—ceased to be published. In advice to the Law Society considering what effect a court might give to a contractual term referring to the MLR following this change, Leonard Hoffmann QC (later Lord Hoffmann) advised that a court could be expected to treat a contract containing a reference to the MLR as subject to an implied term, i.e. one to the effect that, if MLR ceased to exist, there would be a substituted rate—the prevailing clearing bank rate.⁹ This opinion was instrumental in garnering broad acceptance for the view that contracts would transition smoothly to the prevailing clearing bank rate.¹⁰

It is to be inferred that the English courts are very reluctant indeed to accept that a commercial agreement has been frustrated, that the doctrine of implied terms is one route by which they may avoid having to do so and that a strong legal opinion could play a role in maintaining market confidence.

no provision allowing expenses to be recovered which exceed the amounts paid or payable.

Section 1(3): Where a valuable benefit has been conferred this must be paid for.

⁹ The base rates published by members of The Committee of London Clearing Bankers. At that time this was deemed to be the rate which came closest to sharing those features of the MLR that made it a suitable benchmark for contracts.

¹⁰ Contents of the Opinion have been disclosed with the kind permission of The Law Society.

5.2.2.2. *Market-led solutions*

Guidance

There has been a recent transition away from certain LIBOR tenors and currencies earlier in 2013. For outstanding contracts which included references to tenors that were eliminated, the International Swaps and Derivatives Association (“ISDA”) issued non-binding guidance and an Amendment Letter to help with the transition to new tenors.

Protocols

Examples of a large scale market transition (to amend existing market standard contracts) include ISDA’s Big Bang and Small Bang protocols which increased the standardization of documentation for credit derivatives and introduced new settlement arrangements for those contracts. The advantage of a coordinated transition of this kind is that market participants can rely on the standardized documentation and refrain from undertaking administratively burdensome and difficult negotiations to vary their contracts. (N.B. Legacy contracts cannot be amended without the consent of the parties and even where new protocols are published they must be adopted by the parties in question. The advantage of a protocol, however, is that it is designed following consultation and presumptively fair to both parties—in this case both the fixed and the floating rate payer—which, together with the pressure to conform to market standards, incentivizes both parties to adopt the protocol.)

The loan markets have no such history of variation protocols, unlike the derivatives markets, but there is no reason in principle why such protocols should not be developed for the LMA’s market standard terms.

Designing standardized protocols across both loan (i.e. LMA) and derivatives (i.e. ISDA) contracts could promote uniformity across back-to-back contracts and prevent mismatching of interest rates. Further, counterparties to existing contracts who hedge their loans on interest rate swaps, may thereby be incentivized to adopt the “harmonized” protocols to avoid any mismatch.

5.2.2.3. *Risk factors for material change: by product*

The paragraphs below set out certain features of the LIBOR definitions in market standard terms which give rise to legal risk in the following way: if these same features are not included in the putative new or revised benchmark, a contracting party may be able to argue that the new or revised benchmark is not contemplated by the legacy contract in question. This issue may become litigious and the party may seek a declaration that the fall-back arrangements may apply and even, on the failure of the fall-back arrangements, that the contract has been frustrated. The chances of succeeding on such a claim may be slim, given the courts’ reluctance to find that a commercial contract has been frustrated, but should the risk materialize it would likely set a precedent for all legacy contracts on the same market standard terms, potentially causing very significant market disruption.

(a) Derivatives

Derivatives on ISDA terms, and cleared derivatives under clearinghouse rules often, define LIBOR as a rate for the making of “deposits” (see definition under Appendix A.1 at A.1.1). Exchange-traded derivatives also typically specify that the Settlement Price must be

calculated “by reference to the interest rates for deposits”. Material legal risk could arise in respect of these contracts where a change to the methodology has the effect that LIBOR cannot reasonably be regarded as the rate for the making of deposits. For cleared derivatives, however, the relevant central counterparty or exchange has discretion unilaterally to designate a replacement benchmark if the contractual benchmark is unavailable (see Appendix A.1 at A.1.1(c)).

The mere fact, however, that LIBOR may (hypothetically) no longer be calculated from submissions based chiefly on deposits under a revised fixing methodology does not *ipso facto* mean that it is not a rate for deposits. If the benchmark is administered with the objective of identifying a rate for deposits or unsecured borrowing, then the better view is that it does not matter if the submissions are extrapolated chiefly, or even entirely, from different transactions.

Significant legal risk will only arise in this regard if 1) the administrator’s definition of the benchmark abandons the concept of a rate for borrowing/cost of funds/deposits; 2) deposits, although available, are, as a matter of administration or regulation, excluded from the data on which submissions are based; and/or 3) back-testing shows that fixing the benchmark from a wider range of transactions has somehow resulted in a rate which cannot reasonably be said to reflect the cost of borrowing or a rate for deposits (a slight difference from the expected path of the historic rate would not be enough here).

In summary, the feature of a contractual definition which specifies that LIBOR is a “rate for deposits” does not necessarily raise legal risk merely because “transaction-anchoring” in the fixing methodology may lead to a wider or different set of data being used for submissions.

(b) Loans

Syndicated loans on LMA terms define LIBOR as the Screen Rate and the definition does not refer expressly to a “rate for deposits”. As noted [above](#), however, one can infer from the additional cost of funds “trigger” for fallback arrangements that the character of LIBOR as a reflection of the cost of unsecured interbank borrowing is an important feature of the benchmark for parties entering into contracts on LMA terms. It is conceivable that legal risk would arise, as discussed immediately above, were it no longer reasonable to regard LIBOR as a rate for unsecured interbank borrowing.

Mortgages in the UK are not, generally speaking, contractually linked to LIBOR. Additional details are provided in Appendix A.1 at sections A.1.2(b) and (c) below.

(c) Other products

Research indicates that documentation in respect of floating rate debt securities mirrors the terms set out in the ISDA Definitions. The same analysis of legal risk highlighted under the paragraph on derivatives, above, would also apply to LIBOR definitions in the terms of these bonds and notes.

The case of notes issued on the back of complex structured finance arrangements is considered in Appendix A.1 at section A.1.3 below. The risk for frustration in is no greater for the agreements of which these complex arrangements are comprised than it is for individual financial instruments and the legal analysis for covenants is very similar if not identical to that for other kinds of contractual promise.

Two additional factors, however, are relevant to the legal risk analysis for complex structured transactions. The first is that, both market experience and research suggest that trustees can be expected to be very cautious about modifying the LIBOR-linked terms of the agreements under provisions of this kind; more so than ordinary commercial counterparties. Trustees are likely to be particularly reluctant to agree any amendments if predictive analysis suggests that the amendments will incorporate a benchmark or a fixing methodology which is commercially unfavourable to the noteholders (as lenders), either because fixings are likely to be lower than those predicted for LIBOR or because they are likely to be more volatile. It seems likely, however, that, if trustees are advised that the alternative to modifying existing provisions may be frustration and the consequent collapse of the arrangements, they will in all probability conclude that the balance of noteholders' interests is in favour of modification and will proceed accordingly. It goes without saying that trustees' reluctance in this regard is only a risk factor for frustration in cases where the proposed transition cannot be accommodated within the existing terms—express or implied—of the agreements.

The second factor to be considered here is inherent to the nature of the complex structured arrangements in question. Such arrangements often comprise derivatives, loans and debt securities, all containing LIBOR-linked terms. What is said [above](#), therefore, about the desirability of designing standardized protocols across different types of product so that amendments to back-to-back contracts may be consistent, thereby preventing the mismatching of definitions, is important. (The comment [above](#) to the effect that LIBOR definitions are not currently synchronized perfectly across loans and derivatives should, however, also be noted here. Contracts may “match” even if both definitions are not perfectly harmonized in revised market standard terms for different products.)

5.2.2.4. *Mitigating factors*

Market standard terms across many products refer to the benchmark publisher or the “LIBOR01 Page” on which LIBOR fixings are published (a notable exception is exchange-traded derivatives). Provided that there is no change to the page on which the new or revised benchmark is published, this aspect of any given contract may promote contractual continuity by giving rise to a rebuttable presumption that the parties intended to identify the applicable reference rate by its publication venue.

5.2.2.5. *Risk profile: by transition hypothesis*

(a) Transition to a new benchmark rate for deposits

It is impossible to say definitively which legal risks would arise on transition to a new rate for unsecured interbank deposits or borrowing, with the consequential withdrawal of LIBOR. Much would depend on the publication venue (as discussed immediately [above](#)) and the possibility of any endorsement or designation by the British Bankers Association (“BBA”).

However, it is possible to say that transition to a new rate for unsecured deposits would offer a much greater chance of preserving contractual continuity through the operation of the doctrine of implied terms ([above](#)) than would a transition to a benchmark reflecting a different criterion.

(b) Transition to a new benchmark for secured lending

It follows from everything that has been said above that transition to a secured benchmark would give rise to the greatest legal risk, given the degree of dislocation from LIBOR. Contractual continuity could best be preserved in these circumstances through the operation of the market-led solutions discussed [above](#). Consultation on a market-wide protocol or protocols would have the added advantage of providing a platform on which market participants could agree an appropriate formula for “mapping” LIBOR-linked contracts onto the new rates.

(c) Modification of the fixing methodology

The risks associated with a revised fixing methodology would depend on the nature and extent of the revisions. The nuances of revising the methodology to incorporate data extrapolated a wider set of transactions are discussed [here](#).

What is said [above](#) about a new rate for unsecured deposits (i.e. that it would offer a much greater chance of preserving contractual continuity through the operation of the doctrine of implied terms) applies *ipso facto* to preserving LIBOR with a new fixing methodology, provided that the methodology remains compatible with the objective of fixing a rate for deposits.

5.2.3. Conclusion

Most contracts on market standard terms – with the apparent exception of exchange-traded derivatives, but see Appendix A.1 – incorporate fall-back provisions which will be relied upon by contracting parties, in the first instance following transition if LIBOR, as it is contemplated by the terms in question, is withdrawn. Whilst these terms will provide comfort to markets, heavy reliance upon them in the long-term would be unsustainable. A court will infer from these terms, however, an intention of the contracting parties’ to avoid as far as possible the frustration of their contract and will endeavour to uphold that intention.

The courts have adopted a restrictive approach to the doctrine of frustration. In this regard, the better view is that an English court would likely to make every effort to find a means by which contractual continuity could be preserved following the withdrawal of LIBOR or the introduction of a new fixing methodology or other contractually-relevant revision. One way in which a court could achieve this is by implying a term into the contract that the nearest substitute benchmark should apply to the parties’ agreement. Finally, where the proposed new benchmark, cannot reasonably be said to be within the contemplation of legacy contracts, a market-led solution whereby contractual changes could be adopted by way of protocol would offer the brightest hope for smooth and harmonized transition.

Some legal risk may arise under legacy contracts incorporating market standard terms for derivatives and debt securities where a change to the benchmark has the effect that the new rate cannot reasonably be regarded as the rate for the making of deposits. The same can be said for loans, in relation to unsecured interbank borrowing.

Transition to a new benchmark reflecting the cost of unsecured interbank borrowing would likely result a greater chance of preserving contractual continuity than transition to a benchmark for secured borrowing. The risks associated with revising the LIBOR fixing methodology would depend on the extent of the revisions.

The analysis above describes the instances where material legal risk is most likely to arise and how this can be mitigated. The conclusion can be drawn that a transition which is carefully planned and which engages both regulators and trade associations stands the best chance of minimising legal risk in relation to English law governed legacy contracts. The more so if it is backed by strong legal opinions. Considered alongside the finding that an English court would take a very restrictive approach to the doctrine of frustration, this will provide comfort to markets in the event of transition.

5.3. Phase 2 – Focus On Legal Issues Arising From Proposed Transition Paths

5.3.1. *Summary*

This report supplements an earlier analysis of legal issues arising from benchmark transition for financial products denominated in GBP Sterling (“Legal Issues Analysis Phase 1”). It focuses on specific reference rate alternatives which have been identified by the GBP Fixing Methodologies and Transitions teams and it considers, in greater depth, the legal risks that these alternatives may represent for legacy financial contracts. This report also discusses mitigants which may address legal risks and the circumstances in which these mitigants may be of most use.

Section 5.3.2 below outlines the degree to which contractual continuity (i.e. in respect of LIBOR definitions in legacy contracts) might be affected by transition to the alternative reference rates under consideration. Section 5.3.3 places each alternative reference rate into a category to identify whether it is (i) a continuation of the same rate, (ii) a successor rate or (iii) a new benchmark. Section 5.3.4 examines in greater detail the ways in which legal mitigants may be applied.

5.3.2. *Alternative reference rates*

The alternatives identified in the paragraphs below are those set out in the GBP Fixing Methodologies and Transitions sections of the GBP Currency Report. Here, the alternatives are measured against contractual definitions of LIBOR in key financial products. Excerpts setting out the definitions in question can be found in Appendix A of the GBP Report.

5.3.2.1. *LIBOR+ - Limited definition/methodology changes*

LIBOR+ is defined as an IOSCO-compliant benchmark rate that closely resembles LIBOR in value and definition. It represents unsecured bank debt anchored in observable transactions data and daily fixings for a rate determined through bank panel submissions or a central administrator. Individual banks and brokers are expected to submit their own cost of funds to the administrator based on actual transactions in interbank, certificate of deposit (“CD”) and commercial paper (“CP”) markets. In accordance with the fixing methodology as it has been postulated, the rate would be published at 12.00 based on submissions made at 11.00 the same day. An element of judgement is provided for and may still be applied when interbank market volumes are low.

According to an alternative LIBOR+ which has been postulated, the fixing could be determined by a central administrator who would aggregate all market data including submissions from brokers and other market participants. This latter process would remove any vestige of judgement in the fixing of rates. Under either approach the data collected would be used in conjunction with an algorithm to fix rates along the curve.

Contractual alignment

It would seem that this alternative is a relatively good fit with contractual definitions of LIBOR in key financial contracts, such as those on market standard terms for derivatives and loans. Contractual continuity would be facilitated because the rate would be

administered as LIBOR by the current administrator,¹¹ fixed “as of” 11.00 am and published on the Reuters LIBOR01 page.

Although, typically, derivatives contracts expressly refer to LIBOR as a rate for deposits and loan contracts impliedly achieve a similar result in respect of banks’ unsecured cost of funds, this is not a qualification which should be taken necessarily to exclude a fixing methodology which relies heavily on the CD and CP markets. The better view is that a contractually-compliant rate can be inferred from products other than deposits provided that the objective of the submitting bank and/or the administrator is to determine (i.e. infer) the rate for deposits. Reliance on the CD and CP markets in the way described above may be necessary in order for the fixings to comply with IOSCO Principle 5 on data sufficiency.

5.3.2.2. *Sterling Overnight Index Average (SONIA)*

SONIA is the weighted average rate to four decimal places of all unsecured Sterling overnight cash transactions brokered in London by member firms of the administrator (the Wholesale Markets Brokers Association) between midnight and 4.15 pm with all counterparties in a minimum deal size of £25 million.

This alternative is a reference rate that does not track LIBOR in value and definition (for example, it is extrapolated from both bank and non-bank transactions). It does not necessarily represent banks’ true cost of funding by deposits in the interbank market. However, the methodology could be supplemented by a conversion factor representing a credit spread to reflect banks’ actual cost of funds.

Contractual alignment

This alternative is not a good fit with existing contractual references to LIBOR: whilst it arguably complies with any requirement that the rate be a rate for unsecured borrowing, it is an overnight rate and does not attempt to fix that rate “as of 11.00 am”, nor does it represent a rate exclusively reflecting the interbank market. Two further markers of discontinuity are that SONIA is administered by a different administrator (i.e. the Wholesale Markets Brokers Association) and published on a different Reuters page.¹²

It is possible that some of these issues could be addressed by publishing a new composite reference rate (SONIA + conversion factor representing credit spread between banks and the market as a whole) on the Reuters LIBOR01 page, endorsed by the LIBOR administrator and the BBA. (SONIA is already endorsed by the BBA on its website.)

¹¹ As of 1 February 2014 the administrator for LIBOR is Ice Benchmark Association Limited.

¹² Contractual references to “BBA LIBOR” or “the British Bankers Interest Settlement Rate” are still common in contracts on unrevised market standard terms for loans and may also appear in some long-term derivatives. Some new contracts may possibly refer to “IBA LIBOR”. Derivatives commonly specify that the contractual reference rate or index is that which appears on the Reuters LIBOR01 page.

5.3.2.3. *Bank of England Rate*

The Bank of England Rate is the official benchmark rate and is set by the monetary policy committee of the Bank of England. For longer tenors, brokers' prices in Base Rate swaps could be used. It is hypothesized that this might be collated by the Wholesale Markets Brokers Association in a similar way to overnight index averages.

Contractual alignment

This alternative does not fit with existing contractual definitions. Banks do not fund at Bank Rate and the rate does not represent what is perceived to be a bank's "cost of funds" or a rate for the making of "deposits" in Sterling.

The Bank of England Rate is not determined by a calculation agent and administrator in the same way as LIBOR. What is said [above](#) about discontinuity caused by a transition to a different administrator and/or publication venue also applies here.

5.3.3. *Transition path*

5.3.3.1. *Continuation of the same rate*

The first transition alternative discussed [above](#), i.e. to LIBOR+, includes only methodological changes. Arguably, these are no more significant than the transition which LIBOR underwent in 1998 from a "prime banks" fixing methodology to an "own cost of funds" fixing methodology (discussed at note 26 of Appendix A.1 below). That transition was managed seamlessly with no noticeable market disruption. One reason for this is probably that the dominant governing laws for financial contracts referring to LIBOR, i.e. English law and New York law, have a sufficiently flexible approach to contractual construction that arguments for frustration were regarded as untenable.

In the event that a continuation of the same rate with a new fixing methodology is mandated or recommended by the Official Sector, it will almost certainly involve a hard "cut-over" to the new methodology. Publishing fixings for the original methodology alongside those for the new methodology (i.e. a "parallel track" approach) in these circumstances could undermine legal certainty by creating two alternative rates: both arguably falling within existing contractual definitions of LIBOR.

In the case of a hard "cut-over" to a new methodology any legal risk can almost certainly be wholly mitigated by techniques involving the publication of legal opinions and/or trade association guidance on market standard terms (discussed further [below](#)).

The degree to which the characteristics of LIBOR+ are aligned to the characteristics of LIBOR, determine whether the LIBOR+ is best described as a continuation of the same rate or a successor rate. We have defined "successor rate" in what follows as one for which the Official Sector prefers to adopt a hard "cut-over" from one rate to another similar rate, with the result that contractual continuity can only be preserved if the successor rate is somehow incorporated into existing contracts. Several examples of this kind of "cut-over" to a successor rate have been observed in recent history, including transitions to EURIBOR from IBORs established in European member states adopting the euro. References to "successor rate" in the section below are not legally evaluative and should not be taken to reflect a

view that the cut-over in question would occur seamlessly without legal risk or that the doctrine of implied terms (see section 5.3.4.3 below) would necessarily apply.

5.3.3.2. *Successor rate*

More significant methodological changes—in particular, any changes to the time “as of” which the rate is fixed, or the criteria for submissions as they are published by the administrator—will have the consequence that LIBOR+ is better viewed as a successor rate to LIBOR, rather than a continuation of the same rate.

Conceivably, a new composite rate engineered to achieve fixings similar to LIBOR fixings (e.g. SONIA + conversion factor representing credit spread between banks and the market as a whole, as discussed [above](#)) could also be established as a successor rate, notwithstanding it would not be fixed on the basis of submissions as of 11.00 am (in order to reflect a rate “as of” 11.00 am fixings would need to rely on techniques of interpolation or similar).

If the Official Sector recommends a hard cut-over to a wholly new composite reference rate, it may wish to consider whether the operational framework for new reference rate could be engineered to resemble that of LIBOR: retaining the LIBOR administrator and publishing the fixings on the Reuters LIBOR01 page would undoubtedly assist contractual continuity, given that these are common elements in the LIBOR definition for market standard contracts.

The greater the disjunction between LIBOR and any successor rate, the greater the legal risks associated with the hard cut over. Depending on the size and nature of these risks, the drafting of successor rate language in market standard terms, the publication of authoritative legal opinions and even legislation might assist with transition. These legal risk mitigants are discussed further [below](#).

Where transition is contemplated involving a different benchmark which already exists or a new benchmark which will be established to run in parallel to LIBOR, we have defined the transition as one involving an “alternative reference rate” as opposed to a “successor rate”.

5.3.3.3. *Alternative reference rate*

It can readily be seen from the analysis in section 5.3.2 [above](#), that transition to SONIA *simpliciter* or the Bank of England rate could not easily be categorized as the continuation of the LIBOR reference rate or even a successor rate. The lack of alignment or “fit” between the characteristics of LIBOR, as set out in standardized contractual references, and those of SONIA or the Bank of England Rate would suggest a very significant risk indeed of contractual discontinuity. Various legal risk mitigants which might assist with a transition to these benchmarks, including legislation, are discussed below.

5.3.4. *Legal Mitigants*

The transition paths outlined in the previous section provide a means for determining the degree to which a move away from LIBOR would give rise to legal risk. The paragraphs below outline the key ways in which these risks might be mitigated.

5.3.4.1. *Legal opinions and guidance on market standard terms*

Legal opinions and guidance produced by trade associations on their market standard terms are likely to be effective in mitigating legal risk associated with contractual discontinuity.

Legal opinions might be obtained by trade associations or professional associations such as the Law Society from eminent QCs in England and Wales and published with a view to establishing the better view that courts are likely to promote contractual continuity through the flexible use of common law doctrine on the construction of contracts. A notable precedent is Leonard Hoffmann QC's opinion regarding the withdrawal of the MLR which was made widely available by the Law Society (as discussed at 5.2.2.1(c) above).

Alternatively, guidance on market standard terms might be published by trade associations. A recent example is the guidance produced on behalf of the LMA on the definition of "British Bankers Association Interest Settlement Rate" in legacy loan contracts on LMA standard terms. The guidelines concluded that, absent some clear contrary intent on the part of the contracting parties, English law would interpret such references as references to LIBOR administered by Ice Benchmark Administration Limited ("IBA") as successor administrator to the BBA. Importantly, the Loan Syndications and Trading Association ("LSTA") in the U.S. also produced a similar guidance note.

5.3.4.2. *Introducing "successor rate" language*

Where the Official Sector recommends transition to a successor rate, it may give some consideration as to whether trade associations should be encouraged to produce "successor rate" language or clauses for incorporation into new contracts or, perhaps, existing contracts by protocol. Such language already appears in some, but not all, common financial contracts.

The fact that "successor rate" language is introduced into market standard terms for new contracts does not necessarily give rise to the inference that contracts on the unrevised market standard terms do not refer to a successor rate. The test in every case is what the terms as a whole would mean to a reasonable bystander with all the background knowledge which the parties to the contract had at the outset of the contract. Occasionally, this meaning will be spelt out by implication (see [below](#)). It is perfectly consistent to introduce a new expression into market standard terms whilst simultaneously maintaining that the same effect is achieved by implication in contracts on the unrevised terms.

Recently, the LMA and LSTA have produced revised market standard terms for new contracts incorporating express references to a successor to the BBA as administrator. At the same time, they have issued guidance suggesting that existing terms referring to the BBA as administrator should be read purposively as references to the IBA. This is not inconsistent.

Similarly, a successor rate clause—referring, for example, to "LIBOR or any such other successor"—could prove to be an effective tool in mitigating legal risk in a transition to a successor rate. The publication of new market standard terms to this effect, for new contracts and existing contracts by protocol (see paragraph 5.2.2.2 above), might very well provide a useful safety net and need not necessarily undermine the argument that a successor rate is also implied into the unrevised market standard terms

If transition to a successor rate is recommended, the doctrine of implied terms might—in conjunction with contractual language of the kind suggested above—apply to mitigate legal risk. This is discussed in the section [below](#). Where an alternative reference rate is recommended, however, it is unlikely that introducing generic language regarding successor rates will significantly mitigate legal risk without the application of a stronger mitigant to support this recommendation (i.e. without legislation identifying the alternative as the successor rate, discussed further [below](#)). Any new language introduced into market standard terms, whether for new contracts or by protocol, will likely need to refer expressly to the new reference rate in order to achieve contractual continuity. In these circumstances, it is harder to argue that unamended contracts refer to the alternative reference rate by implication.

5.3.4.3. *Doctrine of implied terms*

Courts in common law legal systems do their utmost, within the parameters of the law, to save financial contracts from any lack of foresight on the part of contracting parties. Under English law, the implication of a term is an exercise in the construction of the instrument as a whole.¹³ The question for a court is whether such a provision would spell out in express words what the instrument, read against the relevant background, should reasonably be understood to mean. The implied term contended for must “go without saying”: i.e. although the instrument does not say so, that is what a reasonable person would understand it to mean. This doctrine can help to ensure contractual continuity even when developments occur to which the parties have never turned their minds; it prevents contracts being frustrated merely because the parties have not expressly allocated between themselves the commercial risks associated with those developments.

Although the doctrine of implied terms is triggered only “by operation of the law” and cannot, therefore, be designed and applied like the other legal risk mitigants discussed in this section, action can be taken to bring a successor rate within the purview of the doctrine. The degree to which the operational framework for the successor rate can be engineered to resemble that of LIBOR would assist the court in reaching a determination that the successor rate is within the broad meaning and intent of the parties’ contract. Equally, the courts would undoubtedly take into consideration any legislative provision identifying a reference rate as a successor to LIBOR (see below, section 5.3.4.5).

It is a little foreseen and unfortunate consequence of the introduction of fallback clauses into market standard terms for financial instruments that it is now harder for courts to imply terms into contracts so as to provide for transition to successor reference rates. This is because the fallback clauses themselves have the effect of allocating the commercial risks associated with the withdrawal of LIBOR and of making provision for that eventuality. It is harder, therefore, to argue that the instrument as a whole should be read as a contract for LIBOR *or any successor rate* (other than the rate calculated according to the Reference Banks fallback (see section A.1.4 of Appendix A.1 for more detail on fall-back provisions).

¹³ [Attorney General of Belize & Ors v Belize Telecom Ltd & Anor \(Belize\), \[2009\] UKPC 10](#). This doctrine is supported by English authority: *Trollope & Colls Ltd v North West Metropolitan Regional Hospital Board* [1973] 1 WLR 601.

For this reason, it is important to consider whether other legal risk mitigants, such as legislation, could assist transition in the event of a hard cut-over to a successor rate.

The limits of the doctrine of implied terms would be severely tested if a materially different reference rate were recommended. A hard cut-over to such a rate is unlikely to occur without giving rise to an unpalatably high risk of frustration. A parallel track might therefore be considered as an effective means of moving contracts away from LIBOR and on to the alternative reference rate. This is considered below.

5.3.4.4. *Parallel track*

Benchmark transition can be managed by running the new benchmark alongside the old benchmark (LIBOR) for a period of years and gradually incentivizing market participants to move their contracts across, with the assistance of market protocols, before a hard cut-over (if any) is required. Currency transition by countries adopting the euro, according to the legal framework established by the EU, occurs over a period of three years during which both currencies are legal tender. A transition of this kind can give market participants an opportunity to discharge their contracts. A period of five years, for example, would probably exceed the lifetime of a majority of outstanding commercial loans governed by English law.

In certain circumstances, however, running a parallel track could create or exacerbate legal risk rather than mitigate it. In particular, this technique could destroy some of the benefits of contractual continuity which could be achieved by identifying the proposed benchmark alternative as the natural successor to LIBOR. Therefore, this legal risk mitigant would be at its most useful where a materially different reference rate is mandated by the Official Sector.

Legislation might also be considered as a means of mitigating contractual uncertainty, but may not be practicable. The next paragraph assesses the possibility of legislation in greater detail.

5.3.4.5. *Legislation*

Legislation might purport to provide for contractual continuity in any of the following ways:

1. precluding any argument by contracting parties that their contracts are frustrated as a result of the transition;
2. establishing a presumption that a contractual reference to LIBOR can be taken to imply a contractual reference to a successor rate; and/or
3. identifying a successor rate, expecting that the doctrine of implied terms will then operate to incorporate that rate into existing contracts.

It should be noted that none of these techniques prevents parties arguing that their contract has made provision for the withdrawal of LIBOR in the form of fall-backs and that no term favouring a successor rate can be implied (i.e. rebutting the implied term presumption in (2) and (3) above). If a court decision upholds this argument and sets a precedent for market standard terms then the effect of transition is likely to be widespread reliance on Reference Banks fallbacks, which may possibly prove disruptive.

It is theoretically possible, however, for legislation to go further than this and

4. forcibly preclude any argument that contracts are discharged under force majeure clauses—or that fall-back provisions apply—following the withdrawal of LIBOR, notwithstanding any contractual provisions to the contrary.

This would guarantee the continued performance of existing contracts on the new reference rate. It would also, however, mark a very considerable interference with parties' freedom of contract.¹⁴

The introduction of EMU meant that EU Member States adopting the euro gave up their sovereign currencies as well as their domestic IBORs in favour of the new currency and EURIBOR. A detailed framework of European legislation was enacted to provide for this merger, which occurred—and, in the case of new member states, is still occurring—remarkably smoothly. This framework implements the first two legislative techniques referred to above in respect of currency transition.¹⁵ It is clear that the legal regime rests in part upon the *lex monetae* principle (also called “the State theory of money”).¹⁶ Unfortunately, this principle does not support benchmark transition *simpliciter*.

The objective of securing global contractual continuity across EMU was significantly advanced by the ISDA EMU continuity clause which was widely adopted at the time. The New York General Obligations Law confirming the continuity of contracts denominated in EU

¹⁴ Not unprecedented, however, as several legal systems contain laws, for example, prohibiting the exercise of termination rights under financial contracts in certain circumstances such as the insolvency of a counterparty.

¹⁵ EMU is governed, *inter alia*, by Council Regulation (EC) No 974/98 of 3 May 1998 on the introduction of the euro (“the Eurozone Directive”) and Council Regulation (EC) No 1103/97 of 17 June 1997 on certain provisions relating to the introduction of the euro (“The Legal Certainty Directive”).

Article 13 of the Eurozone Directive provides:

Where in legal instruments existing at the end of the transitional period reference is made to the national currency units, these references shall be read as references to the euro unit according to the respective conversion rates.

Article 3 of the Legal Certainty Directive provides:

The introduction of the euro shall not have the effect of altering any term of a legal instrument or of discharging or excusing performance under any legal instrument, nor give a party the right unilaterally to alter or terminate such an instrument. This provision is subject to anything which parties may have agreed.

¹⁶ Recital (7) of the same Directive recites that it is “a generally accepted principle of law that the continuity of contracts... is not affected by the introduction of a new currency”. This “generally accepted principle” derives indirectly from the *lex monetae* principle according to which there is an implicit choice of law in every clause identifying a currency in favour of the legal system of that jurisdiction which has established the currency. In other words: a reference to the Irish Pound is impliedly a reference to the currency of Ireland, as determined by Irish law. It can readily be seen that a principle of this kind facilitates contractual continuity during currency transitions.

national currencies (which also rests on the *lex monetae* principle) was of assistance in respect of contracts governed by NY law.¹⁷

To date, the only common law jurisdiction to enter EMU is Ireland. In 1999, Ireland adopted the euro and in 2002 the Irish Pound ceased to be legal tender. EURIBOR was identified by national legislation as the successor rate to the Dublin Interbank Offered Rate (“DIBOR”).¹⁸ In this way, domestic legislation adopted the third of the legal techniques adopted above. Anecdotally, it is reported that there were no concerted attempts to litigate over benchmark transition or to argue that contracts referring to DIBOR were frustrated. One reason for this may have been that virtually all contracts referring to DIBOR were governed by Irish law and, therefore, by the legislative provision which identified EURIBOR as the successor rate.

In the context of a hard cut-over from LIBOR to a different reference rate, legislation could provide additional support for contractual continuity, particularly in conjunction with common law doctrines of implied terms and contractual construction, by clearly identifying the alternative rate as a successor rate. However, the support provided by legislation of this sort would remain patchy at best unless similar provisions were enacted in all the legal systems which govern key financial instruments referring to LIBOR.

It is important to note that, without the other legislative techniques discussed [above](#), legislative provisions identifying a successor rate cannot preclude arguments that the contract has been frustrated or that the parties did not intend their contract to refer to a successor rate. Such provisions merely strengthen the implication that the new rate is implied into existing contracts.

Given what is said [above](#) about the weakening effect of fall-backs on any implication of terms favouring a successor rate, consideration should be given to whether legislation could make useful contribution with respect to the continuity of contracts referring to LIBOR. Quite clearly, in considering this possibility, the Official Sector will take into account the practical difficulties inherent in coordinating a legislative response in multiple jurisdictions. Given the prevalence of English and New York governing law clauses in global financial instruments, State (i.e. New York), national (i.e. U.K.) and European legislative responses should be harmonized at a minimum. Ideally, this harmonized approach would also be extended to other jurisdictions, including Japan and Switzerland.

5.3.5. Conclusion

The LIBOR+ alternative postulated by the GBP Transitions and Fixing Methodologies teams represents a relatively low level of legal risk for legacy contracts. Although the precise parameters of LIBOR+ are not yet clear, it seems likely that it could be the subject of a

¹⁷ S.B. 5049, 220th Leg. 1 1997-8 Reg. Sess. (NY 1997). See also, Lenihan, *The Legal Implications of the European Monetary Union Under U.S. and New York Law*.

¹⁸ The Economic and Monetary Union Act 1998, which implemented the Eurozone Directive in Ireland refers to the Dublin Interbank Offered Rate (“DIBOR”) and provides in Section 22 that

As of the 1st day of January, 1999, the rate known as the Dublin Interbank Offered Rate shall be replaced by the rate known as the Euro Interbank Offered Rate.

seamless transition of the kind witnessed when LIBOR changed its fixing methodology to an “own cost of funds” methodology in 1998.

Transition to an alternative reference rate such as SONIA or the Bank of England Rate would introduce significant legal risk into legacy contracts. If a transition of this kind is contemplated, it is hard to see how the mitigants discussed [above](#) could ensure a seamless transition for legacy contracts at a hard cut-over. What is said [above](#) suggests that legislation could not prevent widespread reliance on fall-backs in these circumstances unless it was to interfere very considerably with market participants’ freedom of contract. A parallel track would, however, facilitate a smooth market-led transition, particularly where it is supplemented by trade association protocols offering standardized amendments to existing contracts.

These two hypotheses represent the end points on a spectrum of possible reference rate alternatives. Some of the alternatives closer to the middle of the spectrum may be susceptible to being characterised as a “successor rate” to LIBOR. In cases where a recommended successor rate exhibits a relatively high degree of fit with common contractual references to LIBOR (in particular the time “as of” which the rate is fixed and the nature of the benchmark as a rate for deposits) then a hard cut-over may still represent the most palatable transition option. It is in these circumstances that the mitigants to legal risk discussed [above](#) are likely to be most useful.

6. Outreach to Market Participants

6.1. Outreach approach

The GBP MPG Working Group conducted a questionnaire with 29 institutions covering banking, asset managers, clearing houses and pension funds. (Appendix B) To date we have received 8 completed reports and expect to have more in November.

There were also a number of conference calls with individual banks and a review meeting with the Bank of England. There were a number of organisations such as the ACT that were directed to give feedback to other MPG members

The most intensive responses came from market practitioners with deep treasury experience and there was a clear focus on both meeting the IOSCO principles alongside a practical set of proposals. The inputs around appropriate reference rates were based on market activity and experience rather than statistical analysis.

The sterling outreach group expects more contributions in November 2013 as some organisations stressed they need time to mobilise their efforts and resources

It has been agreed with some stakeholders that they are not named individually. All those who responded to the questionnaire were agreeable to them being distributed to the MPG if that would help the discussion.

6.2. Benchmark usage by outreach contributors

6.2.1. *Products that are linked to interest rate benchmarks, such as Libor*

The product classes collected are

- Loans and Deposits up to 60 years.
- Syndicated Loans
- Trade finance
- Derivatives
- Mortgages
- Student loans

6.2.2. *Benchmarks used UK*

The major benchmarks used are

- Libor
- OIS-Sonia,
- Ronia,

- ISDA fix,
- Bank base rate,
- Debt management Office close,
- Individual bank's base rate

6.3. Potential alternative reference rates

6.3.1. *Alternative benchmarks*

Stakeholders generally agreed that Libor must continue to be published. All stakeholders favored a strengthening of the fixing mechanism and of the oversight governing Libor setting.

Whilst there was not an immediate replacement for Libor there was seen as value in other reference rates and that over time new markets might emerge as transaction volumes and market practice evolved.

Any benchmark setting should be simple and the calculation methodology should be transparent. Ideally it should be transaction-based or based on tradable-quotes in significant sizes. Furthermore, reference rates could be enhanced with a broader range of products and market participants (not just unsecured interbank, but also new issuance, secondary market etc.). Stakeholder asked for stringent oversight governance to enhance credibility and reliability of all reference rates

The rate benchmarks the Group considered was Libor+, Treasury Bill based, Sterling overnight index swaps, bank of England bases rate. The stakeholders believed they could pass IOSCO principles and thus be valid reference rates in their own right.

The outreach group saw the need for a central and independent administrator such as NYSE "NEuRAL" to capture more transactional data and apply a fixing algorithm.

6.3.2. *Advantages and disadvantages of benchmark rates*

Libor+

Much work has already been undertaken post Wheatley to improve Libor submissions and it was seen in the UK to be the most credible now than has ever been the case.

Contributors suggested taking account of more transaction sources such as interbank, commercial paper, certificates of deposit. This would be achieved by both using a wider set of contributing banks and having authorities encourage activity. For longer fixings at 6 and 12 months people expressed view of potential for averaging over the period to avoid outliers and cliff edges and smooth stresses

Contributor banks to submit all transaction data to NYSE NeURAL or similar who calculates the Libor rate for the industry

There was a view we may want to rebrand LIBOR —although evidence to date shows no great defection or dissatisfaction by clients.

Advantages

- Make the system more transparent
- More anchored in actual trades,
- Have an independent and supervised process under independent calculation agent and or Central Bank oversight
- Transition arrangements eased-legal to advise
- More contributing banks to give broader footprint

Disadvantages

- Depth of transactions beyond 6 months
- Administration and collection of data

T Bills

The Treasury bill market offers some opportunity to give a risk free anchor rate. The debt management Office undertakes weekly auctions and issue £2 BN in 1-, 3-, and 6-month maturities.

Advantages

- It is based off the observable government pricing and has traction in terms of being clear and transparent
- The authorities could take steps to develop and increase the market if it became a more widely used as a reference rate

Disadvantages

- Limited secondary market meaning that prices may be stale and it does not have the depth of activity of the Libor markets.
- This market does not reflect bank funding costs and that is another limitation in adapting its use for more widespread loan or deposit pricing.
- This approach should be considered and if additional volume and trading were to become market norm this will offer a reference point into the market.
- The paucity of data at the 6-month point may constrain price discovery in accordance with the principles and this would need more consideration as part of an overall reform of the T bill market.

Sterling Overnight Index Swaps (OIS)

A number of asset managers were keen on the idea of developing Sonia as they saw it as a clean price with no liquidity or credit spread element. The growing use of centrally cleared transactions and further development of instruments were seen as positive developments.

It was recognised however that the market was very thin beyond the overnight and even there volumes were potentially open to being pushed by market participants

Some contributors noted that Israel has some variant of this approach in operation and that the MPG group may look into this to see if any lessons can be learned

Advantages

- Represents risk free curve
- Could sit alongside Libor for use on derivative only trades
- Breaks dependency on Libor fluctuations caused by bank spreads impacting end users

Disadvantages

- Very thin sterling trading only 4-6 billion daily dwarfed by central bank balances of £290bn plus
- How would transparency and independence of quotes on Sonia swaps be verified

Bank of England Base Rate

The Bank of England rate is the official benchmark rate and thus benefits from the independence and transparency of its setting. The banks do not fund at bank rate but it can act as an anchor reference point with banks negotiating a bi lateral margin with clients and accepting the basis risk then arising.

It is a reliable and durable index and some markets have used such a reference rate for pricing loans and overnight it was a popular index in France in the 1980's. It is a fundamental part of the UK financial architecture and being rooted in market operations has durability and clarity

Advantages

- Transparent and independent
- Precedence in other markets e.g. France in 1980's, Brazil
- Use of short term swap rates to mitigate volatility in overnight rates – if liquid swap market exists

Disadvantages

- Risk free rate with no credit or liquidity premium
- Limited in maturity dimension

6.4. Transition Issues

The transition was seen to be least disruptive if Libor could be retained on an enhanced basis so there would be minimal impact on existing contracts. The major issues that might arise if a new benchmark were applied to existing contracts are:

- Legal frustration of existing contracts and need for re negotiation
- Systems constraints and IT costs
- Hedge accounting violated
- Basis risk of new contracts
- Immediate depth and liquidity in new benchmark required from day 1

6.5. Other considerations

There was agreement that the benchmark should be more grounded in real transactions and executable quotes to give it more credibility and stability. There should be more contributors to the benchmarks and an independent rate calculation agent used taking data and applying interpolation

The role of the Bank of England to participate in the process was reviewed and considered to lend credibility to the process. However, the Bank itself seemed reluctant at this prospect.

A number of asset managers made the point that greater depth and use of Sonia would be welcomed to support the range of instruments to hedge and support their activity. It was noted that the market in sterling futures and options was some £3.5 trillion of open interest and this was fundamental in price discovery

Generally, the willingness of stakeholders to switch to a new benchmark was low. Most think that a cost/benefit analysis only warrants a strengthening of the existing benchmark (Libor). The more dramatic benchmark rates are changed, the higher the costs to stakeholders will be.

Market Participants Group on Reforming Interest Rate Benchmarks

GBP Currency Report Appendix

March 2014

Appendix A. Legal Analysis

A.1. Product profile: market standard definitions of LIBOR

The commonest financial contracts which are linked to LIBOR include: i) syndicated loans; ii) floating rate notes; iii) interest rate swaps; iv) exchange-traded derivatives; and v) forward rate agreements. The paragraphs immediately below outline the market standard terms defining LIBOR for each of these categories of product.¹⁹ Further below, contingency clauses are considered.

A.1.1. Derivatives

(a) Exchange-traded derivatives

In calculating the final settlement price on an expiring contract, under an exchange-traded derivative contract governed by English law, the exchange is typically obliged to refer to “a rate... which shall be calculated by reference to interest rates... in the London interbank market at 11 am London time on the Last Trading Day”. That rate is then subsequently defined in the contract as “BBA LIBOR”.

It should be noted that features of LIBOR such as a) that it is administered or endorsed by the BBA and b) that it reflects rates in the London interbank market at 11 am (London time) are impliedly or expressly incorporated into the contractual definition. A recent joint consultation paper produced by the Interim LIBOR Oversight Committee and BBA LIBOR Ltd also noted that “one may infer from [other standard administrative provisions] that the parties to the contract intended to rely on the rate as it is fixed—and displayed—as of 11.00 am on the Last Trading Day” in which case the time of publication is also arguably a feature which has been incorporated into the contractual definition.²⁰

Contractual references to “BBA LIBOR” or “the British Bankers Interest Settlement Rate”, which are still common in market standard terms for loans and may also appear in some long-term derivatives, have raised the question whether these contracts can accommodate a change in administrator, (i.e., without the change presenting issues as to the contracts’ construction and/or enforceability).²¹ The question is a pressing—although far from insoluble—one for the markets concerned because it was agreed on 9 July 2013 that the administration of LIBOR would be handed over to NYSE Euronext Rate

¹⁹ *The Wheatley Review of Libor: Final Report* (available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191762/wheatley_review_libor_finalreport_280912.pdf).

²⁰ *ILOC—BBALIBOR Joint Consultation Paper on LIBOR Re-fixing* (available at <http://www.bbalibor.com/news/bba-libor-consultation>), paragraph 38.

²¹ *Benchmark Transition Report - December 2012* published by the Financial Markets Law Committee (available at www.fmlc.org/Pages/papers.aspx), at paragraph 5.5.

Administration Limited (a new subsidiary of NYSE Euronext), which is expected to take responsibility for the benchmark early in 2014.²² One solution to this potential problem which has been mooted is that the BBA might continue to designate and/or endorse the NYSE-administered benchmark in some way.²³

(b) OTC derivatives

OTC derivatives comprise a significant proportion of instruments linked to LIBOR in the Sterling and global markets and may be valued at approximately \$230 trillion on a notional underlying basis.²⁴

A wide variety of these derivatives incorporate the 2006 ISDA Definitions.²⁵ The most common index chosen in the Sterling interest rate swaps market under those definitions is "GBP-LIBOR-BBA", which:

²² Subject to authorisation from the Financial Conduct Authority and following a period of transition.

²³ *Ibid.*,

²⁴ *Supra* n.19, at page 76 (table C.1).

²⁵ Some very long-term derivatives (both interest rate swaps and forward rate agreements), however, still incorporate earlier terms produced in 1985 under the auspices of the BBA. These standard market terms (the "BBA IRS" and the "BBA FRA" respectively) provide that the floating rate which is payable is the "BBA Interest Settlement Rate" which is defined as the

rate calculated, and published, by the information vendor for the time being designated by the British Bankers' Association

The definition goes on to provide, with a considerable amount of specificity, that:

The information vendor shall calculate such rate by taking the rates quoted to it by eight BBA Designated Banks as being in their view the offered rate at which deposits in the Currency... are being quoted to prime banks in the London interbank market at 11.00 a.m. on the relevant Calculation Date and eliminating the two highest (or, in the event of equality, two of the highest) and the two lowest... taking the average of the remaining four rates and then (if necessary) rounding the resultant figure up to five decimal places.

Here "information vendor" is an early attempt to identify what has become known to regulators as the "Calculation Agent", currently this role is fulfilled by Thompson Reuters Ltd in relation to LIBOR.

It will readily be seen that this contractual definition relies on both the benchmark fixing methodology and the role of the BBA as the administrator. At the time these terms were drafted, the benchmark was not widely described as being the London Interbank Offer Rate, which is why it is identified here as "the BBA Interest Settlement Rate". It is interesting to note that, when the rate became known as LIBOR, in or about the late 1980s, this did not give rise to any difficulties in interpreting the BBA FRA and BBA IRS terms. One reason for this is that the definition refers to a rate "designated by the British Bankers' Association", which the rate now known as LIBOR continued to be.

The reference to "prime banks" in this definition raises another, yet more interesting point relating to changes in the fixing methodology for an established benchmark. The BBA's own definition of LIBOR, qua administrator, was revised in 1998 (following wide consultation). The BBA moved the rate quoted

means the Reset Date will be the rate for deposits in Sterling for a period of the Designated Maturity which appears on the Reuters Screen LIBOR01 Page as of 11: 00 a.m., London time, on that Reset Date.

In addition to the titular reference to LIBOR, this definition refers to “the rate for deposits” and publication “on the Reuters Screen LIBOR01 Page”, which are, therefore, additional features of the contractual definition. It is noteworthy that publication must occur “as of 11:00 a.m., London time” which has provoked the suggestion that any later re-fixing of the rate will not be incorporated in derivatives payment calculations.²⁶

(c) Cleared derivatives

The rulebook for a central counterparty usually contains procedures for determining the interim and final settlement prices for a cleared derivative. Under the General Regulations of LCH.Clearnet, “GBP-LIBOR-BBA” is listed as one of the “acceptable” indices for interest rate swaps. Under the SwapClear procedures, the Reset Rate will be published by the Clearing House via the Rate Reset reports. The following principle is applied in calculating the Reset Rate:

“GBP-LIBOR-BBA” means that the rate for a Reset Date will be the rate for deposits in Sterling for a period of the Designated Maturity which appears on the Reuters Screen LIBOR01 Page as of 11.00 hours, London time, on that Reset Date.

The definition for this is similar to that in the ISDA Definitions. The LCH.Clearnet fallback provision for cleared derivatives provides that:

in the event of no rate being available the Clearing House will, at its sole discretion, determine an applicable rate.²⁷

In the case of a cleared derivative, the relevant central counterparty or exchange has discretion unilaterally to designate a replacement benchmark applying to all contracts

from a subjective “prime bank rate” to a more objective one, based on the rate at which the particular panel bank could borrow funds. It now provides:

An individual BBA LIBOR panel bank will contribute the rate at which it could borrow funds, were it to do so by asking for and then accepting inter-bank offers in reasonable market size just prior to 1100.

This change to a revised fixing methodology and the consequent abandoning of the idea that the benchmark would be a reflection of borrowing rates among “prime banks”, did not seemingly cause any difficulty for the derivatives markets. Those involved in the 1998 transition are not aware of any instances, for example, of parties arguing that their contracts had been frustrated (see below) as a result of the transition. One reason for this apparent lack of litigiousness may have been, however, that by 1998 the majority of derivatives under the BBA IRS or FRA terms had expired and been replaced by new contracts on ISDA terms.

²⁶ *Ibid*, paragraph 36.

under its authority if the contractual benchmark is unavailable. Exchange-traded Eurodollar futures and options (Liffe, CME) also have fall-back provisions which allow the exchange discretion to determine an applicable rate in these circumstances. Such provisions may be helpful to ensuring a smooth benchmark transition in the future.

A.1.2. Loans

Whilst the greatest share, by underlying value, of the market in LIBOR-linked instruments comprises derivatives contracts, the highest prevalence of LIBOR-linked contracts probably occurs in the loan markets (syndicated and non-syndicated).

(a) Syndicated loans

In the UK, most syndicated loan agreements incorporate Loan Market Association (“LMA”) market standard terms governed by English law. Under these terms, “LIBOR” is defined as “the applicable Screen Rate... as of the Specified Time” which, in turn, is defined as follows:

“Screen Rate” means:

In relation to LIBOR, the British Bankers Association Interest Settlement Rate for the relevant currency and period displayed on the appropriate page of the Reuters screen.

That the definition still refers to the BBA in this way is probably a legacy from the era when the benchmark was not widely known as the London Interbank Offer Rate.²⁸ As footnoted [above](#), questions have been raised about how best to provide for contractual continuity in circumstances in which the BBA is to hand over administration of LIBOR to NYSE Euronext in 2014.

The LMA has revised its terms to address this question for new contracts²⁹ but the revised standard market terms will not take effect for legacy contracts.

As with derivatives, publication on the Reuters screen is a feature of LIBOR which has been incorporated into the market standard terms. This means that a failure to publish the benchmark on the Reuters screen would likely give rise to difficulties in construing the contract and would allow parties to argue that a rate published on a different site was not the rate contemplated by their agreement.

²⁸ See also [above](#), regarding historic definitions in market standard terms for OTC derivatives.

²⁹ The revised definition provides that “Screen Rate” means, in relation to LIBOR, the London interbank offered rate administered by the British Bankers Association (or any other person which takes over the administration of that rate)... displayed on pages LIBOR01 or LIBOR02 of the Reuters screen (or any replacement Reuters page which displays that rate) or on the appropriate page of such other information service which publishes that rate from time to time in place of Reuters...

It has been suggested that defining LIBOR as the rate displayed on the Reuters screen “as of the Specified Time” (which is defined elsewhere as 11.00 a.m.), has the effect that only the first published fixing of LIBOR can be taken into account in interest payment calculations and that any later fixing that is published must be disregarded.³⁰ If so, this is probably an unintended oversight which arises as a result of the fact that intraday re-fixing for LIBOR was not within the contemplation of the administrator, regulators or the markets at the time at which the LMA market standard terms were drafted.

(b) Bilateral commercial loans and commercial mortgages

Many bilateral commercial loans and commercial mortgages will be drafted to replicate key LMA market standard terms. This approach is of advantage where it is later intended to execute an inter-creditor agreement setting up a lending syndicate; and, perhaps, to securitize the loan. In these cases, the features of any contractual definition of LIBOR will resemble the features discussed in the [preceding section](#).

However, many other commercial loans are executed on bespoke terms or on the standard terms of the lender. It is not practicable to give an account of the varied terms according to which LIBOR may be defined across all these instruments.

Some classes of commercial loan do not refer to LIBOR at all. For example, SME loans typically refer to the Bank of England rate.

(c) Other bilateral loans and mortgages

While some retail credit products may be adjusted to reflect LIBOR, it is rarely the case that there is a contractually-defined link to the benchmark. There is generally no such link, for example, in the case of credit cards, auto loans, student loans, retail deposits, and personal loans. Rates set for credit cards will normally incorporate a component which is relative to the credit risk profile of the customer. Auto finance tends to be conditional sale or hire-purchase on fixed rates. Student loans under the Education (Student Loans) Act 1990 etc. are at an interest rate based on Retail Price Index and on terms set out under that legislation. Retail deposits are at fixed or managed rates. Finally, personal loans are executed on the standard terms of the lender, most often at a fixed rate of interest.

In the case of a retail credit product which is adjusted to reflect LIBOR, an act by the lender to accommodate benchmark transition which bears on the terms or performance of the “Consumer Credit Relationship” could trigger certain provisions of the Consumer Credit Act 1974 (as introduced by the Consumer Credit Act 2006) whereby the courts have wide powers, *inter alia*, to alter the terms of the credit agreement or reduce the amount payable by the consumer.

Very large loans to High Net Worth individuals are not normally classed as retail products but will nonetheless often satisfy the European definition of contracts with a “consumer”,

³⁰ *Supra* n.20, at paragraph 37.

i.e. a person acting outside the course of his business or profession. In such cases there may be an intention to syndicate and even securitize the loan at a later date. If so, there may well be a contractual reference to LIBOR, usually defined on the lender's standard terms. These will, to a varying degree, take into account consumer legislation, such as: the Unfair Terms in Consumer Contracts Regulations 1999, the Financial Services (Distance Marketing) Regulations 2004 and other legislation such as the Payment Services Regulations 2009. It should be noted, however, that although these contracts are more often linked to LIBOR they comprise a much smaller proportion of consumer loans than ordinary retail products.

While some UK retail mortgages offer a fixed rate of interest, the majority offer an adjustable rate. The terms of many adjustable-rate mortgages stipulate that the rate of interest is variable at the lender's discretion and so, whilst, the adjustments in question may be made by the lender to reflect changes to a given benchmark (including LIBOR), any link to the benchmark in the mortgage terms and conditions is indicative rather than prescriptive.

In contrast, "tracker rate" mortgages do not provide that the rate of interest is variable at the lender's discretion but the terms of the mortgage may allow interest payments to track an index which is only indirectly linked to LIBOR (such as the Bank of England's Repo Rate, Base Rate or other reference rate).

Retail mortgage terms in the UK do not typically incorporate a contractual definition of LIBOR. Sub-prime and near prime mortgages, however, are an exception and may be tied to LIBOR. There is no standard set of terms for these.

For the small number of mortgages and retail loans that are contractually linked to LIBOR, there will be regulatory implications to benchmark transition. The Treating Customers Fairly policy of the Financial Conduct Authority would likely apply, for instance, in the event of actions by a lender to accommodate benchmark transition. These rules are set out various principles for, among other things, management of information and sales and advice processes.

A.1.3. Debt securities

Floating Rate Notes ("FRNs")—including Commercial or Residential Mortgage Backed Floating Rate Notes and floating rate debt instruments issued pursuant to other kinds of receivables securitization—occupy a significant share of the markets in LIBOR-linked instruments.

Floating rate bonds or notes issued on the back of structured finance arrangements will provide for a floating rate of interest to be payable to the holders. The arrangements themselves may also comprise terms for one or more derivatives (including a hedge) and one or more loans (including a "liquidity facility"). They will rely on the terms of the underlying assets, which may include loans or debt securities. Any and all of these instruments are likely to be linked to LIBOR. The arrangements will also include: one or more trusts—executed by deed, and setting out covenants on the part of the issuer/settlor, including a covenant to pay the interest payable on the notes; one or more deeds vesting a security interest over the assets in the trustee(s); and various contracts providing for the administration and realization of the assets (e.g. a "servicing agreement").

While LIBOR definitions in the terms and conditions of FRNs are not wholly standardized, terms in the Prospectuses for these products are often modeled on ISDA market standard terms. This is because the arrangements within which notes are issued are often supported by interest rate swaps and so the incorporation of terms tracking the ISDA definitions will avoid any mismatch.

For example, terms for FRNs commonly refer to a rate for deposits which appears on a particular screen "as of" a particular time in language reminiscent of the terms for OTC derivatives discussed above. Here is an example:

the Agent Bank will determine the rate for deposits in Sterling for a period equal to the relevant Interest Period which appears on the display page designated LIBOR01 on Reuters (or such other page as may replace that page on that service, or such other service as may be nominated as the information vendor, for the purpose of displaying comparable rates) as of 11:00 a.m. (London time), on the second TARGET Settlement Day before the first day of the relevant Interest Period.

Terms in any of the suite of agreements of which structured finance arrangements are comprised can ordinarily only be modified by a trustee under the terms of the trust which settles the benefit of the issuer's covenants. The "modification" provisions set out in deeds are by not standardised and will be specific to the terms of the agreement but, where they confer a discretion on a trustee, in essence the trustee will be under a duty to have regard to the interests of all classes of noteholders and to satisfy itself that the modification is not "materially prejudicial" to those interests. Here is an example:

the Trustee may without the consent or sanction of the Noteholders at any time and from time to time concur with the Issuer or any other person in making any modification (a) to these presents (including, without limitation...) or any other Transaction Document (excluding only...) which in the opinion of the Trustee it may be proper to make, provided that the Trustee is of the opinion that such modification will not be materially prejudicial to the interests of all classes of the Noteholders or to these presents (including, without limitation...) or any other Transaction Document (excluding only...) if in the opinion of the Trustee such modification is of a formal, minor or technical nature or to correct a manifest error which is, in the opinion of the Trustee, proven. Any such modification may be made on such terms and subject to such conditions (if any) as the Trustee may determine, shall be binding upon the Noteholders and shall be notified by the Issuer to the Noteholders in accordance with the Terms and Conditions of the Notes as soon as practicable thereafter.

The operation of these provisions is discussed [above](#).

A.1.4. "Fall-back" provisions

Most market contracts on standard terms deal with instances where LIBOR is unavailable. These contingency clauses (known as "fall-back" provisions) purport to provide a safety net where LIBOR has temporarily disappeared (i.e. does not appear on the Reuters LIBOR01 Page) by providing another means by which a reference rate can be obtained.

A notable exception is exchange-traded derivatives which do not appear to include standard fall-back provisions to cover the withdrawal of LIBOR. However, such contracts typically vest a wide discretion in the exchange unilaterally to decide that the Settlement Price is to be determined by means other than by reference to LIBOR, provided that the resolution is made in advance and sufficient notice is given to counterparties. This contingency provision would cover a structured transition.

The typical fall-back provisions found in loan contracts on LMA standard terms, derivative contracts on ISDA standard terms and in FRNs stipulate that if LIBOR becomes unavailable, quotations from Reference Banks will be sought.³¹ In most cases, there are often around three or four Reference Banks appointed and a minimum of two quotations from these banks is required. For a typical collateralized loan obligation ("CLO") transaction, the fall-back arrangements often specify that if the Calculation Agent cannot determine the applicable rate, the trustee will do so instead, incorporating any necessary amendments to the terms and conditions of the bonds. In the case of loans on LMA terms, a second fall-back clause provides that if Reference Banks are unable, or refuse, to provide quotations, then the lender's cost of funds will apply.

Provisions of this kind give comfort to parties to legacy contracts, who may be facing a transition of the kind outlined in Appendix A.2. The express object of these clauses is to ensure that, because the withdrawal of LIBOR has been provided for in the contract, that eventuality does not frustrate the contract.

A.1.5. Force majeure/MAC clauses

Some contracts may incorporate other force majeure or material adverse change clauses—i.e. in addition to, or as an alternative to, the standard fall-back provisions—which could be triggered by a change to the methodology of the existing LIBOR benchmark or the elimination of LIBOR. Such clauses are not standard but where they exist, they will *prima facie* prevent the frustration of the contract.

³¹ Fall-back provisions for both ISDA and LMA market standard terms are given in the *Benchmark Transition Report - December 2012* published by the Financial Markets Law Committee, *supra*, n.21, at section 4.

A.2. Transition hypotheses

This appendix outlines a number of hypotheses under which transition to another benchmark or another fixing methodology for LIBOR might occur. It also considers a number of other hypothetical changes to features of LIBOR which would arguably raise questions of contractual construction in the context of the market standard definitions discussed above.

Where transition to another benchmark is hypothesized below, it is assumed for the sake of the analysis that LIBOR is no longer available as an alternative reference rate, i.e. that LIBOR has been wound down or eliminated in the process of establishing the preferred benchmark. Whilst it seems likely that LIBOR could be maintained indefinitely, notwithstanding the availability of alternative benchmarks, with appropriate support from market participants and regulators, a plan to sustain LIBOR in this way does not appear to correspond with the tenor of remarks made by the FSB and OSSG regarding benchmark reform.

The following paragraphs outline each hypothetical scenario for transition.

A.2.1. Transition to another unsecured benchmark

Under this hypothesis, the old LIBOR benchmark is replaced by another benchmark reflecting the cost of unsecured borrowing in the interbank market.³² Although the administrator's definition of such a benchmark would bear obvious similarities to the administrator's definition of LIBOR (in that it would be defined as a benchmark for unsecured interbank borrowing or deposits),³³ the new benchmark might have markedly different features which were considered to bring it into greater alignment with the IOSCO Principles. Such features might include a fixing methodology anchored firmly in transactions, different provisions for the calculation of submissions data and a policy on intraday re-fixing, for example.

Given the obvious similarities in the administrators' definitions of the two benchmarks, the expected margin between LIBOR and the replacement reference rate would be relatively small in this case.

A.2.2. Transition to a secured benchmark

Alternatively, it seems likely that a proposal may be made to replace LIBOR with a benchmark reflecting secured lending rates in the interbank market. The introduction of a new benchmark of this kind and an attempt to transfer legacy contracts to such a

³² Currently, the rate at which each bank makes its submission to the administrator of the LIBOR benchmark reflects the bank's judgement as to its cost of unsecured funds in the London interbank market. The definition of "funds" is: unsecured interbank cash or cash raised through primary issuance of interbank Certificates of Deposits.

³³ See the definition provided by BBA LIBOR Ltd (<http://www.bbalibor.com/explained/definitions>).

benchmark would represent a more significant change than that discussed in the section above. It would be harder (as discussed below) to argue that legacy contracts impliedly contemplate such a transition in the event that LIBOR is discontinued.

Secured benchmarks tend to yield lower fixings compared to unsecured benchmarks. The process by which transition to a secured benchmark can be undertaken is referred to as “mapping” (see section 5.2.2.5 (b) for an analysis of mapping).

A.2.3. Transition to a new fixing methodology

One possibility is that the existing LIBOR benchmark is simply reformed by the introduction of a new fixing methodology to bring the benchmark (“LIBOR+”) into what is perceived to be greater alignment with the IOSCO Principles.

The most likely proposal of this kind is a proposal to “anchor” the benchmark in transactions. Under the current arrangements for LIBOR panel banks are asked to base their submissions on the following question:

“At what rate could you borrow funds, were you to do so by asking for and then accepting inter-bank offers in a reasonable market size just prior to 11 am?”

The question is itself hypothetical and implies that the bank is to use its best judgement to report its cost of funds. Thus, the LIBOR methodology is sometimes referred to as “poll-based” because its express objective is to infer the unsecured cost of funds from banks’ opinions or judgements, rather than from financial data (albeit the judgements in question are very well-informed and experienced ones).

In contrast, a transaction-anchored fixing methodology would require panel banks to calculate their own cost of funds from certain permissible, specified data sources. (That is, if it were still based on submissions by a panel of banks. As an alternative, the fixings could be calculated directly using relevant transactions data from a transactions data repository service, from a transactions settlement service, from another party such as the central bank or from some combination of external parties.) Ideally, given that LIBOR is a benchmark for unsecured interbank lending, the data in question would be deposits and loans. However, in relatively illiquid currencies and tenors, it is clear that there would not be sufficient unsecured borrowing transactions each day from which a bank could calculate its own cost of funds. For that reason, it is expected that a transactions-anchored methodology would incorporate some of all of the following features:³⁴

a) Interpolation

If a panel bank has transactions data for any tenor, such as its borrowing or lending transactions in the market defined by the benchmark publisher for

³⁴ See *BBA LIBOR Guidelines 2009*, CFTC’s Guidelines published in *Order to Barclays PLC 2012* and *The Wheatley Review of Libor: Final Report*, *supra* n.19.

unsecured funds, the panel bank may interpolate or extrapolate the remaining tenors from the available data.

b) Broad categories of transaction

Where a panel bank has few transactions in inter-bank deposits, or those transactions are not representative of the inter-bank market, then an assessment of the inter-bank funding market can be based on transactions or observations of other unsecured deposits and other relevant financial instruments, including: overnight index swaps, repo transactions, foreign exchange, interest rate futures and options and central bank operations. Transactions data may be drawn by panel banks from a broader wholesale market in order to determine a submission and a broader set of banks to estimate LIBOR (in the absence of direct transactional data) may be used.

c) Observed 3rd party transactions

Third party offers observed by panel banks in the market, in other markets for secured funds and provided by a panel bank in various related markets might also be considered when making a submission. Quotes by third parties offered to contributing banks in the same markets might also be sought.

d) Adjustments

In particularly illiquid markets it may be necessary to infer the cost of funds from transactions which are not directly correlated to the currency, tenor or activity (i.e. unsecured lending) in question. It may be necessary to apply adjustments (i.e. for any disjunction relating to the time of the transactions, market events, the term structure, or the credit standards which apply) to the date used in order to arrive at an accurate rate for unsecured borrowing. It is unclear what role a bank's expert judgement would play in making these adjustments to its submissions and whether, if so, they would reintroduce a "poll-based" element to the methodology. It is to be noted that, provided the fixing is anchored in transactions, the use of some degree of judgement, for example in the interpretation of the data through some chosen statistical methodology, is not ruled out by Principle 7 of the IOSCO Principles.

A.2.4. Transitions involving other revisions to the benchmark

Other revisions to a benchmark may include a change to the Administrator and the introduction of a re-fixing policy. These possibilities have been comprehensively discussed elsewhere.³⁵

³⁵ See *ILOC—BBALIBOR Joint Consultation Paper on LIBOR Re-fixing and Benchmark Transition Report - December 2012* published by the Financial Markets Law Committee, *supra*, n.20 and n.21.

A.3. Template Legal Risk Analysis

Executive summary

1. Introduction

(Sets out the jurisdictional and governing law basis on which the analysis is conducted.)

2. Product profile: market standard terms

2.1. Derivatives

- a) Exchange-traded derivatives
- b) OTC derivatives

2.2. Loans

- a) Syndicated loans
- b) Commercial loans
- c) Other loans

2.3. Bonds and notes

2.4. Any other products

3. Transition hypotheses

3.1. Transition to another unsecured benchmark

3.2. Transition to a secured benchmark

3.3. Transition to a transactions-based fixing methodology

- a) Interpolation from limited transactions data
- b) Expanding the categories of transaction
- c) Observed 3rd party transactions
- d) The role of expert judgement

3.4. Transitions involving other revisions to the benchmark

4. Legal risk profile for legacy contracts

4.1. Doctrinal features of the governing law:

- a) Contractual construction and fall-back

- b) Frustration
- c) Implied terms
- 4.2. Market-led solutions: variation, novation etc. (i.e. protocols and other agreements to vary)
- 4.3. Risk factors for material change: *by product* (i.e. contractual references to the existing methodology)
- 4.4. Mitigating factors for elimination or material change: *by product* (e.g. references to the new / modified benchmark)
- 4.5. Risk profile: by transition hypothesis, (incorporating market-led solutions and other mitigating factors).

5. Other issues

- 5.1. Statutory provision for legacy contracts
- 5.2. Force majeure / MAC clauses
- 5.3. The role of Learned Opinions

Appendix B. List of Outreach Contributors

| | |
|---|---|
| UK financial institutions: | <ul style="list-style-type: none"> • HSBC • Lloyds • Barclays • Santander • Nationwide • Standard Chartered • UBS |
| Alternative Managers: | <ul style="list-style-type: none"> • Blue bay • Moore capital • GLG • AIMA |
| Exchange-Traded Futures/Options: | <ul style="list-style-type: none"> • London stock exchange • NYSE • NYSE LIFFE • AXA • Citibank Securities Lending • Clearstream Securities Lending |
| Euroclear | <ul style="list-style-type: none"> • Ignis • JPM Chase Securities Lending • LCH • Legal and General • Northern Trust Securities Lending • State Street • UBS Securities Lending |
| Trade Associations for Members | <ul style="list-style-type: none"> • Association of Corporate Treasurers • Association of British Insurers • British Bankers Association-Libor Panel • Managed Funds association • London Money Market association |

Appendix C. Market Footprint Sources and Assumptions

[See below]

Section 1 | Summary perspectives

GBP Overview

| Asset class | | Overall volume (\$ BN) | % LIBOR-related | % non-domestic | O/n | 1w | 1m | 2m | 3m | 6m | 12m |
|--------------------------------|--|------------------------|-----------------|----------------|-----|----|--------|------|--------|--------|-----|
| Level 1 | Level 2 | | | | | | | | | | |
| Loans | Syndicated loans ¹ | 125 | 100% | 9% | | | Low | | Medium | Low | |
| | Corporate loans (bilateral) ¹ | 305 | 90% | Low | | | Low | | Medium | Low | |
| | SME loans | 181 | 31% | Low | | | Low | | Low | Low | |
| | CRE/Commercial mortgages | 272 | Low | Low | | | Low | | Low | Low | |
| | Retail mortgages | 1,662 | 1–2% | Low | | | | | Low | | |
| | Credit cards | 80 | Low | Low | | | Low | | | | |
| | Auto loans ² | Low | Low | Low | | | | | | | |
| | Consumer loans | 99 | Low | Low | | | Low | | Low | | |
| | Student loans | 75 | 0% | Low | | | | | | | |
| Bonds | Floating/Variable Rate Notes | 800 | 54% | 27% | | | Low | | Medium | | Low |
| Securitisation | RMBS | 377 | 100% | 25% | | | Low | | Medium | | |
| | CMBS | 42 | 100% | 0% | | | | | Low | | |
| | ABS | 78 | 67% | 22% | | | Low | | | | |
| | CDO | 65 | 100% | 0% | | | | | Low | | |
| OTC | IR Swaps | 30,187 | 63% | Low | | | Medium | | High | High | |
| Derivatives | FRAs | 8,965 | 63% | Low | | | Medium | | High | High | |
| | IR Options | 3,091 | 63% | Low | | | Medium | | High | Medium | |
| | X-currency swaps | 3,504 | 63% | Low | | | Medium | | High | Medium | |
| | ETD | IR Options | 1,668 | 100% | Low | | | | High | | |
| Derivatives | IR Futures | 1,836 | 97% | Low | | | | High | | | |
| Deposits | Retail deposits | 1,756 | Low | Low | | | | | TBC | | |
| | Corporate deposits | | TBC | Low | | | | | TBC | | |
| | SME deposits | 1,574 | Low | Low | | | Low | | Medium | Low | |
| Mutual funds | Money market funds | TBC | Indirect | | | | | | | | |
| | Bank loan funds | TBC | Indirect | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | TBC | TBC | |
| | Discount rates | | | | | | | | | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. Significant overlap exists between Syndicated loans and Corporate business loans

2. Auto loans included within consumer loans

GBP contract maturity by asset class

| Asset class | | Outstanding volume (\$ BN) | % LIBOR-related | % Callable | % roll-of after x years | | | | | | | |
|--------------------------------|--|----------------------------|-----------------|------------|-------------------------|-----|------|------|------|------|------|------|
| Level 1 | Level 2 | | | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| Loans | Syndicated loans ¹ | 125 | 100% | | 23% | 53% | 69% | 89% | 91% | 92% | 98% | 100% |
| | Corporate loans (bilateral) ¹ | 305 | 90% | | 30% | | | 40% | | | | |
| | SME loans | 181 | 31% | | | | | | | | | |
| | CRE/Commercial mortgages | 272 | Low | | | | | | | | | |
| | Retail mortgages | 1,662 | 1–2% | | | | | | | | | |
| | Credit cards | 80 | Low | | | | | | | | | |
| | Auto loans ² | Low | Low | | | | | | | | | |
| | Consumer loans | 99 | Low | | | | | | | | | |
| | Student loans | 75 | 0% | | | | | | | | | |
| Bonds | Floating/Variable Rate Notes | 800 | 54% | 16% | 10% | 23% | 35% | 49% | 51% | 60% | 70% | 73% |
| Securitisation | RMBS | 377 | 100% | 42% | 0% | 0% | 1% | 1% | 2% | 2% | 5% | 30% |
| | CMBS | 42 | 100% | 14% | 23% | 31% | 43% | 62% | 78% | 83% | 91% | 100% |
| | ABS | 78 | 67% | 51% | 5% | 9% | 13% | 24% | 36% | 42% | 67% | 84% |
| | CDO | 65 | 100% | | | | | | | | | |
| OTC derivatives | IR Swaps | 30,187 | 63% | | 17% | 30% | 40% | 57% | 65% | 74% | 88% | 96% |
| | FRAs | 8,965 | 63% | | 87% | 99% | 100% | 100% | 100% | 100% | 100% | 100% |
| | IR Options | 3,091 | 63% | | 34% | 48% | 59% | 71% | 76% | 81% | 88% | 89% |
| | X-currency swaps | 3,504 | 63% | | 26% | 41% | 51% | 66% | 73% | 79% | 92% | 98% |
| ETD | IR Options | 1,668 | 100% | | | 95% | | | | | | |
| | IR Futures | 1,836 | 97% | | | | | 95% | | | | |
| Deposits | Retail deposits | 1,756 | Low | | 55% | 91% | | | | | | |
| | Corporate deposits | 1,574 | TBC | | 72% | 95% | | | | | | |
| | SME deposits | | Low | | | | | | | | | |
| Mutual funds | Money market funds | TBC | Indirect | | | | | | | | | |
| | Bank loan funds | TBC | Indirect | | | | | | | | | |
| Non-financial contracts | Late payment terms | TBC | TBC | | | | | | | | | |
| | Discount rates | | | | | | | | | | | |

Global
 Domestic Only
 High >\$1 TN
 Medium \$100 BN>x>\$1 TN
 Low <\$100 BN

1. 1. Roll-off rates in this draft represent contractual maturity, actual roll-off is expected to be significantly faster due to prepayment

Appendix 1 | Sources and assumptions

GBP Corporate loans and Floating/Variable Rate Notes

| | Volume | Relation to LIBOR | Sources |
|-------------------------------------|---|---|--|
| Syndicated loans¹ | <ul style="list-style-type: none"> • Issuance volume in 2012: \$83 BN • Outstanding volume estimated to be \$125 BN • 9% of 2012 issuance volume was nondomestic | <ul style="list-style-type: none"> • 100% LIBOR linked¹ <ul style="list-style-type: none"> – Primarily 3m and 1m tenors | <ul style="list-style-type: none"> • Issuance volumes and maturities: Dealogic (tenors not available) • Outstanding volumes assumption: 1.5x issuance volume • Tenors: Input from market participants |
| Corporate loans (bilateral) | <ul style="list-style-type: none"> • Outstanding volume at the end of 2012: \$305 BN | <ul style="list-style-type: none"> • ~90% referenced to LIBOR <ul style="list-style-type: none"> – ~30% 1 month – ~65% 3 month – ~5% 6 month | <ul style="list-style-type: none"> • Volumes and maturities: Bank of England Statistics • Tenors: Input from banks/market participants |
| SME loans | <ul style="list-style-type: none"> • Outstanding volumes at end of 2012: \$181 BN | <ul style="list-style-type: none"> • ~30% of outstanding loan volume LIBOR linked <ul style="list-style-type: none"> – Primarily 3 months with some in 1m and 6m tenors | <ul style="list-style-type: none"> • Volumes and maturities: Bank of England Statistics • Relation to LIBOR: OW benchmark • Tenors: Input from market participants |
| CRE/Commercial mortgages | <ul style="list-style-type: none"> • Outstanding volumes at end of 2012: \$272 BN | <ul style="list-style-type: none"> • Estimated High <ul style="list-style-type: none"> – Primarily 3 months with some in 1m and 6m tenors | <ul style="list-style-type: none"> • Volumes and maturities: Bank of England Statistics • Tenors: Input from market participants |
| Floating/Variable Rate Notes | <ul style="list-style-type: none"> • Outstanding volume \$800 BN • 27% of the issuance volume is non-domestic¹ | <ul style="list-style-type: none"> • 54% LIBOR linked¹, of which: <ul style="list-style-type: none"> – 3 month: 91% – 1 month: 7% – 6 month: 2% – 12 month: 0.04% • 0.2% linked to EURIBOR • Remaining 10% not specified | <ul style="list-style-type: none"> • Volumes, tenors and maturities: Dealogic, BIS quarterly review |

1. Based on 2012 issuance, all syndicated loans are assumed to be floating rate
Source: Bank of England, Dealogic, BIS quarterly review, Oliver Wyman Analysis

GBP Syndicated Loans Relation to LIBOR

Total issuance of GBP denominated syndicated loans USD, 2012

| | UK | | Non-UK | | Total | | % of total Specified |
|--------------------|-----------|------------|----------|------------|-----------|------------|----------------------|
| | \$ BN | % of Total | \$ BN | % of Total | \$ BN | % of Total | |
| LIBOR | 16 | 21% | 4 | 52% | 20 | 24% | 100% |
| Unspecified | 60 | 79% | 4 | 48% | 63 | 76% | N/A |
| Total | 76 | | 8 | | 83 | | |

UK Corporate Loans Volumes

MFI loans outstanding to non-financial businesses by size of business £ MM, not seasonally adjusted

Table A8.1

| | Loans (excluding overdrafts) | | | Overdrafts | | | Total loans | | |
|-----------------|---|------------------|--------------------------------|---|------------------|--------------------------------|---|------------------|--------------------------------|
| | Small and medium-sized enterprises (SMEs) | Large businesses | Total non-financial businesses | Small and medium-sized enterprises (SMEs) | Large businesses | Total non-financial businesses | Small and medium-sized enterprises (SMEs) | Large businesses | Total non-financial businesses |
| 2012 Jul | 166,785 | 283,686 | 450,471 | 17,798 | 17,742 | 35,541 | 184,583 | 301,428 | 486,012 |
| Sep | 165,714 | 280,583 | 446,297 | 17,497 | 18,102 | 35,599 | 183,211 | 298,685 | 481,896 |
| Dec | 160,422 | 277,438 | 437,859 | 15,850 | 18,400 | 34,250 | 176,272 | 295,838 | 472,109 |

Estimation of loans outstanding to non-financial businesses excluding Commercial mortgages/CRE

| YE 2012 (£/USD = 1.604) | £ BN | % of total | USD BN |
|---|--------------|------------|------------|
| Loans to Large businesses (incl. CRE/Commercial mortgages) | 295.8 | 63% | 475 |
| Loans to SME (incl. CRE/Commercial mortgages) | 176.3 | 37% | 283 |
| Total loans to non-financial businesses | 472.1 | | 758 |
| of which CRE/Commercial Mortgages ¹ | 169.5 | | 272 |
| Estimated portion of CRE to large businesses | | 63% | 170 |
| Estimated portion of CRE to SMEs | | 37% | 102 |
| Loans outstanding excluding CRE/Commercial mortgages | | | 486 |
| Loans to large businesses (excl. CRE/Commercial mortgages) | | | 305 |
| Loans to SMEs(excl. CRE/Commercial mortgages) | | | 181 |

1. Refer to Slide UK CRE/Commercial Mortgages – Drilldown

Source: <http://www.bankofengland.co.uk/statistics/Pages/bankstats/2013/Aug13/default.aspx>

UK Commercial Real Estate/Mortgages Volumes

MFI loans outstanding to UK residents, by industry £ MM, Not seasonally adjusted

Table C1.2

Real estate, professional services and support activities

| | | Buying, selling and renting of real estate | Professional, scientific and technical activities | Administrative and support services | Total | Public Administration And defence | Education |
|------|-----|--|---|-------------------------------------|---------|-----------------------------------|-----------|
| 2012 | Mar | 178,661 | 17,238 | 13,679 | 209,578 | 7,957 | 11,484 |
| | Jun | 174,731 | 16,149 | 12,980 | 203,859 | 7,826 | 11,445 |
| | Sep | 171,887 | 16,319 | 12,499 | 200,705 | 8,064 | 11,460 |
| | Dec | 169,529 | 15,133 | 13,096 | 197,758 | 7,742 | 12,049 |

Conversion to USD

| | £ BN | | £/USD YE 2012 | | USD BN |
|--------------------------------|-------|---|---------------|---|--------|
| Total CRE/Commercial Mortgages | 169.5 | x | 1.6043 | = | 272 |

UK CRE/Commercial mortgages

Relation to LIBOR

Does Barclays Libor scandal affect me?

Q&A: Have mortgage holders been overcharged, who are the biggest losers and what happens to the £290m in fines?



The Barclays fine means the FSA will probably need to ask banks (including Barclays) for less money next year. Photograph: Andy Rain/EPA

Does this affect me?

If you have a buy to let mortgage or a sub-prime loan, then it directly affects you. Ray Boulger of mortgage brokers John Charcol estimates there are between 200,000 and 250,000 mortgages where the interest rate paid is linked to three-month Libor, many of them buy-to-let loans from lenders such as Paragon. A number of borrowers who took out "sub-prime" loans before the credit crunch struck also pay an interest rate determined by Libor.

Typically, the interest rates on these mortgages were set using a formula such as "three-month Libor +1.5%". Every three months, the lender sets the interest for the next three months according to the Libor rate. Even if a mortgage wasn't initially priced at Libor, it is likely to have contained a provision that it would revert to Libor at the end of a particular term, such as a two-year fix.

Libor also influences the setting of interest rates on fixed-rate deals, although only at the margins.

GBP Floating/Variable Rate Notes Relation to LIBOR

GBP Floating Rate Notes issuance in 2012 USD BN

| | UK | | Non-UK | | Total | |
|--------------------|-------------|------------|-------------|------------|-------------|------------|
| | \$ BN | % of total | \$ BN | % of total | \$ BN | % of total |
| LIBOR | 25.5 | 40% | 21.6 | 92% | 47.1 | 54% |
| 1 month | 1.8 | 7% | 1.5 | 7% | 3.3 | 7% |
| 3 months | 22.7 | 89% | 20.0 | 91% | 42.8 | 91% |
| 6 months | 0.9 | 4% | 0.06 | 2% | 0.9 | 2% |
| 12 months | 0.01 | 0.1% | - | - | 0.01 | 0.04% |
| EURIBOR | - | - | 0.1 | 0.1% | 0.1 | 0.2% |
| Unspecified | 38.7 | 60% | 1.9 | 8% | 40.6 | 46% |
| Total | 64.2 | | 23.6 | | 87.8 | |

GBP Floating Rate Notes issuance in 2012 USD BN

Table 13B: International bonds and notes

By type, sector and currency

In billions of US dollars

| Type, sector and currency | Amounts outstanding | | |
|-----------------------------|---------------------|-----------------|-----------------|
| | Dec 2012 | Jun 2013 | Sep 2013 |
| Total issues | 21,183.3 | 21,050.3 | 21,600.1 |
| Floating rate | 5,993.9 | 5,800.4 | 5,950.2 |
| US dollar | 1,467.8 | 1,507.7 | 1,546.0 |
| Euro | 3,293.8 | 3,139.4 | 3,212.6 |
| Yen | 143.2 | 105.9 | 99.3 |
| Pound sterling | 803.4 | 785.0 | 820.1 |
| Swiss franc | 28.0 | 24.3 | 24.7 |
| Canadian dollar | 38.6 | 36.5 | 38.8 |
| Other currencies | 219.0 | 201.6 | 208.7 |
| Financial corporations | 5,688.3 | 5,481.1 | 5,608.3 |
| Non-financial corporations | 118.2 | 120.6 | 129.3 |
| General government | 93.8 | 90.1 | 90.9 |
| International organisations | 93.6 | 108.6 | 121.8 |

GBP Retail Loans

| | Outstanding volume at EY 2012 | Relation to LIBOR | Sources |
|-------------------------|--|--|---|
| Retail mortgages | <ul style="list-style-type: none"> • \$1,662 BN | <ul style="list-style-type: none"> • 1–2% referenced to LIBOR <ul style="list-style-type: none"> – Tenors TBC – Primarily legacy loans (pre-2008) and Buy-to-let | <ul style="list-style-type: none"> • Volumes: Bank of England Statistics • Relation to LIBOR: Council of Mortgage Lenders |
| Credit cards | <ul style="list-style-type: none"> • \$80 BN | <ul style="list-style-type: none"> • Estimated a low proportion referenced to LIBOR <ul style="list-style-type: none"> – Primarily 1 month | <ul style="list-style-type: none"> • Volumes: Source: Bank of England Statistics • Relation to LIBOR: Input from market participants |
| Auto loans | <ul style="list-style-type: none"> • Included in consumer loans | <ul style="list-style-type: none"> • TBC | <ul style="list-style-type: none"> • <i>Research in progress</i> |
| Consumer loans | <ul style="list-style-type: none"> • \$99 BN¹ | <ul style="list-style-type: none"> • Low proportion referenced to LIBOR <ul style="list-style-type: none"> – Primarily 1 and 3 month | <ul style="list-style-type: none"> • Volumes: Source: Bank of England Statistics • Relation to LIBOR: Input from market participants |
| Student loans | <ul style="list-style-type: none"> • ~\$75 BN | <ul style="list-style-type: none"> • UK student loans are not linked to LIBOR | <ul style="list-style-type: none"> • Source: Parliament Paper – Student Loan Statistics |

1. Includes auto loans

Source: Bank of England, House of Commons Library, Oliver Wyman analysis

UK Mortgages and Consumer loans Volumes

Outstanding loans to the Household sector

£ MM Not seasonally adjusted

Table A 4.1

| | Individuals | | | | Unincorporated businesses and non-profit Institutions | Total household sector |
|-----------------|-------------------------|--------------------|-------------|--------|--|------------------------------|
| | Secured on dwellings | Consumer credit | of which: | | | |
| | | | Credit card | Other | | |
| 2012 Mar | 1,019,434 | 113,983 | 49,640 | 64,343 | 42,632 | 1,176,049 |
| Jun | 1,029,436 | 112,724 | 50,179 | 62,545 | 37,756 | 1,179,915 |
| Sep | 1,033,758 | 112,153 | 50,152 | 62,001 | 37,191 | 1,183,102 |
| Dec | 1,035,891 | 112,612 | 50,911 | 61,700 | 36,762 | 1,185,265 |

Conversion to USD

£/USD (EY 2012) = 1.6043

| | £ BN | \$ BN |
|---|--------|--------|
| Credit Card Loans | 50.9 | 80.2 |
| Other Consumer Loans (Includes Consumer and Auto Loans) | 61.7 | 99.0 |
| Secured on Dwellings | 1035.9 | 1661.9 |

Estimated of relation of Retail Mortgages in the UK to LIBOR/EURIBOR

The Wheatley Review of LIBOR: initial discussion paper

Response by the Council of Mortgage Lenders to the Wheatley Review of LIBOR

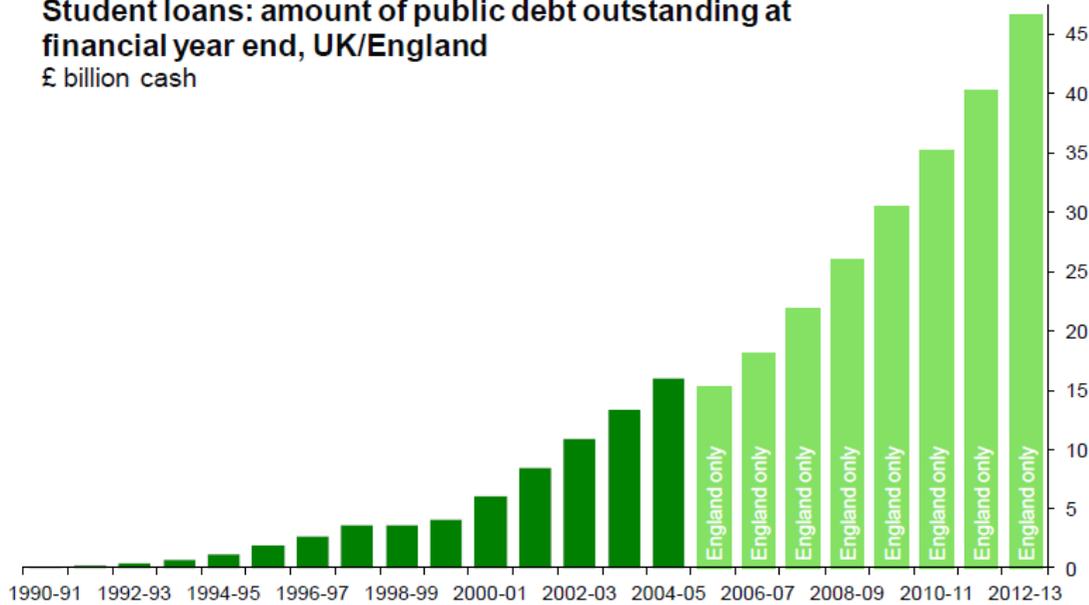
Introduction

1. The CML is the representative trade body for the first charge residential mortgage lending industry, which includes banks, building societies and specialist lenders. Our 109 members hold around 94% of the assets of the UK mortgage market. In addition to lending for home-ownership, the CML's members also lend to support the social housing and private rental markets.
2. The CML welcomes the opportunity to comment on the initial discussion paper and looks forward to the conclusion of the initial review of LIBOR and further discussion and comment on the appropriate changes to the calculation of LIBOR and other benchmarks.
3. This response has been drafted in consultation with our members. As such, we will limit our response to issues that are of most significance to their mortgage lending activities.
4. It should be noted that LIBOR (and EURIBOR) were only used as a pricing benchmark for a very small proportion of mortgages in the UK and we understand that most relate to sterling LIBOR. After consultation with our members, we would estimate that between 100,000-200,000 mortgages are linked to LIBOR or EURIBOR, representing between 1-2% of the outstanding mortgage market. The bulk of these mortgages were entered into pre-2008. Even so, any changes to definition of or composition of the benchmark rate will affect consumers and our members in the operation and administration of these mortgages. We consider that it is very important for there to be proper transitional arrangements to any new benchmark index.
5. In addition to the number of mortgages using LIBOR and EURIBOR as a benchmark for setting interest rates, our members also have significant exposure to these benchmarks in the form of derivative contracts necessary for the creation and hedging of a variety of mortgage products.

GBP Student loans

Volumes

Student loans: amount of public debt outstanding at financial year end, UK/England
£ billion cash



Source: SLC statistical first release 1/2013 Student loans for higher education in England -financial year 2012-13 ,and earlier editions



Student Loan statistics

Standard Note: SN/SG/1079
 Last updated: 3 July 2013
 Author: Paul Bolton
 Section: Social & General Statistics

| | £ BN | | £/USD YE 2012 | | \$ BN |
|---|-------------|----------|---------------|----------|-------------|
| Total Outstanding UK Student Loans | 46.6 | x | 1.6043 | = | 74.7 |

UK Securitised products

| | Volume outstanding EY 2012 | Relation to LIBOR | Assumptions/Sources |
|-------------|--|---|---|
| RMBS | <ul style="list-style-type: none"> • \$377 BN • 25% of the issuance volume is non-domestic¹ | <ul style="list-style-type: none"> • 100% LIBOR¹ linked, of which: <ul style="list-style-type: none"> – 3 month: 93% – 1 month: 7% | <ul style="list-style-type: none"> • Outstanding volumes: SIFMA • % Domestic, tenors and maturities: Dealogic |
| CMBS | <ul style="list-style-type: none"> • \$42 BN • None of the issuance volume is non-domestic¹ | <ul style="list-style-type: none"> • 100% LIBOR¹ linked, of which: <ul style="list-style-type: none"> – All 3 month | <ul style="list-style-type: none"> • Outstanding volumes: SIFMA • % Domestic, tenors and maturities: Dealogic |
| ABS | <ul style="list-style-type: none"> • \$78 BN • 22% of the issuance volume is non-domestic¹ | <ul style="list-style-type: none"> • 67% Priced on LIBOR¹ <ul style="list-style-type: none"> – All 1 month | <ul style="list-style-type: none"> • Outstanding volumes: SIFMA • % Domestic, tenors and maturities: Dealogic |
| CDO | <ul style="list-style-type: none"> • \$65 BN • None of the issuance volume is non-domestic¹ | <ul style="list-style-type: none"> • 100% Priced on LIBOR¹ <ul style="list-style-type: none"> – All 3 month | <ul style="list-style-type: none"> • Outstanding volumes: SIFMA • % Domestic and tenors: Dealogic |

1. Based on 2012 issuance
Source: Dealogic, SIFMA, Oliver Wyman analysis

UK Securitised products Volumes



Outstanding Securitisation volumes in Europe

By collateral type (USD BN)

| Year | ABS | | | | | CDO | | MBS | | SME | WBS | | Total |
|------|------|----------|--------------|--------|-------|-----|------|-------|------|-----|-------|------|-------|
| | Auto | Consumer | Credit Cards | Leases | Other | CDO | CMBS | Mixed | RMBS | SME | Other | Pubs | |
| 2010 | 51 | 69 | 28 | 36 | 96 | 309 | 197 | 21 | 1778 | 238 | 47 | 19 | 2,889 |
| 2011 | 50 | 75 | 24 | 39 | 91 | 261 | 170 | 15 | 1655 | 248 | 48 | 18 | 2,695 |
| 2012 | 64 | 67 | 29 | 30 | 87 | 232 | 149 | 12 | 1329 | 214 | 52 | 18 | 2,284 |

By nationality (USD BN)

| Year | Belgium | France | Germany | Greece | Ireland | Italy | Multinational | Netherlands | Other | PanEurope | Portugal | Russian | | United Kingdom | | Total |
|------|---------|--------|---------|--------|---------|-------|---------------|-------------|-------|-----------|----------|------------|-------|----------------|---------|-------|
| | | | | | | | | | | | | Federation | Spain | Kingdom | Kingdom | |
| 2010 | 109 | 48 | 126 | 53 | 100 | 305 | 226 | 433 | 20 | 113 | 79 | 12 | 401 | 864 | 2,889 | |
| 2011 | 122 | 59 | 113 | 49 | 87 | 292 | 178 | 428 | 20 | 101 | 75 | 9 | 379 | 784 | 2,695 | |
| 2012 | 126 | 58 | 98 | 46 | 75 | 269 | 150 | 389 | 15 | 78 | 55 | 4 | 278 | 643 | 2,284 | |

Outstanding Securitisation volumes

(USD BN), UK as % of total for Europe

| | Outstanding volume 2012 (\$ BN) |
|----------------------|------------------------------------|
| UK Total | 643 |
| Europe Total | 2,284 |
| UK % of Europe Total | 28% |

Outstanding Securitisation volumes

UK Estimate¹ (USD MM)

| | Europe (\$ BN) | UK estimate ¹ (\$ BN) |
|-----------------------|-------------------|-------------------------------------|
| ABS | 278 | 78 |
| CDO | 232 | 65 |
| CMBS | 150 | 42 |
| Core CMBS | 149 | 42 |
| CMBS from Mixed (10%) | 1 | 0 |
| RMBS | 1,340 | 377 |
| Core RMBS | 1,329 | 374 |
| RMBS from Mixed (90%) | 11 | 3 |

1. 28% of total Europe

Source: <http://www.sifma.org/research/statistics.aspx>

GBP Securitised products

Relation to LIBOR

Relation of LIBOR to securitised products issued in GBP 2010–2013 (\$ BN, % of Total)

| | Overall Issuance volume (\$ BN) | % Floating | LIBOR- linked | % of LIBOR linked | | | |
|-------------|------------------------------------|------------|------------------|-------------------|------|-----|-------------|
| | | | | 1m | 3m | 12m | Unspecified |
| RMBS | 13 | 100% | 100% | 7% | 93% | - | - |
| CMBS | 0.8 | 100% | 100% | - | 100% | - | - |
| ABS | 6.9 | 84% | 67% | 100% | - | - | 1% |
| CLO | 1.2 | 100% | 100% | - | 100% | - | - |

Key market participants

- Securitisation market in the UK is predominantly RMBS with some ABS
- Largest issuers of GBP RMBS include Santander, Co-op, Lloyds and Virgin Group.
- Largest issuers of GBP ABS include Lloyds, Tesco, Santander, FirstRand and Peugeot SA
- There have been only 3 issuers of GBP CMBS in the last 3 years, namely Deutsche Bank, Unite Group and RBS
- Lloyds was the issuer of the only CLO in the last 3 years

GBP Derivatives

| | Outstanding Volume EY 2012 | Relation to LIBOR | Assumptions/Sources |
|------------------|----------------------------|--|---|
| OTC | | | |
| IR Swaps | \$30,187 BN | <ul style="list-style-type: none"> • 63% priced on LIBOR of which <ul style="list-style-type: none"> – 3% in 1M – 37% in 3M – 60% in 6M | <ul style="list-style-type: none"> • Volumes: BIS OTC IR statistics • Tenors and maturities: DTCC (summary across interest rate derivative transactions registered in DTCC) |
| FRAs | \$8,965 BN | <ul style="list-style-type: none"> • As above | <ul style="list-style-type: none"> • Volumes: BIS OTC IR statistics • Tenors and maturities: DTCC (summary across interest rate derivative transactions registered in DTCC) |
| IR Options | \$3,091 BN | <ul style="list-style-type: none"> • As above | <ul style="list-style-type: none"> • Volumes: BIS OTC IR statistics • Tenors and maturities: DTCC (summary across interest rate derivative transactions registered in DTCC) |
| X-currency swaps | \$3,504 BN | <ul style="list-style-type: none"> • As above | <ul style="list-style-type: none"> • Volumes: BIS OTC FX statistics • Tenors and maturities: DTCC (summary across interest rate derivative transactions registered in DTCC) |
| ETD | | | |
| IR Options | \$1,668 BN | <ul style="list-style-type: none"> • 100% EURIBOR liked <ul style="list-style-type: none"> – All 3 month | <ul style="list-style-type: none"> • Volumes: BIS ETD Statistics • Relation to LIBOR and maturities: LIFFE Statistics |
| IR Futures | \$1,836 BN | <ul style="list-style-type: none"> • 97% EURIBOR <ul style="list-style-type: none"> – All 3 month | <ul style="list-style-type: none"> • Volumes: BIS ETD Statistics • Relation to LIBOR and maturities: LIFFE Statistics |

Source: BIS, LIFFE, DTCC, Oliver Wyman analysis

GBP Exchange Traded Derivatives Volumes

Notional outstanding GBP denominated Interest Rate Derivatives on LIFFE YE 2012

| YE 2012 (£/\$ = 1.6043) | Reference Rate | Units Outstanding | Value per unit in GBP | Notional outstanding (GBP BN) | Notional outstanding (USD BN) |
|---|----------------|-------------------|-----------------------|-------------------------------|-------------------------------|
| Options | | | | | |
| Long Gilt | Other | 0 | 100,000 | 0 | 0 |
| 3 Month Sterling 3 Year Mid-curve | 3-month LIBOR | 16,800 | 500,000 | 8 | 13 |
| 3 Month Sterling 4 Year Mid-curve | 3-month LIBOR | 0 | 500,000 | 0 | 0 |
| Three Month Sterling | 3-month LIBOR | 1,408,915 | 500,000 | 704 | 1,130 |
| Three Month Sterling 2 Year Mid Curve | 3-month LIBOR | 294,597 | 500,000 | 147 | 236 |
| Three Month Sterling Mid Curve | 3-month LIBOR | 359,349 | 500,000 | 180 | 288 |
| Total options | | 2,079,661 | | 1,040 | 1,668 |
| Of which LIBOR related | | | | | 1,668 (100%) |
| Futures | | | | | |
| Long Gilt | Other | 337,657 | 100,000 | 34 | 54 |
| Medium Gilt | Other | 3,189 | 100,000 | 0 | 1 |
| Short Gilt | Other | 5,500 | 100,000 | 1 | 1 |
| Three Month Sterling | 3-month LIBOR | 2,220,126 | 500,000 | 1,110 | 1,781 |
| Total Futures | | | | 1,145 | 1,837 |
| Of which LIBOR related | | | | | 1,781 (97%) |
| Total Exchange Traded Derivatives (Options and Futures): | | | | | 3,505 |
| Of which LIBOR related | | | | | 3,449 (98%) |

Source: <https://globalderivatives.nyx.com/en/stirs/nyse-liffe/euribor-futures-options>

GBP OTC and exchange traded derivatives

Relation to LIBOR

Notional amount of outstanding derivative contracts referencing GBP LIBOR¹

USD BN Equiv, November 5, 2012

| | LIBOR s/n–o/n | LIBOR 1w | LIBOR 2w | LIBOR 1m | LIBOR 3m | LIBOR 6m | LIBOR 12m | LIBOR Total |
|------------------|------------------|-------------|-------------|-------------|-------------|-------------|--------------|----------------|
| Notional amount | 0 | 0 | 0 | 960 | 11,860 | 19,373 | 1 | 32,193 |
| % of LIBOR Total | - | - | - | 3% | 37% | 60% | - | - |

Estimation of OTC Derivatives referencing GBP LIBOR

USD BN Equiv, November 5, 2012

| | Notional outstanding |
|--|----------------------|
| Total derivatives referencing GBP LIBOR (OTC & ETD) | 32,193 |
| ETDs referencing GBP LIBOR ² | 3,449 |
| OTCs derivatives referencing GBP LIBOR | 28,774 |
| Total OTC IR derivatives and x-currency swaps³ | 45,746 |
| % referencing GBP LIBOR | 63% |

1. As registered in DTCC

2. See previous slide

3. Source: BIS

Source: www.dtcc.com/products/derivserv/data/rates.php

Notes

- This table represents the gross notional amounts (in USD equivalent) for all IRS trades referencing LIBOR by common reset frequencies
- Aggregate summary based on a subset of Interest Rate derivative transactions (IRS) that have been registered in DTCC Derivatives Repository Ltd's (DDRL's) Global Trade Repository (GTR)
- "LIBOR" notional amount provided are derived from all trades where either leg of the transaction references LIBOR

GBP OTC and Exchange Traded Derivatives Maturities

Contractual roll-off of outstanding Interest Rate Derivatives
GBP IR derivative trades reported to DTCC Global Trade repository

| November 2013 | Notional outstanding (\$BN) | % roll-off after x years | | | | | | | |
|--------------------------------|--|---------------------------------|----------|----------|----------|----------|-----------|-----------|-----------|
| | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 |
| Swap | 24,731 | 15% | 27% | 37% | 55% | 63% | 72% | 88% | 96% |
| FRA | 12,904 | 87% | 99% | 100% | 100% | 100% | 100% | 100% | 100% |
| BasisSwap | 3,514 | 31% | 47% | 57% | 70% | 77% | 83% | 91% | 97% |
| OIS | 11,356 | 84% | 96% | 98% | 99% | 99% | 100% | 100% | 100% |
| CrossCurrencySwap | 1,533 | 26% | 41% | 51% | 66% | 73% | 79% | 92% | 98% |
| CapFloor | 495 | 38% | 64% | 76% | 87% | 92% | 95% | 99% | 100% |
| InflationSwap | 1,080 | 4% | 8% | 13% | 24% | 30% | 37% | 62% | 87% |
| CallableSwaps | 49 | 0% | 3% | 6% | 12% | 20% | 35% | 65% | 87% |
| CrossCurrencySwapExotic | 1 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| SwapExotic | 206 | 13% | 18% | 25% | 37% | 42% | 48% | 67% | 86% |
| Swaption | 2,185 | 34% | 48% | 59% | 71% | 76% | 81% | 88% | 89% |
| OptionExotic | 24 | 18% | 25% | 37% | 62% | 69% | 78% | 91% | 93% |
| DebtOption | 0 | - | - | - | - | - | - | - | - |

Source: DTCC Global Trade Repository (8 November 2013)

GBP OTC Interest Rate Derivatives Volumes

Interest rate derivatives by instrument, counterparty and currency¹ Notional amounts outstanding at end December 2012, USD MM

| Instrument/counterparty | Total | US dollar | Euro | Japanese yen | Pound sterling | Swiss franc | Canadian dollar | Swedish krona | Residual |
|-----------------------------------|--------------------|--------------------|--------------------|-------------------|-------------------|------------------|------------------|------------------|-------------------|
| Forward rate agreements | 71,352,616 | 29,044,477 | 25,559,982 | 51,630 | 8,964,972 | 943,057 | 248,940 | 2,984,344 | 3,555,214 |
| with reporting dealers | 11,507,040 | 3,021,215 | 3,462,884 | 8,150 | 2,714,713 | 176,285 | 136,797 | 909,065 | 1,077,931 |
| with other financial institutions | 57,387,854 | 25,155,400 | 21,027,401 | 34,276 | 6,034,139 | 668,022 | 106,187 | 2,017,919 | 2,344,510 |
| with non-financial institutions | 2,457,723 | 867,863 | 1,069,697 | 9,204 | 216,121 | 98,750 | 5,956 | 57,360 | 132,772 |
| Interest rate swaps | 369,998,614 | 106,680,617 | 137,553,787 | 48,702,355 | 30,187,646 | 4,334,175 | 7,193,563 | 2,978,231 | 32,368,240 |
| with reporting dealers | 75,466,171 | 20,363,728 | 20,349,704 | 16,249,248 | 4,259,114 | 658,644 | 1,715,465 | 886,471 | 10,983,797 |
| with other financial institutions | 264,707,067 | 78,006,962 | 107,534,156 | 27,140,358 | 23,505,597 | 2,776,654 | 4,579,163 | 1,813,857 | 19,350,320 |
| with non-financial institutions | 29,825,376 | 8,309,929 | 9,669,928 | 5,312,748 | 2,422,934 | 898,877 | 898,933 | 277,903 | 2,034,124 |
| Options sold | 39,771,786 | 10,348,010 | 20,253,297 | 5,195,875 | 2,438,899 | 64,696 | 41,930 | 164,738 | 1,264,341 |
| with reporting dealers | 29,626,605 | 7,050,171 | 15,874,449 | 4,078,946 | 1,820,416 | 36,650 | 14,704 | 76,384 | 674,885 |
| with other financial institutions | 8,783,493 | 2,791,906 | 3,849,811 | 987,121 | 545,819 | 19,895 | 16,993 | 52,302 | 519,646 |
| with non-financial institutions | 1,361,688 | 505,933 | 529,038 | 129,808 | 72,664 | 8,152 | 10,233 | 36,052 | 69,808 |
| Options bought | 38,502,089 | 9,768,138 | 19,979,779 | 4,967,457 | 2,579,875 | 51,243 | 37,844 | 137,394 | 980,359 |
| with reporting dealers | 30,218,406 | 7,281,197 | 16,093,381 | 4,131,468 | 2,033,643 | 35,541 | 16,149 | 67,566 | 559,461 |
| with other financial institutions | 7,197,419 | 2,184,803 | 3,333,030 | 748,428 | 485,619 | 10,645 | 13,514 | 42,541 | 378,839 |
| with non-financial institutions | 1,086,264 | 302,138 | 553,369 | 87,561 | 60,613 | 5,057 | 8,181 | 27,287 | 42,058 |
| Total options | 48,351,377 | 12,950,469 | 24,249,166 | 6,058,134 | 3,091,751 | 79,848 | 64,350 | 230,160 | 1,627,499 |
| Total contracts | 489,702,595 | 148,675,557 | 187,362,928 | 54,812,107 | 42,244,359 | 5,357,072 | 7,506,848 | 6,192,731 | 37,550,993 |

¹ While data on total options are shown on a net basis, separate data on options sold and options bought are recorded on a gross basis, ie not adjusted for interdealer double counting.

GBP OTC Currency Swap Derivatives Volumes

Foreign exchange derivatives by instrument, counterparty and currency¹ Notional amounts outstanding at end December 2012, USD MM

| Instrument/counterparty | Total | US dollar | Euro | Japanese yen | Pound sterling | Swiss franc | Canadian dollar | Swedish krona | Residual |
|---|-------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|-------------------|
| Outright forwards and foreign exchange swaps | 31,718,023 | 27,273,698 | 10,509,813 | 5,316,135 | 3,819,501 | 2,065,551 | 1,733,310 | 876,607 | 11,841,431 |
| with reporting dealers | 11,083,369 | 10,203,431 | 3,291,844 | 2,193,821 | 1,166,300 | 790,503 | 542,453 | 196,872 | 3,781,514 |
| with other financial institutions | 14,060,151 | 12,711,881 | 4,733,117 | 2,168,747 | 1,045,433 | 920,776 | 758,073 | 339,449 | 6,242,826 |
| with non-financial institutions | 5,774,504 | 4,358,386 | 2,484,853 | 953,568 | 807,767 | 354,270 | 432,785 | 340,285 | 1,817,094 |
| Total including gold | 32,013,296 | | | | | | | | |
| Currency Swaps | 25,420,032 | 22,471,257 | 9,731,489 | 5,324,630 | 3,503,985 | 1,169,310 | 1,094,635 | 496,621 | 7,048,137 |
| with reporting dealers | 12,895,136 | 12,101,089 | 4,482,038 | 3,124,124 | 1,716,023 | 548,175 | 443,224 | 215,340 | 3,160,259 |
| with other financial institutions | 9,809,144 | 8,347,553 | 3,912,407 | 1,697,023 | 1,340,754 | 469,981 | 428,969 | 202,663 | 3,218,938 |
| with non-financial institutions | 2,715,754 | 2,022,616 | 1,337,043 | 503,483 | 447,207 | 151,151 | 222,442 | 78,618 | 668,948 |
| Options sold | 7,236,919 | 5,796,703 | 2,358,582 | 2,654,762 | 368,290 | 459,970 | 190,858 | 55,649 | 2,589,024 |
| with reporting dealers | 4,438,779 | 3,515,538 | 1,447,126 | 1,743,066 | 218,512 | 321,049 | 114,272 | 31,672 | 1,486,323 |
| with other financial institutions | 2,209,970 | 1,790,290 | 660,796 | 750,689 | 101,669 | 123,599 | 55,524 | 12,458 | 924,915 |
| with non-financial institutions | 588,175 | 490,874 | 250,661 | 161,009 | 48,109 | 15,323 | 21,062 | 11,518 | 177,794 |
| Total including gold | 7,351,038 | | | | | | | | |
| Options bought | 7,839,407 | 5,586,508 | 3,040,758 | 2,580,162 | 351,623 | 462,452 | 194,360 | 57,531 | 3,405,420 |
| with reporting dealers | 5,273,166 | 3,540,505 | 2,240,194 | 1,785,530 | 218,299 | 329,346 | 114,988 | 34,392 | 2,283,078 |
| with other financial institutions | 1,951,871 | 1,559,568 | 561,546 | 614,215 | 92,746 | 111,280 | 54,265 | 11,907 | 898,215 |
| with non-financial institutions | 614,375 | 486,433 | 239,018 | 180,417 | 40,577 | 21,825 | 25,107 | 11,232 | 224,141 |
| Total including gold | 7,958,335 | | | | | | | | |
| Total options | 10,220,361 | 7,855,195 | 3,555,684 | 3,470,631 | 501,517 | 597,231 | 270,595 | 80,154 | 4,109,715 |
| All instruments | 67,358,399 | 57,600,136 | 23,796,979 | 14,111,391 | 7,824,989 | 3,832,081 | 3,098,534 | 1,453,375 | 22,999,313 |
| Total contracts including gold | 67,844,186 | | | | | | | | |

¹ While data on total options are shown on a net basis, separate data on options sold and options bought are recorded on a gross basis, ie not adjusted for interdealer double counting.

UK Deposits

| | Volume | Relation to LIBOR | Sources |
|---------------------------|---|--|---|
| Retail deposits | <ul style="list-style-type: none">Outstanding volume at end of 2012: \$1.7 TN | <ul style="list-style-type: none">Estimated to be a low proportion linked to LIBOR | <ul style="list-style-type: none">Volumes: Source – Bank of England StatisticsRelation to LIBOR: input from market participantsMaturities: ECB statistics |
| Corporate deposits | | <ul style="list-style-type: none">TBC | <ul style="list-style-type: none">Volumes: Source – Bank of England StatisticsMaturities: ECB statistics |
| SME deposits | <ul style="list-style-type: none">Outstanding volume at the end of 2012: \$1.6 BN | <ul style="list-style-type: none">Low proportion linked to LIBOR – Primarily 3 months with some 1 and 6 months | <ul style="list-style-type: none">Relation to LIBOR: Input from market participants |

UK Deposits Volumes

Industrial analysis of monetary financial institutions deposits from UK residents

£ MM, not seasonally adjusted

Amounts outstanding of deposit liabilities (including under repo) in sterling

| | Total financial and non-financial businesses | Individuals and individuals trusts | Total UK residents |
|----------|--|------------------------------------|--------------------|
| RPM | Z945 | TDDU | TDCA |
| 2012 Jan | 1,045,680 | 968,143 | 2,013,823 |
| Feb | 1,002,548 | 973,810 | 1,976,357 |
| Mar | 990,577 | 984,273 | 1,974,850 |
| Apr | 1,013,688 | 988,113 | 2,001,801 |
| May | 1,023,717 | 989,898 | 2,013,616 |
| Jun | 987,910 | 1,004,019 | 1,991,929 |
| Jul | 985,001 | 1,005,512 | 1,990,513 |
| Aug | 985,161 | 1,012,568 | 1,997,730 |
| Sep | 986,904 | 1,016,751 | 2,003,655 |
| Oct | 977,902 | 1,017,777 | 1,995,680 |
| Nov | 967,552 | 1,025,530 | 1,993,082 |
| Dec | 981,219 | 1,028,670 | 2,009,889 |

Conversion to USD

| UK Deposits | £ BN | USD/£ (EY 2012) | \$ BN |
|----------------------------|---------|-----------------|---------|
| Retail deposits | 1,028.7 | x 1.6043 = | 1,650.3 |
| Corporate and SME Deposits | 981.2 | | 1,574.1 |

Source: <http://www.bankofengland.co.uk/statistics/Pages/bankstats/2013/Aug13/default.aspx>

Market Participants Group on Reforming Interest Rate Benchmarks

CHF Currency Report

March 2014

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Executive Summary

Background and Objectives

Swiss Franc (CHF) financial markets are highly developed, mature and international. As such the dependencies of various products and contracts are of substantial size, particularly when seen in relation to Switzerland's GDP. BIS reports that the Swiss Franc is the fifth most traded currency in foreign exchange markets¹. Since a few large players dominate Swiss Franc financial markets dependencies are exacerbated further. The near zero interest rate environment and the massive excess liquidity in the banking system makes active markets, prices and transactions scarce which makes a strengthening benchmark interest rate a relatively urgent issue.

The objective of the CHF workstreams was to identify and analyze options for Libor reform in the aftermath of the Libor manipulation scandal and in light of the changed circumstances of a near zero interest rate environment. Credit Suisse, Swiss Re and Nestlé collaborated to produce these reports. It was the intention of the workgroup to find solutions that were in the best interest of all stakeholders in the Swiss Franc market from a markets participants' point of view. The workgroup has consulted regulators and government stakeholders, but the conclusions and recommendations are endorsed only by the workgroup. The Swiss Franc workgroup took the preliminary findings of the workgroup in other currencies into account, but particular attention was paid to identifying issues that particularly affected the Swiss Franc markets.

Major Findings and Priorities

The brief summary below focuses primarily on the main conclusions of the workgroup's findings and on the findings that affect the Swiss Franc markets differently to other markets. A complete analysis of each issue can be found in the relevant sections of the full Swiss Franc report. The summary is structured along the lines of the six workstreams: Outreach, Market Footprint, Reference Rate Menu, Fixing Methodologies, Transition and Legal Analysis.

The main findings of the Outreach workstream were:

1. The desire of stakeholders to seek a dramatic change to interest rate benchmark rates is low.
2. There is a strong desire to minimize legal uncertainty and changes in the economic properties of Libor.
3. A potential new benchmark rate must be transparent, have strong governance and be based on a broad base of transactions. The design of the new benchmark should be simple and the new benchmark rate should be broadly accepted across markets.

Additionally, banks mentioned that regulation is currently exacerbating the low trading volumes in the current near-zero interest rate environment. Most of these views are shared

¹ Triennial Central Bank Survey 2013

by the stakeholders in the other currencies, though both the low willingness for significant reform and the requirement for a simple solution appear to be more pronounced with Swiss stakeholders.

The findings of the Market Footprint are adequately summarized by the table of position sizes by product. It is notable that the availability of data for certain instruments is significantly lower in Switzerland than in other markets. On one hand the Swiss Franc repo market is highly concentrated on the Swiss Franc Tri-party repo platform where data is easily collected. On the other hand instruments such interest rate swaps (IRS) and overnight index swaps (OIS) data availability is much lower. The workgroup was relying on public data.

The Reference Rates Menu report identifies three alternatives that have the potential to replace Libor: Libor+ (loosely described as a transaction based Libor clone), Swiss Average Rate (SAR, secured rates) and an OIS based solution. Libor+ is described as a preferred solution, but all three appear feasible and beneficial to the workgroup. The inclusion of the SAR is one of the most significant deviations from the recommendations of the workgroups in other currencies. Among a number of other factors that favor the usage of the SAR, the fact that SAR are already largely IOSCO compliant favored the inclusion of secured rates.

The Fixing Methodologies Workstream focused particularly on the modalities of fixing Libor+. The Swiss Franc workgroup recommends a waterfall logic that bases the benchmark rate on transactions if sufficient transaction data is available. If sufficient transaction data is unavailable the benchmark rate will be based on tradable quotes. If no quotes are available, experts will determine the level of the benchmark. Since the Swiss Franc work group did not have access to transaction in the unsecured money market, the group was unable to back-test the efficacy of such a mechanism. The fixing mechanism recommendation is still preliminary.

The Transition section recommends a three stage transition that provides for an implementation phase, a parallel-run phase and a termination phase. Such a recommendation is currently unique to the Swiss Franc workgroup, however the finding of most other transition reports do not contradict such a transition mechanism, since the three phased transition is essentially a compromise between a very liberal approach and an approach with a fixed termination date.

The analysis of the Legal Analysis Workstream is largely in line with the findings of the other workgroups, even though the legal expert closely examined the implications of a transition to a new benchmark rate in the context of the Swiss Legal system. Broadly speaking the findings are that 1) the more a reformed benchmark rate conserves the economic properties of what LIBOR currently stands for, the higher the level of legal certainty and the lower the litigation risk and 2) the more abrupt the transition from the current LIBOR to a reformed benchmark rate the more unforeseeable the legal consequences and the higher the litigation risk.

In summary, the findings in the Swiss Franc workstream are broadly in line with the findings of the other workstreams. Where differences exist, it is often the case that many alternatives can be deemed feasible. Many of the factors that determine the nature of a recommendation require weighing benefits against disadvantages. In many cases the benefits of having a uniform solution across currencies override the cost-benefit analysis of

the workgroup of a single currency. Thus, the following document should serve as the starting point for a coordinated reform of the Swiss Franc Libor rates.

1. Market Footprint

1.1. Approach

The Swiss Franc (CHF) Market Footprint analysis aims to quantify the volumes of key classes of financial instruments that reference CHF-LIBOR. Outstanding volumes are shown as of September and October 2013 by asset class and by LIBOR tenor. The information is intended to inform the MPG workstreams tasked with choosing a reference rate menu and designing transition strategies.

Wherever possible, volume data was taken from official and public sources. However, public data cannot provide a complete picture of LIBOR-based financial instruments. Thus, the data is complemented with a combination of private data and estimates by market participants gathered through the outreach workstream and a series of bilateral discussions. Wherever possible, attempts were made to corroborate non-official data by making use of multiple sources such as reports by market analysts, news reports and bank websites.

The main data sources are summarized in the table below:

Table 1 Key data sources

| | Key data sources |
|-----------------------------------|--|
| Syndicated Loans | <ul style="list-style-type: none"> • BIS Quarterly Review • Input from market participants |
| Corporate and retail Loans | <ul style="list-style-type: none"> • SNB • Input from market participants |
| Bonds | <ul style="list-style-type: none"> • BIS Quarterly Review |
| Derivatives | <ul style="list-style-type: none"> • DTCC • Bloomberg |
| Deposits | <ul style="list-style-type: none"> • SNB • Input from market participants |

A number of early versions of these results were circulated to members of the MPG for comment and to feed into their respective analysis. All feedback from MPG members was incorporated into the final version of this analysis.

1.2. Summary of Findings

The notional volume of outstanding financial contracts indexed to CHF-LIBOR is estimated to be greater than \$6.5 TN². The main types of contracts indexed to CHF-LIBOR include Over-the-Counter (OTC) and exchange traded derivatives, corporate loans, retail mortgages,

² \$ figures in this report refer to US Dollar; where values have been converted from CHF, the exchange rate used is an approximated average rate for 2013 (USDCHF=0.90)

floating rate bonds and securitized products. 1-month, 3-month, and 6-month are the most commonly referenced tenors across all product groups. 12-month is occasionally used. Other CHF-LIBOR tenors are rarely used.

It is important to note that in addition to the above analysis of financial contracts which directly reference CHF-LIBOR, there is also a range of other important applications where LIBOR is used. These include:

- Late payment clauses in commercial contracts often refer to LIBOR as an interest rate
- LIBOR is often used as a discount rate for valuation purposes - although less so for cleared OTC derivatives, which primarily use OIS rates
- LIBOR is sometimes used as a performance benchmark for money market funds and other asset managers.

An overview of the Market Footprint findings is presented in Figure 1 below.

Figure 1: CHF-Libor Market Footprint overview³

| Asset Class | | Outstanding volume (\$ BN) | % linked to LIBOR | O/n | 1w | 1m | 2m | 3m | 6m | 12m |
|------------------------|-------------------------------|-------------------------------|----------------------|-----|-----|-----|----|--------|--------|-----|
| Level 1 | Level 2 | | | | | | | | | |
| Loans | Syndicated loans | 91 | 50-70 | | Low | Low | | Medium | High | |
| | Corporate loans (bilateral) | 52 | 40-60 | | Low | Low | | High | Medium | |
| | SME loans (domestic) | 89 | 10-20 | | Low | Low | | High | Medium | |
| | Commercial mortgages | 232 | 15-25 | | Low | Low | | High | Medium | |
| | Retail mortgages | 717 | 10-20 | | Low | Low | | High | low | |
| | Credit cards | n/a | | | | | | | | |
| | Auto loans | n/a | | | | | | | | |
| | Consumer loans | n/a | | | | | | | | |
| | Student loans | 0 | | | | | | | | |
| Bonds | Floating Rate Notes (FRNs) | 24 | 100 | | | | | Medium | High | |
| Securitisation | RMBS | 0 | | | | | | | | |
| | CMBS | 0 | | | | | | | | |
| | ABS | 0 | | | | | | | | |
| | CLO | 0 | | | | | | | | |
| OTC Derivatives | IR Swaps | 4,032 | 100 | | low | | | Medium | High | |
| | FRAs | 1,079 | 100 | | | | | Medium | High | |
| | IR Options | 40 | 100 | | | | | | High | |
| | Basis Swap | 489 | 100 | | | | | | | |
| | X-currency swaps | 498 | 80-100 | | | | | Low | High | |
| | Constant Maturity swaps (CMS) | n/a | | | | | | | | |
| ETD | IR Options | n/a | | | | | | | | |
| | IR Futures | 200 | 100 | | | | | High | | |
| Deposits | Retail deposits (only CHF) | 662 | 0 | | | | | | | |
| | SME deposits | | | | | | | | | |
| | Corporate deposits | 215 | 0-10 | | low | | | | | |
| Mutual funds | Money market funds | | | | | | | | | |
| | Bank loan funds | | | | | | | | | |
| Other | Money Market Paper | 5 | 100 | | | | | High | Medium | |

³ The categories low, medium, and high reflect the relative frequency of the resetting period of the respective product, not the absolute USD volume. The percentages for the ranges are about 5 - 15% for low, about 16% - 49% for medium, and about 50% - 100% for high.

Exchange traded and OTC derivatives are by far the largest class of contracts that are linked to LIBOR. Derivatives linked to LIBOR include Short Term Interest Rate Swaps and Options, Forward rate agreements and cross currency swaps. Data from the DTCC Global Trade Repository (GTR) shows \$6.3 TN of notional contract outstanding linked to CHF-LIBOR. Of these, the majority is linked to 6-month LIBOR, followed by 3-month linked contracts and a small number of 1-month linked products.

2. Reference Rate Menu

2.1. Market Overview

The Swiss National Bank (SNB) lowered its 3-month Libor target to between 0% and 0.25% in August 2011. 3-month Libor has remained at virtually 0% since then. In September 2011, the SNB began to enforce a minimum exchange rate versus the Euro (EUR/CHF 1.2000). In the forefront of the introduction of the minimum exchange rate, the SNB suspended all liquidity absorbing operations and, as a result, the Swiss franc liquidity has expanded significantly. Therefore, trading activity on Swiss Franc money markets, which had already been low for some time, has dropped to insignificant levels.

Low inflation expectations and the anticipation that interest rates will stay low for an extended period led to an extremely low and flat interest rate curve. Short term government debt trades at slightly negative rates and the current 10 year government bond yields approximately 1%.

2.2. Introduction

The goal of the Swiss Franc Rates Menu Workstream is to identify existing reference rates and to envision new reference rate benchmarks that have the potential to replace and improve Libor. To identify the broadest possible set of alternative benchmark rates, the workgroup relied on its own expertise, on the commentary collected in the Swiss Franc Outreach Workstream and on the working documents shared by other MPG workgroups. A comprehensive list of the collected ideas can be found in Appendix B.1. The Swiss Franc Workgroup weighed the advantages and disadvantages of the different alternatives against each other and narrowed the focus of the analysis to three options that display the highest potential for becoming an IOSCO-compliant benchmark interest rate. The criteria to analyze the different options were selected primarily based on the information that was collected in the Outreach Workstream. The criteria can be found in Appendix B.2.

2.3. Recommendations

Two reference rates reflect conditions on the very short end of the interest rate curve in the Swiss Franc market, SARON and TOIS. Both are either already largely compliant with the IOSCO principles or there are efforts in progress to achieve IOSCO compliance.

For longer maturities and under the assumption that the existing Libor benchmark rates cannot be strengthened and be made IOSCO compliant, it is the recommendation of the Swiss Franc workgroup to consider three alternative benchmark rates: Libor+ (unsecured), Swiss Average Rates (secured) and OIS (derivative). A description of the three alternatives and an analysis of the suitability of each alternative are presented below.

Naturally, the implementation of these reference rates depends on the decisions by the administrator of Libor. The details on transition recommendation and on the legal implications as they apply to the Swiss market are analyzed in the respective sections of this report.

2.4. Reference Rate Menu

2.4.1. Repo - Swiss Average Rates (SAR)⁴

Trading in the Swiss Franc repo market is highly concentrated in the Swiss repo trading platform of Eurex. It is estimated that roughly 90% of all repo-transactions in Swiss Francs are traded and settled over the Swiss Tri-party Repo Platform. Repo trades are almost exclusively traded against the general collateral basket of the SNB (SNB GC). Since the SNB GC basket consists primarily of collateral denominated in EUR and GBP, Swiss Franc repos are frequently cross currency repos. Typically, Swiss Franc repo trades have no haircut. Instead, the exposure is mitigated via multiple daily collateral adjustments by the tri-party agent (SIS) multiple times per day.

The SNB and SIX Swiss Exchange jointly launched the Swiss Reference Rates in August 2009, which are based on the market activity on the Swiss Franc repo market, for tenors ranging from over-night to 12 months (see Appendix B.3). The calculation method of the Swiss Reference Rates takes into account repo transactions and committed (i.e., executable) quotes posted on the repo trading platform. All transactions and quotes from all eligible repo participants are included in the calculation of SAR.

The factors that speak in favor of using SAR as a reference rate include IOSCO compliance, high level of transparency, low potential for conflicts of interests and the relatively broad base of potential contributors. The workgroup analysis and the information collected by the Swiss Franc Outreach Workstream indicate that SAR complies with the IOSCO principles. The workgroup's analysis of the IOSCO compliance of SAR is presented in Appendix B.4. Since transaction data is available to all market participants (transactions only on an anonymous basis) and since the vast majority of the Swiss Franc repo market activity is concentrated on the Eurex Repo platform, SAR are highly transparent. There are now around 170 institutions that have access to the trading platform including both foreign and domestic banks, as well as large domestic insurance companies. Furthermore, banks have increased their use of repo to manage their liquidity over time.

Factors that speak against the usage of SAR as a reference rate include the currently low trading volume, the different risk premia of collateralized rates (repo) and uncollateralized rates (Libor), and the substantial transition cost when switching from Libor to SAR. The spread between SAR and Libor was largely constant before the financial crisis and has been highly volatile since then (Appendix B.5). It is particularly problematic in light of certain potential transition mechanisms. The Swiss Reference Rates are currently more volatile due to the low market activity in the 0% rate environment as even small trades can have a significant impact on the reference rates. Furthermore, there are relatively long periods of time when fixings were unavailable for the longer tenors due to the very low market activity. Finally, a switch from an uncollateralized rate to a collateralized reference rate results in relatively high legal costs and economic risk of potential renegotiation of contracts, hedging

⁴ http://www.six-swiss-exchange.com/indices/swiss_reference_rates/

risks from trading legacy Libor positions against new SAR hedges as well as IT and operational costs.

It is the conclusion of the Swiss Franc workstream that SAR has the potential to become a new reference rate standard. However, measures should be taken to increase the attractiveness of term repo as well as to reexamine and formalize the SAR governance structure. The most critical issue is the relatively high volatility of SAR when compared to Libor. Volatility may be reduced by incentivizing term transactions. A first step is undertaken with a Memorandum of Understanding for market making among banks (non-legally binding). The Memorandum of Understanding for active quoting will contribute to a robust overnight rate and shall avoid a discontinuation of the index.

2.4.2. Overnight Index Swap (OIS)

OIS is a traded derivative that is usually based on the overnight unsecured rate. In Switzerland, OIS is based on the Tom-Next rate, i.e., the so called TOIS fixing.⁵ The administrator of the TOIS fixing is ACI Suisse. There are no official fixings available for the OIS. Hence, one of the first steps for OIS to become a reference rate would be to determine an administrator and to establish a fixing methodology. For instance, along the methodology of ISDAfix rates for interest rate swaps, a panel of banks could be asked to send their quotes to an administrator. For a more transaction based methodology these contributions could also be enhanced with overall OIS market activity data, which in turn requires the usage of an OIS trading platform. With the upcoming reform efforts in the OTC derivatives segment the precondition of broad-based transaction reporting and platform based trading should be fulfilled.

Factors that speak in favor of an OIS-based solution are the international comparability, the maturity of the market, and the global trend in favor of using OIS based references rates. Additionally, derivative markets such as IRS (referencing Libor) show higher market activity than spot markets (Libor). If the TOIS Fixing were to become more economically relevant (usage in financial products), then the activity in the IRS segment would shift towards the OIS segment. The OIS curve represents risk-free credit/liquidity. The Swiss Franc OIS market has been in place since 1999. OIS-contracts are standardized and mostly uniform across the Swiss Franc market. Prices are readily available on market information services.

Factors that speak against OIS-based reference rates are the limited investor universe, the lack of transparency, the derivative nature of OIS, the substantial costs of a transition and foremost the low market activity⁶. OIS contracts are generally traded only by the most sophisticated financial market participants. The number of market makers is small currently. Corporates and smaller banks use exclusively IRS to hedge their interest rate exposure, as most of their assets are linked to Libor. OIS is currently a pure over-the-counter instrument in Switzerland. Thus, there is limited data available on transactions or quotes. The derivative nature of OIS can lead to a considerable spread between Libor and OIS rates in

⁵ A description of the TOIS Fixing mechanism can be found in Appendix B.6.

⁶ Underlying notional volumes are currently at around CHF 200bn. The data from the DTTC database suggest that only around 100 trades represent contracts maturing in 2013.

times of financial distress (Appendix B.8.1). Unlike the SAR, OIS is not significantly more volatile than Libor. Finally, switching from Libor to OIS will lead to considerable switching costs in terms of introducing additional risk, legal costs for the renegotiations of contracts and operational cost.

Theoretically, OIS has a lot of potential to replace Libor and to address many of the issues that Libor is exposed to. However, in practice this solution has a number of drawbacks that would need to be addressed before OIS becomes a serious contender to Libor as a benchmark interest rate. Some of these drawbacks may be mitigated by regulation and market initiatives, other drawbacks are more fundamental.

2.4.3. Libor+

"Libor+"⁷ is a vision for a future benchmark rate that is primarily transaction-based. Libor+ is envisioned to significantly improve and strengthen the existing Libor mechanism, while only deviating as much as necessary from the existing framework. Transactions are collected from the unsecured market, the commercial paper market and the CD market in Swiss Francs. The data includes both primary market transactions (issuance) and secondary market data (trading). Data is only collected from transactions where the cash taker is a bank, a broker, or any other significant financial institution (such as a large insurance company). This should allow the universe of data contributors to be large enough to accurately reflect market conditions. Additionally, the data is sufficiently homogeneous to be consistent with the current properties of Libor. The data is collected by a third party agent such as for example the Swiss exchange, SIX Group. For the collection of tradable quotes a trading platform must be built. The calculation and publication of the reference rate can either be the responsibility of the same domestic agent or be delegated to an administrator that publishes Libor+ rates in all other currencies where such rates are calculated. In the absence of sufficient market data, we suggest that the administrator also includes tradable quotes of the participants and – if needed - expert opinions as reference points for the determination of the reference rate (waterfall logic).

Factors that speak in favor of such a solution are IOSCO compliance, the high level of transparency of a transaction-based solution and the moderate degree of change away from Libor. Developing a new solution for the determination of reference interest rates allows for the development of a framework that is explicitly tailored to the IOSCO recommendations. Basing Libor+ reference rates on transactions does not only increase the cost for contributors to influence and possibly manipulate the reference rate to their advantage, but it also strengthens both its transparency and the ability to justify rate contribution by the participants. Practitioners favor solutions that avoid a dramatic change away from Libor. This is not only a question of designing an appropriate transition mechanism but also a question of designing replacement rates that do not fundamentally change the properties of the existing Libor fixings. Libor+ is a change that modifies what needs to be modified without significantly deviating from Libor's existing economic properties. Also, the fact that the administrator can decide on the hierarchy of trades, quotes, and expert knowledge used

⁷ Libor+ is a preliminary name intended only to facilitate discussion

for the determination of the reference rates makes it much harder for risk takers to influence the fixing in their favor.

Factors that speak against a Libor+ solution include the substantial effort that is necessary to create a new framework from scratch, the uncertain level of participation and adoption, the substantial implementation risk and the degree of deviation from Libor. The cost of designing, building and marketing an entirely new framework for money market reference rates may be substantial. This is particularly true if such an effort would require international coordination. International coordination may reduce the cost of operating such a framework (economies of scale), but it may also significantly increase the initial cost. Also, it is uncertain whether a new solution would be accepted by potential contributors and by consumers. Acceptance and adoption are both subject to self-reinforcing trends. Should many choose to accept Libor+, the new reference will quickly replace Libor as the most important benchmark rate. Should initial adoption be slow, it may be next to impossible to ask contributors and consumers to transition to Libor+. This problem may be mitigated to some degree by legislation. The workgroup believes that the implementation of a Libor+ framework is feasible and realistic. However, as with any major and global financial infrastructure project, there exists substantial implementation risk. Lastly, an implementation will carefully weigh the degree of deviation from Libor against their benefits, but it is possible that different stakeholders come to different conclusions with regard to the acceptable degree of deviation.

Libor+ is an option that is intended to mitigate virtually all known weaknesses of the existing Libor framework without deviating more than necessary from an otherwise proven fixing mechanism. However, there remain considerable risks associated with a Libor+ solution. Some of the risk may be mitigated by an appropriate transition and fixing mechanism design, but some risks will remain. Additionally, in the event that there are insufficient data points to calculate a Libor+ rate for some time, the last resort solution of an expert panel may not be fully IOSCO compliant.

3. Fixing Methodologies

3.1. Introduction

The goal of the Swiss Franc Fixing Methodologies Workstream is to identify and evaluate the options that are available to calculate benchmark interest rates. The workgroup identifies arguments in favor of and against each option by using both the expertise within the workgroup and the information gathered in the Swiss Franc Outreach Workstream. Many of the issues discussed are closely related to the Libor+ proposal of the Swiss Franc Rates Menu Workstream. However, an attempt has been made to judge each aspect of the fixing methodology independently of the Reference Rate Menu Workstream. In the interest of brevity, only the workgroup's recommendation and the critical aspects of our analysis are presented in the report. A comprehensive analysis is shown in abbreviated form in Appendix C.

3.2. Recommendation

The workgroup's analysis concluded that a combination of trade- and quote-based reference rates would best reflect market conditions and meet the IOSCO principles. It is uncertain whether a panel approach or a total market activity approach is most appropriate. An analysis of this issue is presented in Section 3.3.

Data for potential benchmark rate ought to be collected from banks and larger financial institutions with significant activity in the Swiss Franc money market, such as insurance companies. Contributors should include both foreign and domestic legal entities. Besides using data from unsecured markets, a new potential reference rate ought to include data from transactions in CP of financial issuers, time deposit transactions and certificates of deposit transactions of financial issuers. Data from secured markets or derivative markets should not be mixed with data from unsecured transactions, since these have economic properties that deviate significantly from the legacy Libor rates. For the Swiss Franc benchmark rates both onshore and offshore transactions ought to be included. Internal transactions within the same holding company ought to be excluded. Similarly, transactions where an issuer buys back its own securities ought to be excluded. Contributing banks ought to have a reasonably uniform credit quality, though relying on rating criteria alone is unlikely sufficient to preserve the integrity of the data.

The fixing ought to be calculated and published at the end of the day, as opposed to the current mid-day mechanism in Libor. The fixing ought to represent the aggregate of transactions in one day (i.e. represent a weighted average), as opposed to a point-in-time observation at the end of the day. The tenors to be fixed ought to include the 1-month, 3-months and 6-month points. The very short end of the curve is covered by the SARON and TOIS fixings. The group is not in favor of an interpolation or a publication more points along the curve. The calculation of the new reference rate ought to take place in Switzerland.

Data validation ought to occur through a "waterfall" logic. If there is not enough data, quotes can be relied upon to calculate a rate. Finally, if there are no quotes, expert opinions can be drawn upon to find a proper benchmark rate. Outliers can be removed to smooth the published rates.

The workgroup is of the opinion that proper incentives need to be established to compensate contributing banks for providing data. The workgroup envisions a licensing arrangement or regulatory capital relief to address this issue.

3.3. Critical aspects

The workgroup identified two issues that are critical to the success of a new benchmark rate and where the solution is not obvious even after a collection of facts and market opinions. These issues include the decision of panel contribution versus capturing total market activity and the data selection mechanism when the amount of available data is low.

It is not obvious whether the cost of implementing a mechanism to capture all transactions in the Swiss Franc money market is compensated sufficiently by a larger data universe which may improve the quality of the reference rate. Capturing all data will likely require new legislation in Switzerland. This is not only an unlikely outcome but it is also very uncertain what such legislation ought to look like in order to give the appropriate authority to the data collection agent – especially in light of the significance of the portion of non-domestic market participants. From this perspective, a panel approach seems to avoid this pitfall. However, participation on a voluntary basis is unlikely to materialize. The litigation risk arising from contributing benchmark rates is likely to outweigh the reputational benefit of being a panel member or any potential compensation from licensing revenues. A more complete list of other considerations is presented in Appendix C.

The mechanism that makes the new reference rate robust to low transaction volume and low quote volume or both will be one key aspect that will significantly affect the adoption rate of the new benchmark. The Swiss Franc working group focused primarily on two alternatives, a waterfall approach and a weighted average approach, though other calculation methods can be envisioned. A waterfall strategy that bases the reference rate first on transaction data until a predefined threshold is reached where the amount of data is deemed insufficient. Then, the reference rate could be based on quotes and, if that fails, expert opinions can be drawn upon. Such an approach is clear and easily understandable. However, it may also lead to significant jumps in the reference rate as the data falls down the waterfall. Furthermore, the setting of the threshold may be difficult to calibrate. If the benchmark were to use a weighted average approach, the benchmark may become smoother, but appropriate weights may have to change over time to reflect market conditions. Once experts begin determining the weights, the benchmark may as well be based entirely on the expert opinion. A more complete list of all the relevant issues is presented in the Appendix C.

4. Transitions

4.1. Introduction

The Swiss Franc workgroup identified three transition concepts for moving from the existing benchmark reference rates (Libor) to the new benchmark rate alternatives that were proposed in the Rates Menu workstream in case that legacy Libor cannot be strengthened to become IOSCO compliant. The proposed transition mechanism was designed with a focus on the introduction of Libor+ benchmark rate. However, apart from timing differences the workgroup proposes to use a similar approach for the introduction of secured or OIS based reference rates. The workgroup considered a "Successor Rate" transition, a "Parallel with Cut-Over" transition and a "Market Led" transition. An analysis of each solution is presented in Section 4.2 below. After analyzing each solution, the workgroup recommends a compromise between a "Parallel with Cut-Over" transition and a "Market Led" transition. Section 4.3 describes the workgroup's recommendation. Section 4.4 identifies the risks in our recommendation. The analysis shown below took legal implications into account as far as they have been identified by the Legal Analysis Workstream.

4.2. Transition alternatives

"Successor Rate" Transition

The name "Successor Rate Transition" refers to a scenario where Libor is replaced with a new benchmark rate within a relatively short amount of time without a strict requirement to renegotiate existing contracts that reference Libor. Should such a scenario be feasible, the fixing and the publication of Libor would be discontinued and a new reference rate would replace Libor immediately. Appropriate legislation would substantially reduce the legal uncertainty during such a switch⁸. The transition during the introduction of the Euro may serve as a model for the implementation of such an option.

The benefits of such an implementation are low litigation risks, the conceptually simple implementation and the avoidance of markets that trade parallel to each other. The "Successor Rate" alternative bears the highest legal uncertainty of all three options. However, as mentioned above, a "Successor Rate" would require legislation by each jurisdiction to mitigate litigation risk. Once such legislation is in place, there is little risk that litigation challenging contracts based on the nature of the transition will be successful. The simple nature of such a solution is self-evident. There may not be a need to renegotiate existing contracts, no hedging and no accounting or tax considerations for stakeholder to manage. Finally, a "Successor Rate" transition scenario avoids running two parallel markets and thereby avoids the emergence of new arbitrage opportunities between the two markets, which would certainly not enhance market participants' trust in the market. More details on the disadvantages of parallel markets are provided below.

⁸ This is particularly the case if the economic properties of the new benchmark rates are substantially different from legacy Libor rates.

The Swiss Franc workgroup identified two important disadvantages. On one hand the drafting and passing of internationally uniform legislation will be a significant challenge and, on the other hand, legislators would run a certain risk of unintended consequences. Since there is a reasonably strong desire to harmonize both the nature of new reference rate and the transition mechanism across different jurisdictions, reasonable uniform transition legislation would need to be passed. In the opinion of the Swiss Franc workgroup, the probability of achieving agreement on both the nature of the legislation and the timing of the legislation is much lower than it was during the introduction of the Euro. Secondly, legislation always bears the risk of introducing unintended consequences. Though the workgroup is positive that a thorough analysis of the new potential reference rate will reveal most of the consequences of a switch, a mandatory switch bears substantially more risk that certain effects that are unknown today, may later prove to introduce adverse effects.

The workgroup considers a "Successor Rate" transition a feasible option with relatively low risk. However, the group recommends a "Successor Rate" transition only as a backstop solution should the market prove to be unable to migrate to better reference rates using a softer, market-driven approach.

Market-Led Transition

A "Market-Led" transition for Libor introduces new benchmark rates, but Libor continues to be fixed and published. In this version of a transition switching to the new Libor benchmark rates can be encouraged by regulators and industry group, but there will be no mandatory switch and no termination date of the Libor fixing.

The advantages of such a solution include the liberal nature of the approach and lower litigation risk than a strategy with a termination date. The main advantage of a liberal approach is that market participants themselves decide whether the properties of the new benchmark warrant a transition. The risk of unintended consequences from the introduction of new reference rates is small. Such an approach will avoid a renegotiation of contracts for many market participants and allow this to happen where desired. The Legal Analysis Workstream identified this option as the one that bears the least amount of uncertainty.

The disadvantages of such an approach include the risk of a low adoption rate, an undue burden on rate contributors and the permanent development of parallel markets, which allow for new arbitrage opportunities. In financial markets, liquid markets usually attract even more liquidity. Hence, the mere introduction of new reference rates will not necessarily lead to the establishment of a new market, unless the advantages of the new rates are overwhelming. This is unlikely to be the case here. It is also unlikely that market markers provide prices both for Libor and for the new rates without some expectation that the legacy market will transition into the new markets. Finally, splitting liquidity between legacy and new market for an indefinite amount of time will have adverse effect.

Parallel with Cut-Over Transition

This approach sets a termination date on which Libor will no longer be calculated or published. The announcement of the termination date has to be made early in the process, but the termination date may be multiple years in the future. The new reference rates will begin publication right away. Consumers of Libor fixings must on one hand take the termination date into account when agreeing on new contracts and must renegotiate

contracts with a lifetime that extends beyond the termination date. Libor and the new reference rate will run in parallel until a reasonable portion of old contracts has either expired or has been renegotiated. Based on the Outreach workstream and the Market Footprint Workstream of the Swiss Franc Working Group a plausible termination date ought to be set at least 7 years in the future to allow the majority of contract to expire without the need of renegotiation.

The advantages of such a solution are its simplicity and transparency as well as the possibility of an entirely private sector implementation. If the termination date is defined such that all stakeholders have sufficient time to adapt their systems, this transition may cause little trouble for the market participants. Libor consumers with contracts maturing before the termination date are not forced into renegotiations. Also, new contracts with a maturity substantially shorter than the termination date may still be entered into for some time. Furthermore, pursuing an entirely private sector solution may reduce the risk of unintended consequences. Should the market realize that the proposed new solution introduces undesirable effects over time, there is will be ample time for the market to react. A private sector solution may also be more flexible to changing markets conditions compared with an official solution.

The disadvantages of this solution include the need of some renegotiation of legacy contracts, the development of a basis market and the risk of low adoption rate. In setting the termination date, the advantages of a long transition period with little renegotiation need to be balanced against the disadvantages of a reasonably speedy improvement of the Libor benchmark rates. Thus, it is likely that some renegotiations cannot be avoided. The introduction of new reference rates may reduce the liquidity in both cash and derivate markets. At first sight, a slow reduction of the legacy rate markets and the slow buildup of liquidity in the new benchmark rates markets appear unproblematic. However, in current market conditions, where liquidity is already low, such an approach may make price finding more difficult, in turn adversely affecting the quality of the new benchmark rates. Finally, allowing consumers to switch to new benchmark rates over a long time may adversely affect the adoption rate. Should the new benchmark rates not reach critical mass relatively quickly, there is the risk that the new benchmark rates may fail.

4.3. Transition recommendation

It is the recommendation of the Swiss Franc workgroup to use a "Parallel with Cut-Over" transition to introduce a new benchmark rate. The process ought to start with the decision to introduce a new benchmark rate. This decision is largely dependent on what progress Libor has made to become IOSCO compliant. If such compliance is firmly planned or has already been achieved, an introduction of new benchmark rate is superfluous. Once a decision for a new benchmark has been made, a preparation phase will follow during which the infrastructure for the new benchmark is built. After that, the new benchmark will be calculated and published in parallel to the old legacy Libor rates. After running the benchmarks in parallel, a decision has to be made to either set a termination date for legacy Libor, to continue running both benchmarks in parallel or to stop publishing the newly

introduced benchmark⁹. A graphical presentation of this process is shown below. The decision to set the termination date ought to take into account the interest rate environment at the time¹⁰, the market share of the new benchmark rate and any legal, tax and accounting developments.

The proposed solution is a compromise between setting a termination date and running benchmark rates in parallel. It combines a liberal, market driven transition approach with a firm commitment to reform Libor. The transition is simple, transparent and allows stakeholders time to adjust to the new situation. The two-stage introduction of the new reference rates gives ample time to identify and react to unintended consequences that may materialize either during the preparation phase or during the parallel run. Depending on how far in the future the parallel run and the termination date is scheduled, the need to renegotiate legacy contracts can be largely avoided or avoided altogether, since contracts will expire and will have to be replaced with contracts based on the new benchmark rates.

The proposed solution also addresses many of the weaknesses that the other alternatives suffer from. A basis market will develop during the parallel run, but depending on the duration of the parallel run phase, such a market will be short lived. Particularly, if a Libor+ solution is implemented, the basis between legacy Libor and Libor+ is expected to be small and relatively stable. Furthermore, the negative effect of splitting the total market liquidity can partially be mitigated by a short parallel run phase. The risk of a low adoption rate still persists, but this solution allows the administrator to react to market conditions by either publishing a termination date or abandoning parts of the reform (for example if legacy Libor were to become IOSCO compliant).

4.4. Risks and critical factors

The workgroup identified timing and communication as the two key critical factors that will determine the success of the proposed transition mechanism. Finding the right time for announcing the termination date and the right date for the termination date itself will be a tradeoff. Making a decision later will allow for the collection of more data in order to make a more informed decision. However, running markets in parallel for too long will result in operational costs and a division of liquidity. Similarly the setting of the termination date will be a tradeoff between less renegotiation (termination date far in the future) and a firm signal to reform Libor (termination date in the near future). With the information available to the Swiss Franc workgroup right now and under the assumption that Libor+ will become the new benchmark rate, it is the recommendation of the work group to plan approx. 1 year for the preparation phase, and approximately 1 year of parallel run. The termination date may be set approximately 3 years in the future once the decision to terminate legacy Libor

⁹ A decision to abandon the new reference rates is only envisioned if significant unintended consequences materialize during the time of the parallel run. An extremely low adoption rate, material litigation risk or changes in the market situation (for example if the introduction of a new benchmark rate leads BBA to introduce an IOSCO Libor).

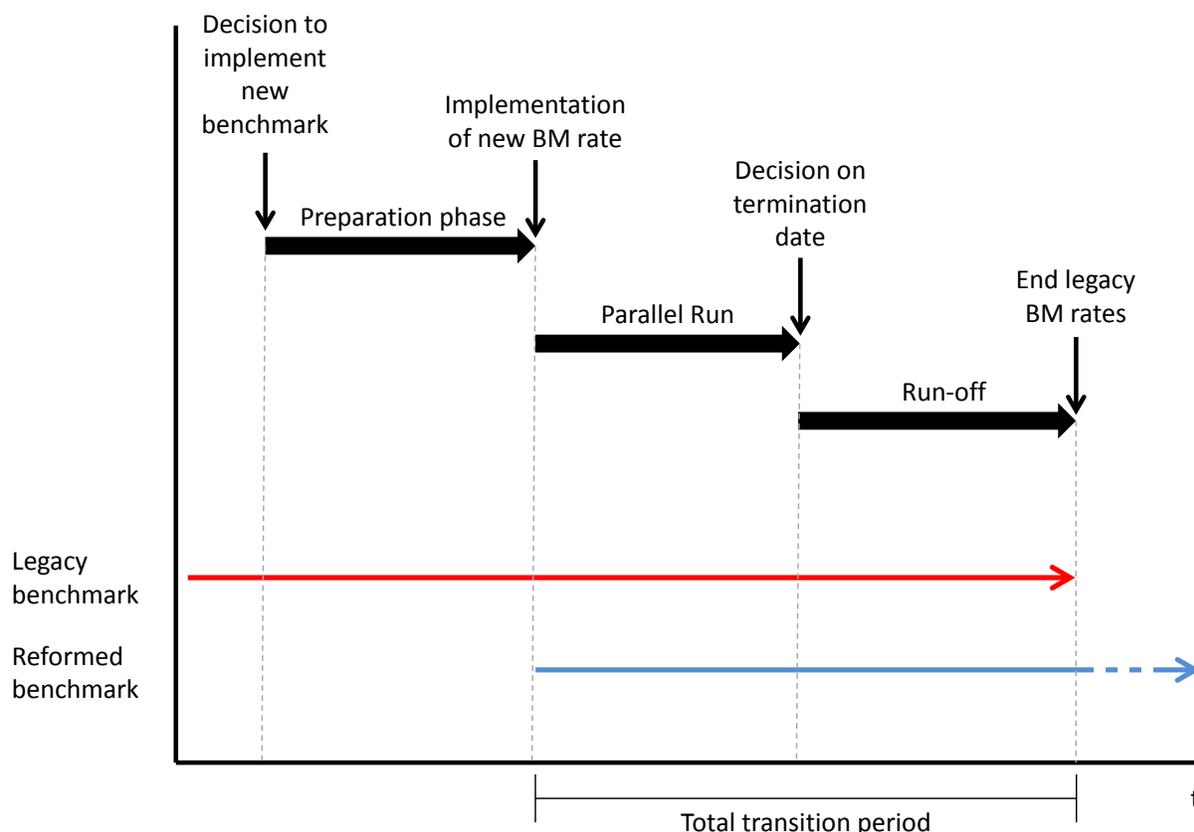
¹⁰ Preliminary findings in the Swiss Franc legal workstream indicate that a transition is riskier when the difference between the legacy rate and the new benchmark rate is large. This is particularly an issue when switching from Libor to secured rates or OIS.

has been made. The workgroup's legal analysis confirmed that longer transition periods (i.e. more distant termination dates) bear less litigation risk than short transition periods.

Preliminary findings indicate that Libor+ is a feasible option that has the potential to be widely accepted by market participants and the broader public. Should this view be confirmed relatively quickly, the duration of the parallel run and the of run-off period may be shortened further.

As mentioned above, a relatively liberal approach runs the risk of being rejected by markets and stakeholders. However, letting the market decide whether a new benchmark rate is adopted will mitigate litigation risk and ensure the longevity of the new IOSCO compliant benchmark rates. An appropriate communication strategy is likely to mitigate some of that risk. The support of governments and regulators alike will be crucial in such an endeavor. Although it is not entirely clear what all the details of such a comprehensive strategy ought to look like, it will be important to credibly convince the market that legacy Libor will be replaced even when no termination date has been communicated yet.

4.5. Transition recommendation timeline



5. Legal Analysis

5.1. Introduction

5.1.1. Objective

The Legal Analysis of the CHF horizontal work stream identifies possible legal risk for contracts incorporating market standard terms which reference CHF LIBOR and are governed by Swiss law. The report does not address contracts which reference CHF LIBOR but are not governed by Swiss law, e.g. contracts that reference CHF LIBOR but are governed by English or German law. The Section labeled "Phase II" summarizes the findings of the previous sections in the report with a focus on some of the issues that were identified in the Transition Workstream in Phase I.

5.1.2. Background

The Reference Rate Menu Workstream has reviewed three potential successor rates, (i) LIBOR+, (ii) Swiss Average Rate Overnight (SARON), (iii) Overnight Index Swap (OIS) and has voiced a clear preference for LIBOR+. LIBOR+ aims to rectify many of the perceived weaknesses of the current mechanism whilst still providing flexibility to track closely the economic properties of what LIBOR currently stands for. SARON and OIS, however, are envisaged as based exclusively on market transactions and could result in substantial deviations from current LIBOR.

The Transition Design workstream, after having reviewed (i) an immediate replacement of LIBOR, (ii) a gradual phasing in with a fixed termination date for old LIBOR and (iii) an open-ended rundown of old LIBOR, recommends a variation on (ii), i.e. a "Parallel with Cut-Over" transition.

It goes without saying that the basic assumption underlying the analysis is one of significant correlation between legal uncertainty (in the form of exceptions to continuity of contract) and increased costs / litigious activity. This is an assumption shared by all stakeholders on the basis of experience. Nonetheless, the actual severity of this risk depends to a great extent on the composition of the stakeholder group and a multitude of institutional and judicial factors which are beyond the scope of this report.

5.1.3. Approach

In order to illustrate more clearly the underlying legal issues, we proceed on the basis of a fictitious "Successor Rate" transition. This is later refined to account for the "Parallel with Cut-Over" transition recommended by the Transition Design workstream.

5.1.4. Overview

Section 5.2 builds on the work of the Market Outreach workstream and provides an overview of contracts which reference CHF LIBOR and are governed by Swiss law. **Section 5.3** sets out the legal risk profile for legacy contracts without contingency provisions relating to the benchmark rate. **Section 5.4** provides the legal risk profile for legacy contracts that contain fallback provisions. **Section 5.5.5** briefly discusses market based and

governmental solutions to the aforementioned legal risks. **Section 5.6** summarizes our findings.

5.2. Relevant Contracts

This report addresses the most important LIBOR-linked financial contracts and instruments under Swiss law, namely

- Syndicated Loans
- Other Loans to Corporate/Commercial Clients
- Loans to Private Clients
- LIBOR Cap Warrants
- OTC Derivatives.

The Market Outreach Workstream has provided us with sample agreements and standard documentation; for listed instruments, we have incorporated publicly available information from the issuance programs etc. For a detailed review of the relevant contracts and instruments, we refer to Appendix D.1.

In reviewing the universe of Swiss contracts and instruments, an analytical distinction was made between (i) contracts/instruments that do not contain fallback provisions and (ii) contracts/instruments that contain fallback provisions:

(i) The standard documentation for *Syndicated Loans*, *LIBOR Cap Warrants* (the most important exchange-traded derivative linked to LIBOR) and *OTC Derivatives*, contains fall-back provisions dealing with the unavailability of LIBOR quotes (for details, see Appendix D.1).

(ii) Regarding Commercial/Corporate Loans and Loans to Private Clients (with floater mortgages constituting by far the most relevant type), it is to be expected that the majority of agreements do not contain fallback provisions.

This distinction is mirrored in our legal analysis which begins with contracts without fallback provisions in a first step and then extends to contracts with fallback provisions. For a full review of the legal issues and in particular the pertinent rules under the Swiss law of obligations, we refer to Appendix D.2.

5.3. Legal Issues under Contracts without Fallback Provisions

The absence of pre-existing fallback provisions directly invokes the general law of obligations as codified in the Swiss Code of Obligations and developed in the jurisprudence of the Swiss Federal Court. Four principles could be invoked in response to a benchmark switch and thus bring about legal uncertainty and litigious activity:

- (i) Supplementary interpretation of contract ("*ergänzende Vertragsauslegung*")

- (ii) *Clausula rebus sic stantibus*,
- (iii) Subsequent impossibility ("*nachträgliche Unmöglichkeit*"), and
- (iv) Error as to the basis of the contract ("*Grundlagenirrtum*").

5.3.1. Continuity of Contract and its Exceptions under Swiss Law

a) Continuity of contract

If one of the contemplated benchmark reforms was implemented in a "hot switch" transition, the contractual reference to "old" LIBOR would become meaningless. In filling the resulting gap in the contract, a Swiss judge would apply a set of rules known as the doctrine of supplementary interpretation of contract. Under this doctrine, the contract is to be interpreted such that the will of the parties at the time of its conclusion is realized as far as possible. The will of the parties is in practice inferred from an analysis of the provision in question as to its purpose.

The purpose of referencing LIBOR in a contract is to effect an automatic adjustment of the floating leg along with refinancing conditions so as to avoid the need to renegotiate the mutual obligations in response to changed market conditions. Only in very exceptional cases might the parties seek to obtain/sell exposure to LIBOR as a purpose in itself (and this does not apply to any of the contracts/instruments under review). What the parties seek to achieve by referencing "old" LIBOR, *legally speaking*, is to incorporate the nearest available and officially sanctioned proxy to the risk free interest rate for the respective currency and tenor as the most effective method of quantifying the floating leg. Having documented this intention in a contractual provision with a clear purpose, a party would be blocked from invoking exceptions to continuity of contract (see hereunder **b**)) at the occasion of the switch to a new benchmark rate. That said, the probability that objections to continuity of contract would carry some argumentative credibility or be met with success does increase with every further departure from what LIBOR currently stands for. At the very least, a party would feel motivated to challenge its ongoing obligations if the new rate differs substantially from what LIBOR currently stands for.

b) Exceptions to continuity of contract

Three exceptions to continuity of contract might be invoked:

- (i) *Clausula rebus sic stantibus*

Under *clausula rebus sic stantibus*, i.e. the rules on hardship, a contract may be set aside where a change in circumstances that the parties did not contemplate at the time of contracting causes a severe imbalance in the contract cannot be accounted for by amending the terms of the contract (no automatic relief). The analysis of a claim brought under this doctrine would be similar to a supplementary interpretation of contract analysis, the reason being that the only practicable way of amending the contract would be to insert a reference to the new benchmark rate in lieu of "old" LIBOR (a court could not construct a functional reference rate on its own): the question to be answered is whether a contract so amended is in line with what the parties originally contracted for. As we have shown, the purpose of referencing LIBOR in a contract is to effect an automatic adjustment of the floating leg along with refinancing conditions so as to avoid the need to renegotiate the mutual

obligations in response to changed market conditions. This purpose is best served by amending the contract as referencing the new benchmark rate.

(ii) Subsequent Impossibility

The doctrine of subsequent impossibility excuses non-performance of a contractual obligation; the counterobligation expires, and so the contract effectively expires. Some parties – whether erroneously or not – might take discussions under US law as historical precedent (uncertainty over questions of impossibility was one of the principal factors motivating the State of New York to legislate for guaranteed continuity of contract ahead of the introduction of the Euro). Legally speaking, this argument would be incorrect. The obligation owed by the floating leg payer is a mere *payment* obligation. Quantification of the payment obligation is not owed under the contract (this is the very purpose of referencing a value determined by third parties).

(iii) Error as to the Basis of the Contract

The basic rule on errors states that an error in motive is not sufficient grounds for a party to void a contract. As an exception, the facts that a party deems essential for it to enter into the contract may be held relevant, provided the result is commercially reasonable. Importantly, there is authority in Swiss jurisprudence to the effect that such material error in motive may relate to the occurrence or non-occurrence of *future circumstances*. The availability of LIBOR quotes over the life of the contract could theoretically be invoked as a future circumstance, the fixing methodology as a present or future circumstance. In both cases, and beyond actually establishing that it acted in error, a party would have to argue that it was commercially reasonable to place central importance on these facts.

5.3.2. *Synthesis*

For the legal risk profile of contracts that are silent on adverse LIBOR contingency, the entry point of the legal analysis is the question whether the contract can be construed as referencing the new benchmark rate in lieu of “old” LIBOR.

If the contract can be construed as referencing the new benchmark rate, continuity is ensured. If referencing the new benchmark rate would impose on the parties obligations they did not contract for, a gap in the contract remains and the default rules of statute and jurisprudence come into play. The more a renewed benchmark deviates from what LIBOR currently stands for, the higher the risk that the analysis is conducted at the blurred edges of these concepts. Whereas Swiss law leaves the doctrine of impossibility to clear-cut cases, the same is not true of the doctrine of hardship (*clausula rebus sic stantibus*) and the doctrine of error as to the basis of the contract. The potential for legal uncertainty in a *hot switch* transition is more than trivial.

5.4. Legal Issues under Contracts with Fall-Back Provisions

The fallback provisions reviewed in preparation of this report purport (i) to bridge brief instances in which a LIBOR quote (for whatever reason) does not appear on the relevant

screen or (ii) market disruptions, which may undermine the determination of “old” LIBOR rates for days or weeks.

5.4.1. Fall-Back Provisions not Applicable to Benchmark Reform

As to whether or not these fallback provisions would operate to capture the switch to a reformed benchmark, there are arguments to be made for both sides, but the better view under Swiss law is that they do not capture such an event, e.g. the introduction of a new benchmark does not constitute a market disruption event. For a detailed analysis of the fallback provisions in use in Switzerland as to their applicability, we refer to Appendix D.3.

The resulting gap in the contract means that the contract is to be analyzed as if no fallback provisions were present. The analysis thus has to proceed as for contracts without fallback provisions (see sub 5.3 above).

Whether the fallback provisions themselves can be made operational, e.g. in to account for market disruptions *within the new benchmark* system, is another question altogether which is not the object of this inquiry. Some legal uncertainty would arise though, as a party might argue that it should not be submitted to the new benchmark system under a contract with dysfunctional fallback provisions.

In summary, the fallback provisions do not capture a switch to a new reference rate. The contract would then be construed as referencing the new benchmark rate in lieu of “old” LIBOR. The analysis is complicated by the fact that a party might argue that it should not be subjected to the risk of adverse contingencies within the new system under a contract with dysfunctional fallback provisions. Furthermore, the fallback provisions could become relevant indirectly if a party were to rely on them to object to continuity of contract (see hereunder, 5.4.2).

5.4.2. Potential for Dispute Regardless of Applicability

The mere existence of the fallback provisions could cause legal uncertainty once the benchmark rate system they are modeled on ceases to exist, *regardless of the fact that they do not capture the transition to a new benchmark rate*.

A common fallback provision in essence vests the right in one party/the calculation agent unilaterally to amend the terms of the contract to account for the changed circumstances. The party might seek to take advantage of this discretion at the occasion of the introduction of a new benchmark rate.

The same level of legal uncertainty would arise if one assumed that the clause was in fact applicable: Any unilateral price determination, under the applicable Swiss law of obligations, has to be exercised *reasonably* and in good faith. Under contracts/instruments held by retail customers, an additional layer of scrutiny in substance can arise in the form of consumer protection law/consumer-specific contract law. Where an amendment of the terms (in good faith) is deemed impossible or impracticable, some of the fallback provisions allow the payer of the floating rate to terminate the contract where, in its *reasonable* discretion, an adaptation is not possible. The standard of review is essentially the same as under the doctrines of supplementary interpretation of contract and *clausula rebus sic stantibus*.

5.5. Market-Based Solutions

We have seen that although legacy contracts could easily be made to work under a new benchmark system by way of supplementary interpretation, the mere existence of pre-existing fallback provisions in certain types of contracts as well as the general law of obligations bear substantial risks of legal uncertainty. The kinds of market based solutions one might envisage depend on the relevant contracts/instruments.

5.5.1. Syndicated Loans

Contract amendment in the market for syndicated loans could be assisted by the Loan Market Association (LMA) endorsing the reformed benchmark as an appropriate means of achieving the objectives of a self-adjusting contractual interest rate.

5.5.2. Other Loans

In the domestic mortgage market, the costs of renegotiating every contract individually would in all likelihood exceed the benefits and depending on the level of legal uncertainty felt by the lenders, legislation guaranteeing continuity of contract may be the only solution. In light of the purpose served by a reference to LIBOR in a mortgage agreement and also the fact that LIBOR+ would not deviate materially from LIBOR, we submit that there would be no need for legislation under the current proposals. Continuity of contract would be ensured by the rules on supplemental interpretation of contract. This could be different if benchmark rates more akin to SARON and OIS were phased in. The same consideration applies to the other domestic loan markets.

5.5.3. OTC Derivatives

The fall-back provisions in the OTC derivatives market are effectively administered by a trade organization which could activate existing mechanisms to reduce legal uncertainty: Under the aegis of the International Swaps and Derivatives Association (ISDA), the market for OTC derivatives operates a time-tested solution to the problem of amending large numbers of private contracts. Under the technique of protocol adherence, members of ISDA sign a protocol and all contracts under which they face another member of ISDA that has signed up to the same protocol are thereby amended to contain the terms of the protocol. The same structure could be implemented for OTC derivative contracts governed by the *Schweizer Rahmenvertrag für OTC Derivategeschäfte*, if those players who document their transactions on the basis of this domestic OTC master agreement feel the need for increased legal certainty.

Ultimately, market based solutions should not be relied on to guarantee a smooth "Successor Rate" transition to a new benchmark rate in light of the number of stakeholders involved. Legislative solutions face the need for global consistency and coordination. From a legal perspective, gradual transition of the type recommended by the Transition Design workstream is the only sensible approach (see immediately below sub 5.6).

5.6. Findings

The findings may be summarized as follows:

- The Transition Design workstream recommends a gradual transition which allows for adjustments to be made during the transitional phase ("Parallel with cut-over" transition). We understand that, from the perspective of the Reference Rate Menu workstream, LIBOR+ would be the best candidate to substitute LIBOR.
- The implementation of a benchmark reform structured along these two proposals would significantly reduce legal uncertainty. Some residual risk would remain with respect to legacy contracts whose tenor would extend beyond the cut-off point for LIBOR. For the bulk of these contracts, supplemental interpretation of contract would work to ensure continuity of contract. Should a party invoke exceptions to continuity of contract, such attempts would in all probability fail, if only for the fact that the parties will have had substantial time to adapt to the discontinuation of LIBOR in the meantime.
- However, the introduction of a benchmark rate with economic properties materially different from LIBOR (such as SARON and OIS), particularly if implemented in a very short transitional period, would lead to much greater legal uncertainty and could result in costly litigation.

5.7. Additional Analysis (Phase 2)

This section addresses certain aspects raised in the "Phase 2 Questionnaire" of the MPG legal stream and in various discussions among the legal stream's members. Its substantive content is almost entirely based on the CHF Libor Legal Report that was prepared for Phase 1.

5.7.1. Contractual Fall Back Provisions

Some of the typical agreements for the products identified by the Market Outreach Workstream contain fall back provisions that deal with the unavailability of CHF LIBOR rates, but a large (probably preponderant) portion of the market operates under agreements without fallback clauses. However, none of the fall back provisions found in the reviewed contracts capture a switch to a new rate. The provisions are essentially designed for a temporary unavailability of the current CHF LIBOR. Mainly for this reason, the existence or absence of fall back provisions in agreements will not impact the legal/litigation risks associated with a transition to a new benchmark rate. As explained in more detail above, in both cases an assessment of the legal situation would ultimately rely on the same general principles of the Swiss law of obligations.

5.7.2. "Bucketing"

Below, the proposed alternative benchmark rates are classified pursuant to the categories set out in the Transitions Cross-currency Summary as follows:

- 1a) Alternative benchmark is a continuation of the same rate.
- 1b) Alternative benchmark is a successor rate.
- 2) Alternative benchmark is a new benchmark.

Repo – Swiss Average Rates (SAR)

SAR obviously deviates in a significant manner from the economic properties of the current CHF LIBOR, since it reflects a market for secured funding transactions. SAR must therefore be classified as a new benchmark (variant 2).

Overnight Index Swap (OIS)

OIS significantly deviates from the current CHF LIBOR in that it refers to derivative instruments. Amongst others, OIS transactions exhibit markedly different credit risk and liquidity characteristics compared to traditional lending transactions. These elements alone constitute a substantial departure from fundamental economic characteristics of current CHF LIBOR and OIS must thus be considered as a new benchmark (variant 2).

Libor+

Libor+ largely preserves the economic nature of the current CHF LIBOR. Similarly to current CHF LIBOR, it is a rate for unsecured funding that applies to large financial institutions. However, the administrator would change and the fixing methodology would be subject to substantial modification. Therefore, Libor+ is probably best classified as a successor rate (variant 1.b).

5.7.3. Mitigants

In this paragraph some potential mitigants that aim at minimizing legal risks associated with a transition will be presented in respect to each alternative benchmark rate.

Repo – Swiss Average Rates (SAR)

As indicated above, SAR represents a significant change and its introduction would expose the market to increased risks associated with legal uncertainty and potential litigation, which would be difficult to mitigate by means other than parallel tracking. In theory legislation would be conceivable (and also generally desirable). However, the enactment of formal and legally binding legislation would most likely be onerous in terms of, amongst other things, timing, procedures, political consensus and also content (namely in case of a substitute rate which departs in a material way from current CHF LIBOR like SAR). At least in the short term, legislation does not appear to be a readily available option.

Overnight Index Swap (OIS)

For OIS the same analysis as for SAR in 3.1 applies.

Libor+

Libor+ essentially preserves the economic properties of current CHF LIBOR. As explained in more detail in the Phase 1 Legal Report, it is rather unlikely that existing contracts could be successfully challenged in court. Certain risks can nevertheless arise in circumstances where as a matter of fact Libor+ would exhibit a consistent spread compared to current LIBOR. Therefore a gradual implementation of the new benchmark would be advisable. Additional comfort could derive from legal opinions and recommendations aimed at facilitating the

amendment of contracts like protocols etc., especially if endorsed by governmental bodies or industry associations.

6. Outreach to Market Participants

6.1. Outreach approach

The Swiss Franc MPG Working Group conducted interviews with a number of financial institutions and corporations which the group deemed important and representative stakeholders in Swiss Franc financial markets. Interviews were designed to collect data on how the business of each stakeholder is linked to benchmark interest rates (such as Libor) and to give stakeholders an opportunity to share their vision on what potential Libor reform ought to look like. An agenda was shared with stakeholders to guide the conversation (Appendix E.2). Not all stakeholders commented on all topics in the agenda.

The group reached out to the following institutions:

- 5 large commercial and private banking players, including their Treasury Management, Debt Capital Market and Syndication desks, as well as their loan departments (Credit Suisse, Julius Bär, Pictet, UBS, Zürcher Kantonalbank)
- 1 leading broker (Cosmorex)
- 2 large corporates (Nestlé, Novartis)
- 4 insurance companies (Swiss Re, AXA, Swiss Life, Zurich)
- 2 industry associations (ACI, Swiss Banking Association). Both declined to comment because they feel that they do not have any additional information in light of our already broad-based survey

It has been agreed that comments are not linked to individual stakeholders. Some of the feedback has been omitted in this report in the interest of brevity. The complete report can be found in Appendix E.3. Unless otherwise noted, a recommendation shown below is shared by the majority of stakeholders.

6.2. Benchmark usage by outreach contributors

6.2.1. *Products that are linked to interest rate benchmarks, such as Libor*

Stakeholders listed primarily plain-vanilla interest rate swaps (IRS) and variable rate mortgages as instruments that are directly linked to Libor. Other products included retail and commercial loans, fixed advances, Lombard loans and syndicated loans. OIS is linked to the TOIS fixing in Switzerland. Only banks mentioned using OIS.

In addition, banks and corporates use Libor to price internal interest rate curves (funds transfer pricing). These curves are used as a basis to price term loans and term deposits. Thus, there is an indirect link to Libor for these products.

Other indirectly Libor-linked instruments include FX-Swaps (mainly 1 month to 12 month maturity) and Cross-Currency Swaps (>1y).

6.2.2. Benchmarks used in Switzerland

Stakeholders mentioned three benchmark reference rates that they use most often: Libor, TOIS and Swiss Average Repo Rates (such as SARON). Swiss stakeholders focus their attention primarily on the Swiss Franc and the US Dollar Libor rates. Many stakeholders are aware of the Swiss Franc Average Rates (Repo reference rates), but few use them in their pricing frameworks.

6.2.3. Business driver for position

IRS are used primarily for the hedging of assets and liabilities (direct link). Libor is also used to price client transactions (rollover-mortgages/loans) and for transfer pricing. IRS are often used for pricing coupon bonds at issuance.

6.2.4. Most relevant exposures by instrument and tenor

Most of the market risks (FX, interest risk and basis risks) are directly or indirectly linked to Libor. This includes tenors between 1 month and 30 years. Typically, loans have a maturity of around 5 years (frame contract). Interest rate swaps usually have a tenor between 3 and 10 years. However, some interest rate swaps have maturities of up to 30 years. Overnight Index Swaps (OIS) usually have maturities of up to 2 years. Libor futures have also been mentioned as an important tool to hedge duration risk.

6.2.5. Re-set frequency

The most frequently used reset frequencies are: 1 day (TOIS) or 1 month, 3 month, 6 month (LIBOR)

6.2.6. Type of legal documentation (adequate long-term fall-back provisions)

All stakeholders reported that they use the standard master agreements for virtually all their money market instruments and derivatives. The Swiss local OTC standard contract ("Rahmenvertrag") is not widely used by key stakeholders. Smaller players in the domestic market may use the "Rahmenvertrag" more.

Most loan contracts (retail and commercial) have no fallback provisions. Where fallback provisions exist, it is unclear whether it is feasible to rely on these provisions over longer periods of time.

6.3. Potential alternative reference rates

6.3.1. Alternative benchmarks

All stakeholders mentioned that Libor must continue to be published. All stakeholders favored a strengthening of the fixing mechanism and of the oversight governing Libor setting. Stakeholders cannot see an obvious IOSCO compliant alternative to Libor in Swiss Franc.

Currently, stakeholders are evaluating measures to make the TOIS fixing and SARON (both overnight rates) more robust on the basis of the IOSCO principles.

6.3.2. Advantages and disadvantages of benchmark rates other than Libor

OIS curves can be a potential source of alternative reference rates. However, this is only true as long as the OIS-Swap market is deep and liquid (which is currently not the case).

Secured rates like SARON might serve as a benchmark for the secured funding market. It is not suited as a benchmark for cost of unsecured funding (although the interbank funding is primarily based on secured funding in a “normal non-0% Monetary Policy environment”).

6.3.3. Other potential benchmarks if market evolution were to occur

Benchmark setting should be simple and the calculation methodology should be transparent. Ideally, it should be transaction-based and/or based on tradable-quotes in relevant size. Reference rates could be enhanced with a broader range of products and market participants. Stakeholders asked for strong oversight governance to enhance the credibility and the reliability of all reference rates

Some stakeholders envision using the FX Swap market and a benchmark rate of another currency, though most stakeholders take issue with such an approach.

6.4. Transitions

6.4.1. Economic Considerations

The most frequently mentioned concern is the cost of no longer having access to a Libor fixing. Most contracts do not have adequate fallback provisions. A material change or a termination would lead a number of stakeholders to renegotiate all their contracts. Additionally, it is unclear whether the new benchmark rate will be able to replicate the same characteristics that Libor represented. The longer a transition takes, the larger the cost of the uncertainty becomes.

If the change to Libor leaves the fundamental economic properties of Libor intact, most of the above-mentioned concerns become manageable for stakeholders. The economic cost of a moderate change is considered low for most stakeholders

6.4.2. Legal Considerations

Derivatives and loans are typically covered by master agreements. As mentioned above, most contracts may need to be renegotiated, particularly where there is no fall back provision. Due to the number and the notional size of the contracts such an effort would absorb a significant amount of capacity in the legal department of stakeholders and would also take a significant amount of time.

Most stakeholders are not aware of relevant legal precedent for such a situation. Even contracts that have fallback provisions may also face significant litigation risk, since such clauses have not been tested in court.

6.4.3. Accounting (e.g. P&L impact)

Some stakeholders were concerned that if a new benchmark is noticeably different from BBA Libor, they could suffer either adverse economic impact or windfall profits. Since no successor benchmark rate has been determined yet, it is hard to quantify the accounting impact of a change. However, stakeholders are concerned about the impact on IFRS and US-GAAP hedge accounting.

6.4.4. Operational aspects

Any change, even a relatively small change, will lead to significant operational costs. Stakeholders mentioned IT costs and costs in the back office. Others simply referenced the operational dependencies that developed due to the longstanding legacy of Libor. While most stakeholders agree that operational costs are significant, some mentioned that they are manageable.

6.5. Other consideration that the MPG should consider

6.5.1. Need for new benchmarks or desire for strengthening of existing ones?

Stakeholders were not unanimous in their assessment of the seriousness of Libor's problems. Some reported to have suspected that large players influenced Libor fixings; others think that manipulation did not move the needle enough to make it a significant issue. However, all agreed that there is room for improvement, for more oversight and for more transparency. Most agreed that the fixing mechanism needs to be strengthened.

6.5.2. Key properties of the ideal benchmark

All stakeholders asked that fixing mechanisms are transparent, that the new rate ought to be based on a liquid, representative and widely accepted market and that the fixing is robust to manipulation. Such a system does not have to use transactions exclusively. It can also include tradable, realistic quotes in sufficient size.

Generally, stakeholders favor that a broad range and a large number of market participants contributes to the benchmark. Some stakeholders strongly favored simple solutions. More complex solutions (such as FX Swap implied rates) would demand a comprehensive effort to educate the broader public.

6.5.3. Desired level of government involvement

Some stakeholders favor international oversight. Others wish for oversight by the central bank and again others wish that the Swiss Exchange serves as a central data aggregator and supervisor. Only few consider direct government intervention necessary. No stakeholders find FINMA, the Swiss regulator, an appropriate agent for calculating a

benchmark rates. However, a government role in providing a regulatory framework is generally accepted.

Frequently, stakeholders mentioned that an endorsement by the Swiss National Bank (SNB) would add credibility. However, most were uncertain about what role the SNB should play exactly in such a process. One stakeholder mentioned that significant participants in the Swiss Franc financial markets ought to be compelled, either by law or by an MoU, to contribute rates for finding benchmark rates.

6.5.4. Willingness and flexibility to switch to alternate benchmarks

Generally, the willingness of stakeholders to switch to a new benchmark was low. Most think that a cost/benefit analysis only warrants a strengthening of the existing benchmark (Libor). The more dramatically benchmark rates are changed, the higher the costs to stakeholders will be.

Most stakeholders favor a long transition period, where old benchmark rates continue to be fixed and new products based on new benchmark rates will replace the old. However, there is a vocal minority that feels that running a trading book with products based on two different benchmark rates will incur significant basis risk and arbitrage opportunities.

6.5.5. International x-currency coordination

Most stakeholders favour a solution that takes the specific situation of the Swiss market into account. However, most also favor some degree of harmonization.

6.5.6. Broader market participants inclusion

Most stakeholders find it important that benchmark rates are not only set by a small group of international banks. A large pool of participants would help in restoring trust.

Market Participants Group on Reforming Interest Rate Benchmarks

CHF Currency Report Appendix

March 2014

Appendix A. Market Footprint Sources and Assumptions

| Asset class | | Overall volume* | % directly linked to LIBOR† | Reset Periods | | | | | Source/ Comment (overall volume): |
|-----------------------|-------------------------------|-----------------|-----------------------------|---------------|-----|--------|--------|-------------------|-----------------------------------|
| Level 1 | Level 2 | | | 1m | 2m | 3m | 6m | 12m | |
| Loans | Syndicated loans | 91 | 50-70 | low | low | medium | high | 1 | |
| | Corporate loans (bilateral) | 52 | 40-60 | low | low | high | medium | 2 | |
| | SME loans (domestic) | 89 | 10-20 | low | low | high | medium | 2 | |
| | Commercial mortgages | 232 | 15-25 | low | low | high | medium | 2 | |
| | Retail mortgages | 717 | 10-20 | low | low | high | low | 3 | |
| | Credit cards | | | | | | | No data available | |
| | Auto loans | | | | | | | No data available | |
| | Consumer loans | | | | | | | No data available | |
| | Student loans | 0 | | | | | | No market | |
| Notes | Floating Rate Notes (FRNs) | 24 | 100 | | | medium | high | 1 | |
| Bonds | | | | | | | | | |
| Securitisation | RMBS | low | | | | | | No market | |
| | CMBS | low | | | | | | No market | |
| | ABS | low | | | | | | No market | |
| | CLO | low | | | | | | No market | |
| Derivatives | | | | | | | | | |
| OTC | IR Swaps | 4,032 | 100 | low | | medium | high | 4 | |
| | FRAs | 1,079 | 100 | | | medium | high | 4 | |
| | IR Options | 40 | 100 | | | | high | 4 | |
| | Basis Swap | 489 | 100 | | | | | 4 | |
| | X-currency swaps | 498 | 80-100 | | | Low | high | 4 | |
| | Constant Maturity swaps (CMS) | | | | | | | | |
| ETD | IR Options | | | | | | | No data available | |
| | IR Futures | 200 | 100 | | | high | | 5 | |
| Deposits | Retail deposits (only CHF) | 662 | 0 | | | | | 6 | |
| | SME deposits | | | | | | | No data available | |
| | Corporate deposits | 215 | 0-10 | low | | | | 7 | |
| Mutual funds | Money market funds | | | | | | | No market | |
| | Bank loan funds | | | | | | | No market | |
| Other | Money Market Paper | 5 | 100 | | | high | medium | 8 | |

Sources:

| | |
|---|----------------|
| 1 BIS Quarterly Review | Date of source |
| 2 Monthly Bulletin of Banking Statistics, Credit volume statistics, 3Ca | Sep-13 |
| 3 Monthly Bulletin of Banking Statistics, Credit volume statistics, 3B | Oct-13 |
| 4 http://www.dtcc.com/products/derivserv/data/data_table_3.php?vid=0&tbid=0&tabid=3&tid=0&kid=0 | Oct-13 |
| 5 Bloomberg, outstanding volume of all CHF Libor Futures | 18-Oct-13 |
| 6 Bloomberg, outstanding volume of all CHF Libor Futures | 25-Oct-13 |
| 6 Monthly Bulletin of Banking Statistics, Monthly balance sheets, 1J, page 85, column 13 | Oct-13 |
| 7 Monthly Bulletin of Banking Statistics, Monthly balance sheets, 1J, page 84, column 1 - 8 | Oct-13 |
| 8 Monthly Bulletin of Banking Statistics, Monthly balance sheets, 1B | Oct-13 |

* applied FX-rate USDCHF 0.90

† Estimates

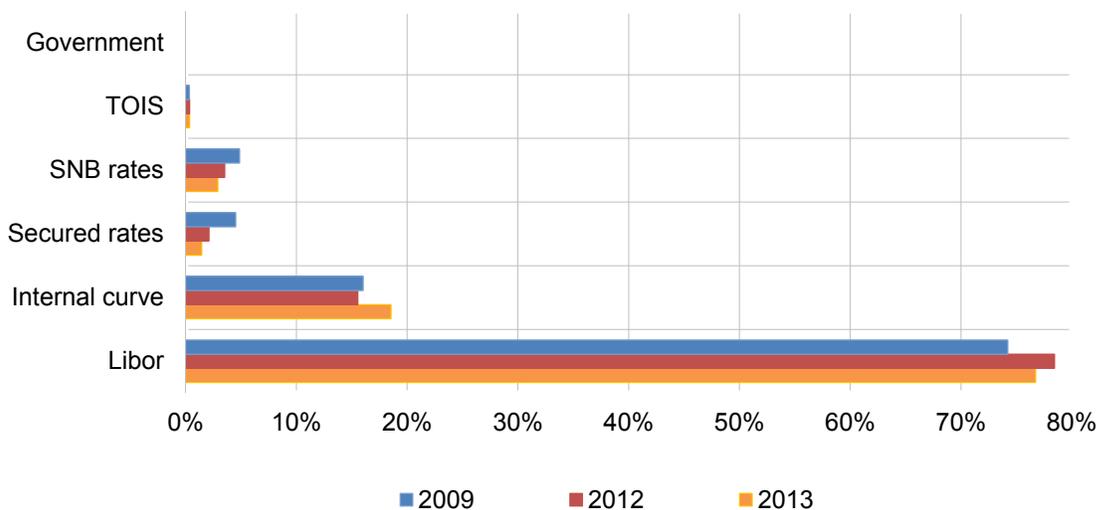
Usage I

Results from the Bank Lending Survey

- Data is based on the Bank Lending Survey June 2013 22 Swiss banks participated in the last survey
- In the survey, six classes of reference rates were defined: (i) 'Libor curve' and derivative contracts, using a Libor as the reference rate, e.g., Interest Rate Swaps (IRS) or Libor futures, (ii) Secured interest rates comprising repo rates and the yields of covered bonds (Pfandbriefe), (iii) TOIS fixing and its corresponding curve, (iv) yields of government bills/bonds (Eidgenossen), (v) the SNB's interest rates (e.g. the SNB's target range) and (vi) a bank's internal curve, which models a bank's effective (marginal) refinancing cost.
- Above figure shows the response to the following question: "Which of the following reference rates is primarily used by your bank to price loans in CHF?"
- Hence, the bank's market share and the estimated shares of loan types is not considered. The data has not been further adjusted.

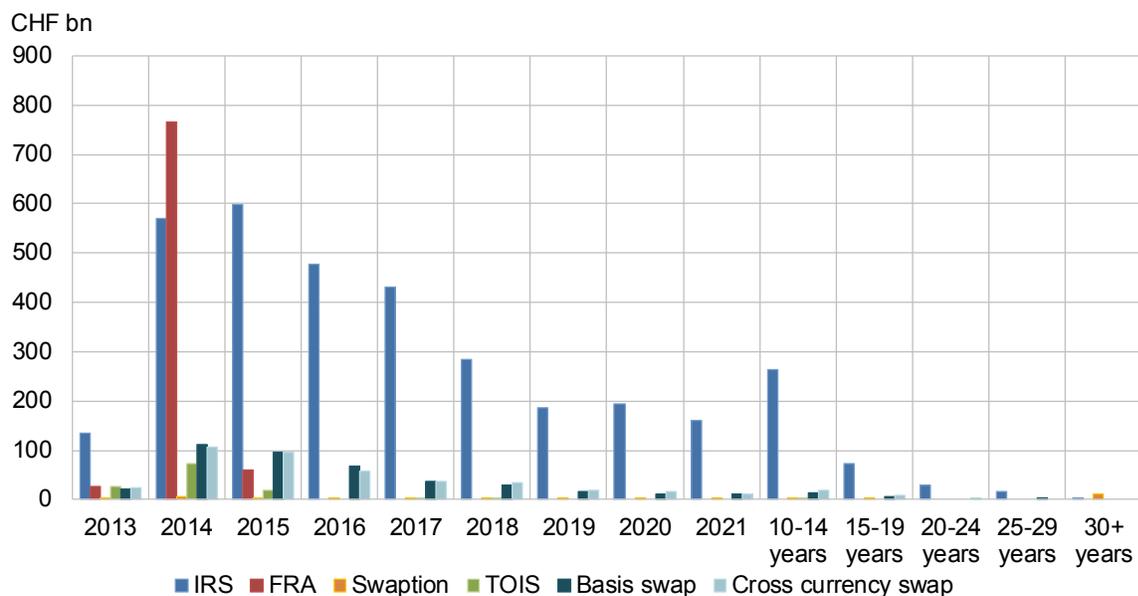
Usage II

Usage of Reference Rates for CHF Loan Pricing



Source: SNB, Bank Lending Survey

IRS SEGMENT CHF - PRODUCTS AND MATURITIES



Source: DTTC Global Trade Repository Interest Rate Swap Data, status from 20th September 2013

Vertical Axis: Underlying outstanding notional amount

Appendix B. Reference Rate Menu Appendix

B.1. List of considered reference rate

| Reference rate | Description | Analysis |
|---|--|---|
| Swiss Average Rates (SAR) | <ul style="list-style-type: none"> • Documented in 4.1 | <ul style="list-style-type: none"> • Documented in 4.1 |
| OIS | <ul style="list-style-type: none"> • Documented in 4.2 | <ul style="list-style-type: none"> • Documented in 4.2 |
| FX Swap Implied | <ul style="list-style-type: none"> • A Swiss Franc benchmark rate is calculated using a US reference rate and the FX swap implied interest rate differential | <ul style="list-style-type: none"> • The relatively high complexity and the significant FX swap basis risk led the workgroup to favour other alternatives |
| Libor with improved governance | | |
| Panel fixing in Zurich (ZIBOR) | <ul style="list-style-type: none"> • Governance, calculation and publication of Swiss Franc Libor is moved to Switzerland • Bank and other financial institutions would draw on internal curves and their expertise to contribute a rate | <ul style="list-style-type: none"> • This alternative would likely suffer from the same flaws as the existing Libor fixing |
| Libor+ (transaction and quote based) | <ul style="list-style-type: none"> • Documented in 4.3 | <ul style="list-style-type: none"> • Documented in 4.3 |
| Commercial Paper | <ul style="list-style-type: none"> • Yield on commercial paper issued in Swiss Franc by banks could be used to calculate reference rates | <ul style="list-style-type: none"> • Since there is virtually no existing commercial paper markets, banks would need to be compelled to raise capital through commercial paper. This was deemed not the right way to go. |
| Futures-based curve | <ul style="list-style-type: none"> • Reference rates would be calculated using the Euro-Swiss Libor futures | <ul style="list-style-type: none"> • Futures are based on 3 month Libor. Thus, this may only improve the quality of the longer maturity fixings. By design weaknesses in 3-month Libor will be propagated to other tenors. |

B.2. Requirements and key properties of ideal benchmark rates

- Reference rate should follow IOSCO principles
- Reference rates should be fixed with the highest possible level of transparency (though high transparency reduces incentives for rate contributors)
- Reference rates should be widely used, broadly accepted and universally endorsed as a standard
- Reference rates should be based on large, liquid markets that are hard to manipulate
- Reference rate fixing mechanism should have strong governance
- Some stakeholders strongly favored simple solutions. Complex solutions may significantly affect adoption rate by the broader public
- Mechanisms should be in place to find fixings even when market liquidity is low and transactions sparse

B.3. Swiss Average Rates tenors

| Tenor | Average Rate | Current Rate |
|-----------------|--------------|--------------|
| Overnight (ON) | SARON | SCRON |
| Tom/Next (TN) | SARTN | SCR TN |
| Spot/Next (SN) | SARSN | SCR SN |
| 1 Woche (1W) | SAR1W | SCR1W |
| 2 Wochen (2W) | SAR2W | SCR2W |
| 3 Wochen (3W) | SAR3W | SCR3W |
| 1 Monat (1M) | SAR1M | SCR1M |
| 2 Monate (2M) | SAR2M | SCR2M |
| 3 Monate (3M) | SAR3M | SCR3M |
| 6 Monate (6M) | SAR6M | SCR6M |
| 9 Monate (9M) | SAR9M | SCR9M |
| 12 Monate (12M) | SAR12M | SCR12M |

B.4. Swiss Average Rates IOSCO Compatibility (preliminary)

| Tenor | Comment | Assessment |
|---|---|----------------|
| 1. Overall responsibility | SIX Group is the Administrator (responsible for the data collection, calculation and publishing), though Swiss National Bank also plays a role (influence on methodology) | Good |
| 2. Oversight of third parties | As this benchmark is entirely transaction and quote based, no tight oversight is necessary. Bilateral market, high post trade transparency. Market is closely monitored by the SNB, though the SNB bears no formal supervision responsibilities. Eurex platform is overseen by FINMA. | Good |
| 3. Conflicts of Interest for Administrators | SIX Group is owned by Swiss banks | Good |
| 4. Control Framework for Administrators | Benchmark is entirely based on transaction and quotes and methodology is publicly available. | Good |
| 5. Internal Oversight | No clear oversight function. | Medium |
| 6. Benchmark Design | | Good |
| 7. Data Sufficiency | SAR is based on market transactions and quotes in the central repo market in Switzerland | Good |
| 8. Hierarchy of Data Inputs | SAR data and calculation methodology is fully transparent. Trade data have priority and are weighted stronger than quote data. | Good |
| 9. Transparency of Benchmark Determinations | SAR calculation methodology is transparent and published. | Good |
| 10. Periodic Review | Currently not regularly done. | Medium |
| 11. Content of the Methodology | The document of the calculation methodology is published. | Good |
| 12. Changes to the Methodology | No procedure yet available. | Medium |
| 13. Transition | No cessation policies. | Poor |
| 14. Submitter Code of Conduct | Not necessary as there is no panel. | Not applicable |
| 15. Internal Controls over Data Collection | Currently not regularly done. | Medium |
| 16. Complaints procedures | No procedure yet available. | Medium |
| 17. Audits | Currently not regularly done. | Medium |
| 18. Audit Trail | Yes | Good |
| 19. Cooperation with Regulatory Authorities | Yes | Good |

B.5. SAR vs. Libor

Chart 1 - 3 month SAR vs. 3 month Libor

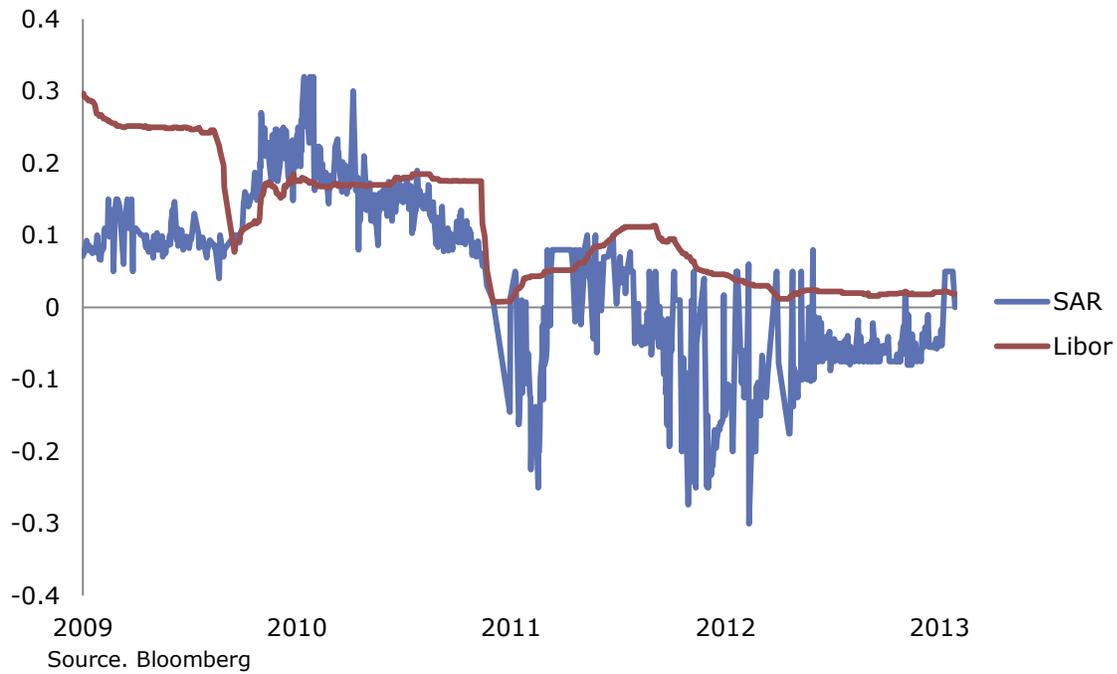
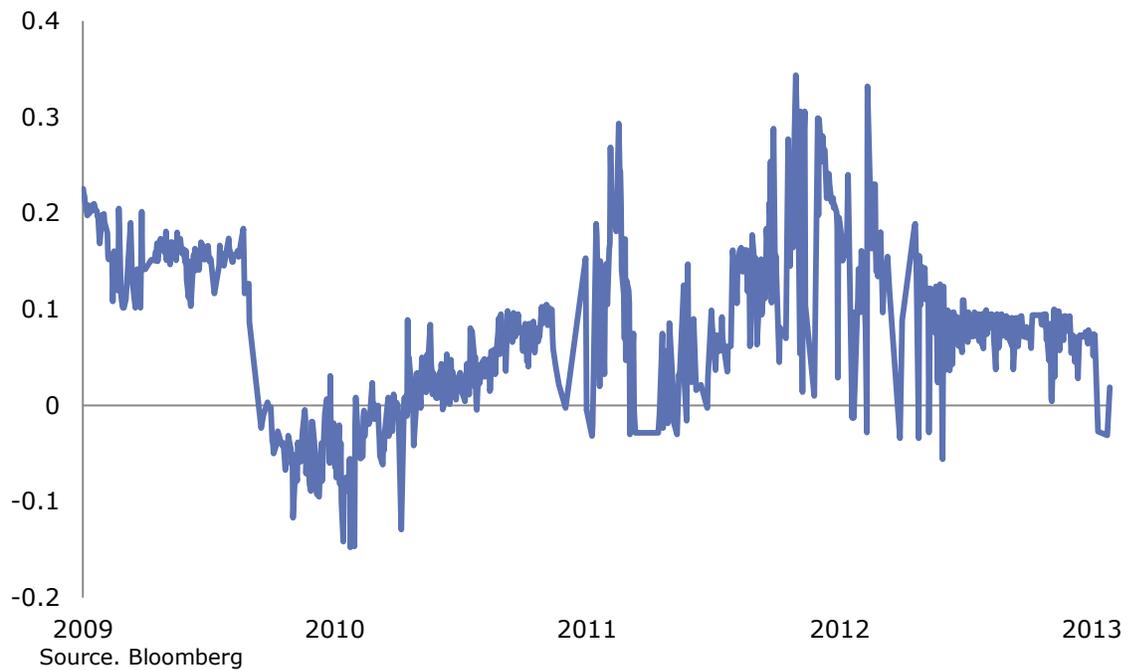


Chart 2 - 3 month SAR vs. Libor Spread



B.6. TOIS Fixing Description

The floating interest rate leg is pegged to the tomorrow/next index, also known as the TOIS fixing. When the TOIS fixing was introduced, ACI Suisse – the Swiss chapter of ACI International – took over a coordinating role in establishing and overseeing the fixing procedure (administrator).

Methodology

Each panel bank agrees to provide a quotation for its tomorrow/next unsecured lending rate to prime banks on each Zurich business day at 10.45 a.m. Therefore, the TOIS fixing is a quote-based reference rate with a prime bank definition (lending). A brokerage firm (Cosmorex AG) calculates the reference rate based on a trimmed mean (eliminating the three lowest and highest quotations). The resulting rate is published at 11 a.m. Reference banks have to trade in the Swiss franc TOIS and/or be active in lending short term Swiss franc funds in the interbank market.

Governance

Each panel bank has to abide by a fixing agreement which includes the definitions mentioned above. These banks form a self-governing panel of which the chair is a designated board member for products of ACI Suisse. All irregularities should be reported to the chairman and the latter must bring these to the attention of the panel. With a majority vote, sanctions such as exclusion from the panel or temporary suspension can be enforced.

Recent developments and reform efforts

Against the background of investigations regarding the manipulations in Libor and the imposed penalty payments, ACI Suisse launched in October 2012 a consultation process in which all stakeholders, especially panel banks, were asked to comment on the fixing procedure, on transparency in the TN money market and TOIS segment and the oversight arrangements currently in place. Several panel banks evaluated their role and decided to withdraw from the panel. During the first six months of 2013 ten banks were leaving the panel letting the panel size falling below the agreed minimum number of 20. The discontinuation of the TOIS fixing could be prevented since panel banks decided to remain in the panel or to re-join. A group of several domestic and foreign banks are still in on-going discussions regarding the future of the TOIS fixing. There is consensus that the long-run solution should be consistent with the IOSCO Principles and based on transactions and committed quotes. The development of the long-run solution will be carried out in two steps. First, under the current administrator ACI Suisse an improved governance structure has to be implemented by Q1 2014. The details are elaborated by compliance and legal specialists from different panel banks. These governance-enhancing measures aim at immediately increasing market confidence in these rates and give comfort to more banks to contribute to the fixing for a more stable and representative basis. Second, SIX Swiss Exchange explores in collaboration with market participants the possibilities for an unsecured money market platform. These long-term measures aim at making the unsecured money market more transparent and the TOIS fixing transaction (and committed quote)-based.

Experience

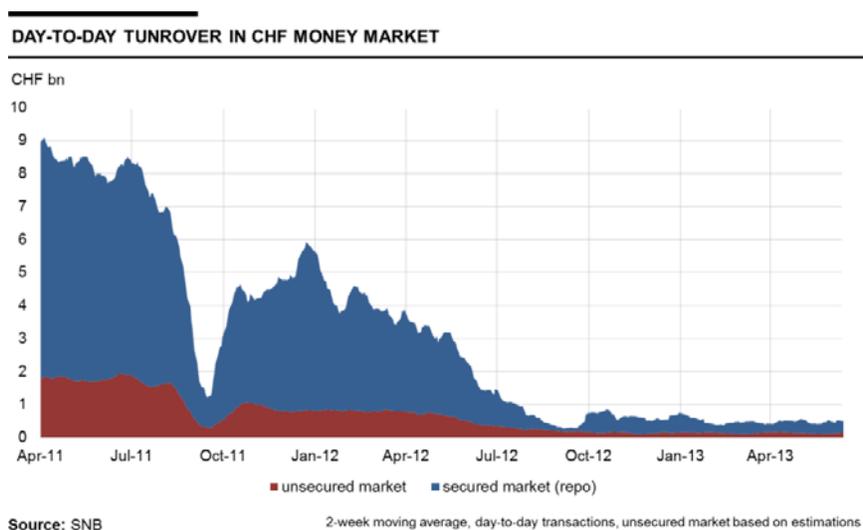
The turnover of the unsecured and secured interbank money market moved in diametrically opposite directions especially in 2008. While turnover plummeted in the Swiss franc unsecured interbank money market, it doubled in the repo market. Therefore, conclusions about whether TOIS fixings have been based mainly on transactions or have tended to be more a result of expert judgment are difficult to draw. Currently, turnover in the secured day-to-day segment is below CHF 400 mn per day; in the unsecured segment it is estimated to be below CHF 150 mn per day.

Assessment

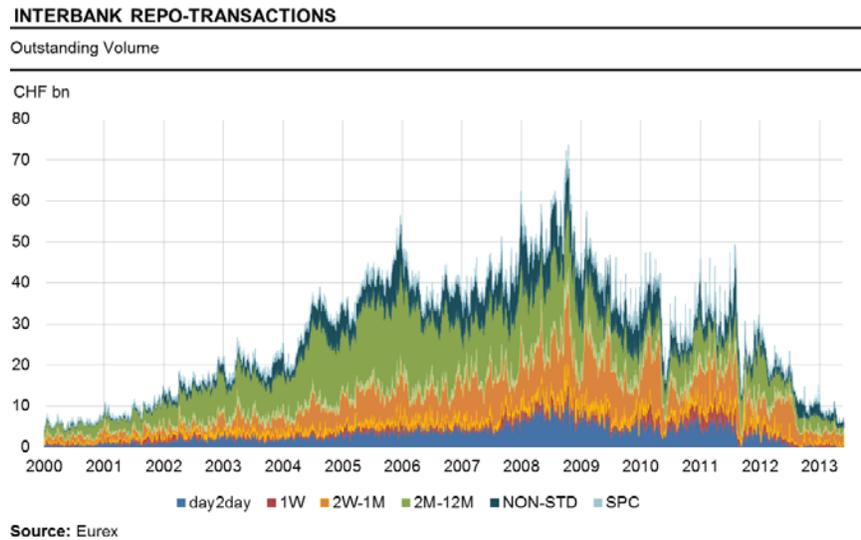
The current framework, as outlined above, is not very transparent, and conflicts of interest are inherent. Therefore, the taken initiatives are necessary to establish a rigorous framework, helping to produce a credible reference rate. Compared to other currency areas, the TOIS fixing is (till now) not based on concluded transactions (e.g. EONIA, SONIA or Fed Funds Effective Rate) which would be the case when an unsecured money market platform is established and used by market participants. The platform provider could also be in charge of administering the reference rate.

Ultimately, the viability of the TOIS fixing is dependent on the turnover in the unsecured market. Currently, market activity in this short maturity – where liquidity is normally concentrated – is very low. The upcoming regulations will further put pressure on the unsecured and question the revitalization of this segment.

B.7. Secured vs. unsecured Trading Volume

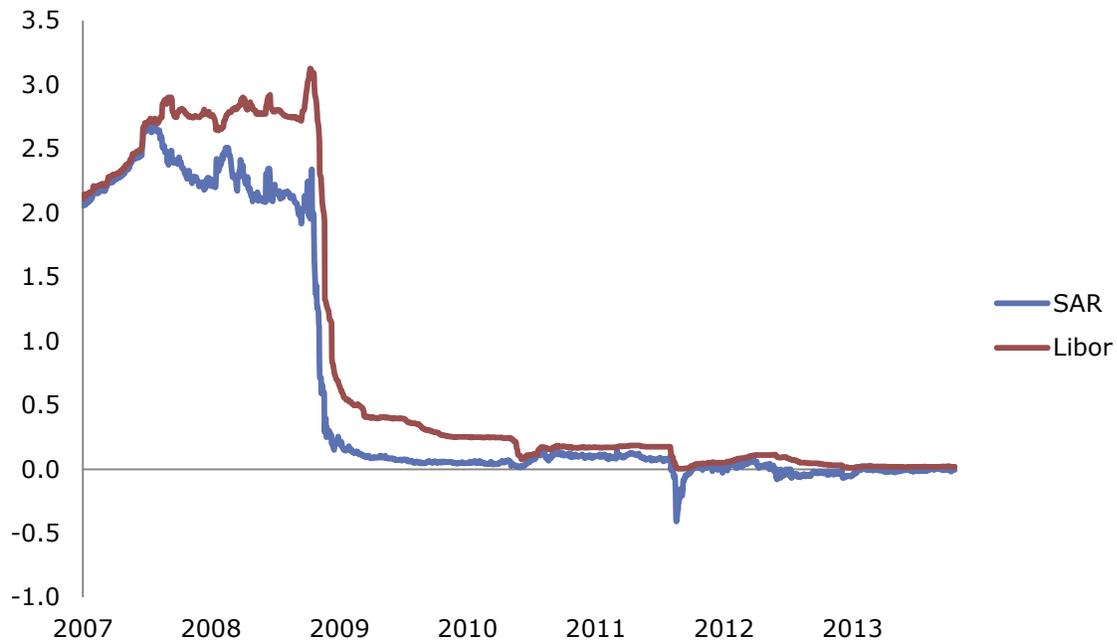


B.8. Outstanding volume of CHF secured interbank market



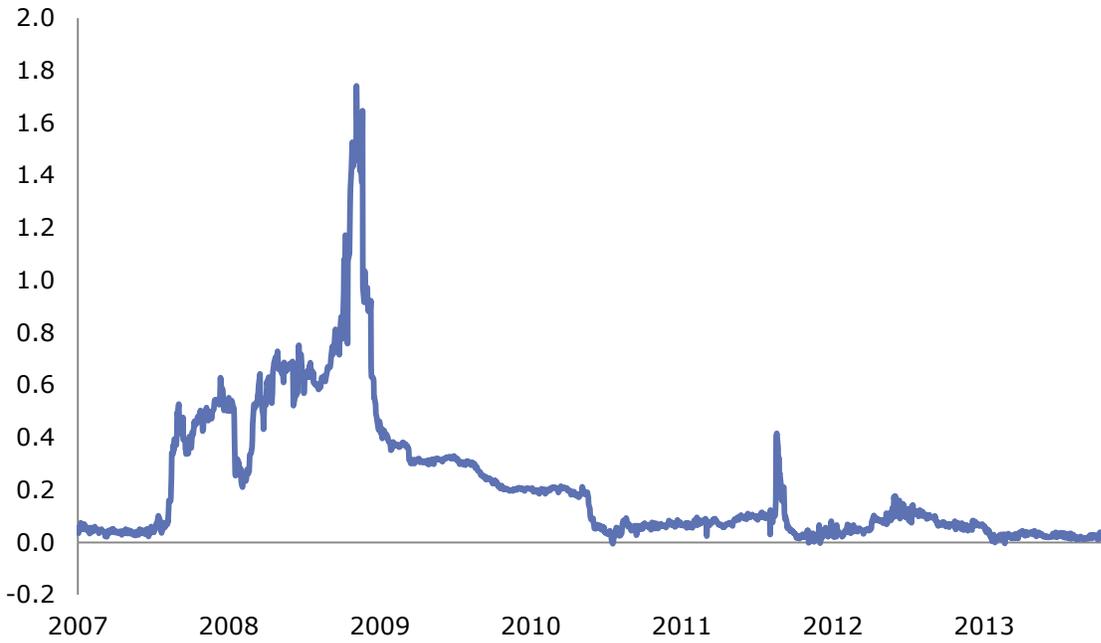
B.8.1. OIS vs. Libor

Chart 3 - 3 month OIS vs. 3 month Libor



Source. Bloomberg

Chart 4 - 3 month OIS vs. Libor spread



Source. Bloomberg

Appendix C. Fixing Methodology Analysis Framework

The work group's first task was to identify the different options that a new vision of money market benchmark rates would be open to. Then arguments in favor and against were collected and finally a recommendation was agreed upon. The outcome of this analysis is shown below.

C.1. Data selection

| Option | Analysis | Recommendation |
|--|--|--------------------|
| Panel vs. total market activity | <ul style="list-style-type: none"> Panel rates depend on the willingness of panel banks to commit rates Panel rates can be less credible, depending on the data source and market conditions; there is a free-rider problem in the allocation of the cost of contribution Market activity rates are based on transactions and potentially on committed quotes (see SAR rates). Therefore, market activity rates can abruptly discontinue if market vanishes or become highly volatile Market activity based rates can be highly volatile in illiquid market environments Market activity rates include the largest data universe; cost of contribution is evenly spread to market participants; free-rider could be solved by compensating the panel members or by adding a fee (for non-panel members) for using the reference rate in their contracts | Critical Factor |
| Trade-based reference rates | <ul style="list-style-type: none"> Clear, rule-based and volume-weighted average of actual transactions between market participants Advantages: highly transparent, simple, no or little room for judgment, cost of manipulation potentially increases Disadvantages: Complex logistics of data collection and the definition of the obligation to both domestic and international market participants are the major negative factors; no potential to include expert knowledge into the individual submissions; may be much more volatile as it will mix transactions from different markets (e.g. franchise trades vs. benchmark trades cannot easily be separated unless transaction filters are defined in very high detail); external audit by administrator can address "friendly trade" problem; still manipulation potential remains (e.g. enter into a large trade with a friendly counterparty to bias the volume-weighted average). This may be addressed by winsorizing the weights (e.g. by allowing a maximum weight of 10% per trade); Potential lack of liquidity may make calculation impossible | Recommendation: No |

| Option | Analysis | Recommendation |
|---|--|--|
| Quote-based reference rates | <ul style="list-style-type: none"> Based on tradable quotes collected either from a panel (similar to Libor) or from the market as a whole Size of bid-ask spread has valuable information about market condition. If bid-ask spread is small, markets tend to be liquid, a wide spread represents illiquid market conditions Risk of manipulation is lower if quotes are tradable compared to mere trader estimates Platform(s) need to be established to collect tradable quotes | Recommendation: No |
| Combination of trade- and quote-based | <ul style="list-style-type: none"> Must define weights or thresholds (waterfall logic) for quote-based and trade-based transactions. Weight and thresholds may change depending on market liquidity Advantages: largest possible data universe; methodology also viable in the absence of any actual trade data; least likely to be manipulated as it includes trade data and an expert opinion that has to adhere to pre-defined principles Disadvantages: complex calculations and filters may be necessary; not necessarily very transparent to all market participants; changing the weights between quote-based and trade-based consensus might be arbitrary | Recommendation: Yes |
| Collecting data from financial institutions only vs. collecting data from broader public | <ul style="list-style-type: none"> Bank-only: Reference rates stay interbank rates; reflect wholesale transaction; narrows available data, but ensures a like for like comparison between individual banks' quotes; Bank rates/transactions could include some "franchise/relationship" discount not reflecting real cost. Broad: Maximum data availability; heterogeneous universe of counterparties makes filtering transactions complex (e.g., variation in counterparties can lead to a volatile credit risk premia and time variant biases) | Recommendation: Financial Institutions |
| Including data from CP markets of financial issuers | <ul style="list-style-type: none"> Pro: Reflects similar economics as Libor, particularly if only CP of highly rated banks is included Contra: CP market is very thin in Switzerland | Recommendation: Yes |
| Including data from Certificates of Deposit | <ul style="list-style-type: none"> Pro: Larger data pool Contra: Not all data is wholesale size | Recommendation: Yes |

| Option | Analysis | Recommendation |
|---|---|---|
| Including data from unsecured market | <ul style="list-style-type: none"> Pro: Current Libor basis Contra: Little data available in maturities above 1M In current 0% rate MM policy there is hardly any trading volume. Balances are left on CB and Bank demand accounts. | Recommendation: Yes |
| Including data from Secured market (repo) | <ul style="list-style-type: none"> Pro: Good data availability in Switzerland; currently low volume but does capture 90% of secured market Contra: Few term transactions; unlikely candidate for internationally uniform solution; different economic properties than Libor | Recommendation: No |
| Including data from OIS market | <ul style="list-style-type: none"> Pro: International comparability; underlying market available since OIS depends only on interest rate expectations (ON) and are also relevant in a liquidity surplus environment; credit risk free rate (as Libor was originally intended to be) Contra: No fixing but would be easy to implement based on contracts traded; no trade repository with reported transactions (yet, still not transparent market); currently low market activity | Recommendation: No |
| Including domestic and/or non-domestic data | <ul style="list-style-type: none"> Domestic: Possible to create legal basis to collect all data Non-domestic: Broad contributor universe; difficult data collection enforcement and governance; international work streams and solution Both: No significant basis between CHF rate domestic and non-domestic but might be an issue for currencies with protected domestic markets | Recommendation: domestic and non-domestic |
| Include transactions within same holding entity | <ul style="list-style-type: none"> Pro: Increasing data universe; accounting and tax law requires intra-group loans to reflect market prices Contra: Possible distortions since transactions may not fully reflect market conditions; could be used for manipulation, as tax laws leave some leeway for intra company transactions; every intra-company transaction bears the legal risk of being a "Libor-manipulator" and can potentially destroy a company's reputation | Recommendation: No |
| Include data where issuer buys back own securities | <ul style="list-style-type: none"> Pro: Larger data universe Contra: Possible distortions when issuer buys back own paper | Recommendation: No |

| Option | Analysis | Recommendation |
|--------------------------------------|--|--|
| Ratings-based panel selection | <ul style="list-style-type: none"> Pro: Homogeneous credit premium reflected in reference rates Contra: Rating agencies react too slowly to changing market conditions; abrupt discontinuation if all panel banks have a too low rating; therefore a CDS-spread based selection might be more appropriate; however, such an approach would exclude smaller market participants | Critical Issue Recommendation: No, but evaluate alternative |

C.2. Data collection and calculation

| Option | Analysis | Recommendation |
|---|---|--|
| Mid-day fixing vs. End-of-day fixing | <ul style="list-style-type: none"> Mid-day: same-day availability; fixing during highest market liquidity End-of-Day: Next-day availability | Recommendation: End-of-day |
| Point-in-time vs. sum of transactions between fixing dates | <ul style="list-style-type: none"> Point-in-time: less data but real time statement about liquidity conditions Sum of transactions between fixing dates: more data but only statements about average conditions; outdated events have an impact on the setting; average within a period of time is more robust and harder to manipulate than an observation at some specified point in time | Recommendation: Sum |
| Data Selection follows waterfall or averaging mechanism | <ul style="list-style-type: none"> Waterfall: Transparent mechanism and uniform data in normal times; with move down the waterfall (traded to quotes to expert opinions), rates may no longer have homogeneous data basis; judgment necessary for determining when data base is insufficient and move to next level is necessary Combination: Larger data universe; dampened effect of changes in technical properties of underlying data; less transparent economic properties; possibly complex calculation | Critical Factor Recommendation: Waterfall |
| Tenors to be calculated | <ul style="list-style-type: none"> Minimal solution: O/N, 1M, 3M, 6M; focus on data points where market activity is concentrated most; consumers of reference rates inter- and extrapolated if necessary Interpolation: Calculation agent interpolates; simpler for public but potentially difficult to agree on interpolation model; likely that market will focus usage on 1M, 3M, and 6M and interpolation will be superfluous Maximal solution: all tenors between ON to 12M; will require more data; higher risk of not having enough data to calculate a representative rate (particularly if only transaction based) | Recommendation: Minimal |

| Option | Analysis | Recommendation |
|--|--|---|
| Calculation in Switzerland or abroad | <ul style="list-style-type: none"> Switzerland: Confidentiality, only one legal jurisdiction needed to enforce submission of trade data/quotes. Basic principal that every country should be responsible to calculate for own jurisdiction as important part of monetary steering International Agent: uniform calculation method makes reference rates more comparable | Recommendation: Switzerland (Non domestic agent only if data secrecy laws can adhered to) |
| Rule-based data validation vs. expert-based data validation | <ul style="list-style-type: none"> Rule-based: transparent, simple, static, but possibly biased depending on market activity, adhere to predefined principles Expert-based: flexible, but not as transparent | Recommendation: Combination (waterfall) |
| Fall-back mechanisms | <ul style="list-style-type: none"> Interpolation: elegant but hard to agree on uniform model for all yield curve shapes; useless if all rates are unavailable Waterfall: may lead to unexpected behavior when moving down the waterfall Previous rate (BBA approach): can reflect market reality sometimes; prevents abrupt discontinuation but potentially unrealistic in the long run, especially if market liquidity deteriorates further (e.g. due to Basel 3 leverage ratio for banks) | Recommendation: Waterfall |

C.3. Other Issues

| Option | Analysis | Recommendation |
|---------------------------------|---|---------------------------------------|
| Regulatory incentives | <ul style="list-style-type: none"> Pro: efficient way to encourage MM activity Contra: may undo some of the efforts to reduce systemic risks | Critical Aspect: No Recommendation |
| Compensation / Licensing | <ul style="list-style-type: none"> Pro: Banks ought to get something in return for their contribution; reputational value of being a panel bank is no longer sufficient Contra: High licensing fees may discourage usage of reference rates, low licensing fees may not be enough to compensate for the reputational risk of contributors, costs for contributors may suddenly increase due to unexpected manipulations while fees are more rigid e.g. abrupt discontinuation is still possible | Recommendation: Yes |

Appendix D. Legal Appendix

D.1. Product Profile – Relevant CHF LIBOR Contracts and Instruments

In the following, we set out the terms of the most important LIBOR-linked financial contracts and instruments under Swiss law. Our sample is based on information provided to us by the Market Outreach workstream.

The purpose of our analysis which forms the basis of this section was twofold, namely (i) to identify legacy contracts which reference CHF LIBOR and (ii) set out their terms insofar as they directly relate to the CHF LIBOR benchmark.

2.1 Loan Agreements

a) Syndicated Loans

Participants in the domestic syndicated loan markets rely heavily on the LMA standards. Even where the documentation is among Swiss parties and subject to Swiss law, the LMA standards are frequently adapted to the domestic environment (Maurenbrecher/Frick, p. 55), a practice which is sometimes referred to as "Swiss LMA Style" (Weber/Häusermann, p. 4). Regarding LIBOR-referencing and the corresponding fall-back provisions, it may safely be assumed that the majority of the documentation in use mirrors the LMA standard terms.

The LMA Facility Agreement (**LMA Terms**) contains the following relevant provisions.

1.1 provides (*inter alia*):

"Interpolated Screen Rate" means, in relation to LIBOR for any Loan, the rate (...) which results from interpolating on a linear basis between:

(a) the applicable Screen Rate for the longest period (...) which is less than the Interest Period of that Loan; and

(b) the applicable Screen Rate for the shortest period (...) which exceeds the Interest Period of that Loan,

each as of the Specified Time (...)

"LIBOR" means, in relation any Loan:

(a) the applicable Screen Rate;

(b) (if no Screen Rate is available for the Interest Period of the Loan) the Interpolated Screen Rate for that Loan; or

(c) if

(i) no Screen Rate is available for the currency of that Loan; or

(ii) no Screen Rate is available for the Interest Period of that Loan [and it is not possible to calculate an Interpolated Screen Rate for that Loan],

(iii) the Reference Bank Rate,

as of [, in the case of paragraphs (a) and (c) above,] the Specified Time (...)

"Reference Bank Rate" means the arithmetic mean of the rates (rounded upwards to four decimal places) as supplied to the agent at its request by the Reference Banks:

(a) in relation to LIBOR, as the rate at which the Reference Bank could borrow funds in the London interbank market (...)

"Reference Banks" means, in relation to LIBOR, the principal London offices of (...)

"Screen Rate" means:

(a) in relation to LIBOR, the London interbank offered rate administered by the British Bankers Association (or any other person which takes over the administration of that rate) for the relevant currency and period displayed on pages LIBOR01 and LIBOR02 of the Reuters screen (or any replacement Reuters page which displays that rate); and

on the appropriate page of such other information service which publishes that rate from time to time in place of Reuters. If such page or service ceases to be available, the Agent may specify another page or service displaying the relevant rate after consultation with the Company.

11. CHANGES TO THE CALCULATION OF INTEREST

11.1 Absence of quotations

Subject to Clause 11.2 (Market disruption), if LIBOR is to be determined by reference to the Reference Banks but a Reference Bank does not supply a quotation by (...), the applicable LIBOR shall be determined on the basis of the quotations of the remaining Reference Banks.

11.2 Market disruption

(a) If a Market Disruption Event occurs in relation to a Loan for any Interest Period, then the rate of interest on each Lender's share of that Loan for the Interest Period shall be the percentage rate per annum which is the sum of : (...)

(ii) the rate notified to the Agent by that Lender as soon as practicable and in any event before interest is due to be paid in respect of that Interest Period, to be that which expresses as a percentage rate per annum the cost to that Lender of funding its participation in that Loan from whatever source it may reasonably select; (...)

(b) In this Agreement **"Market Disruption Event"** means:

(i) at or about noon on the Quotation Day for the relevant Interest Period LIBOR is to be determined by reference to the Reference Banks and none or only one of the Reference Banks supplies a rate to the Agent to determine LIBOR for the relevant currency and Interest Period; or

(ii) before close of business in London on the Quotation Day for the relevant Interest Period, the Agent receives notifications from a Lender or Lenders (...) that the cost to it of obtaining matching deposits in the Relevant Interbank Market would be in excess of LIBOR.

11.3 **Alternative basis of interest or funding**

(a) *If a Market Disruption Event occurs and the Agent or the Company so requires, the Agent and the Company shall enter into negotiations (for a period of not more than thirty days) with a view to agreeing a substitute basis for determining the rate of interest.*

(b) *Any alternative basis agreed pursuant to paragraph (a) above shall, with the prior consent of all the Lenders and the Company, be binding on all Parties.*

b) Other Loans to Corporate/Commercial Clients

As regards LIBOR-related commercial loans other than syndicated loans under Swiss law, the following main categories can be distinguished: (i) Loans secured by mortgages (on real property) and Lombard loans. (ii) Other standardized, mostly bilateral commercial loans comprising credit lines to SME but also to major companies and institutional clients. While it can be assumed that the major part of such (framework) agreements can be terminated by both sides upon notice, there remains a certain percentage of agreements with fixed terms (which again can be terms of several years). Also with respect to such agreements, certain banks have started to include clauses covering LIBOR-discontinuation, but it cannot be excluded, that especially older agreements do not contain specific provisions covering such development.

There is no uniform practice regarding explicit references to LIBOR-BBA / LIBOR. None of the contracts in use by the major players, however, provide for a fall-back mechanism with respect to the reference rate. The general principles of the law of obligations apply. This holds true even if a loan agreement were to confer on the lender a broadly drafted right of extraordinary termination for good cause and also to vest the determination of such good cause in the discretion of the lender. Swiss courts would construe such a clause as a mere reference to the principles of extraordinary termination of contract as embodied in the general law of obligations (Stöckli, p. 16).

c) Loans to Private Clients

The main part of existing LIBOR-related loan agreements with private clients under Swiss law comprises loans secured by mortgages (on real property). To a certain extent, there are also Lombard loans granted to private clients referring to LIBOR. Among all these agreements there is a substantial part of existing contracts with fixed terms. As regards the duration however there is a wide variation (such contracts may have fixed terms of up to 10 years or even more). While certain banks have started to include clauses covering LIBOR-discontinuation it is to be expected that especially in the mortgage area and in older agreements there are no specific provisions considering changes with respect to LIBOR and its availability.

Festvorschüsse

Der Zinssatz setzt sich jeweils aus LIBOR+% zusammen, falls ein LIBOR für die nachgefragte Währung und Laufzeit verfügbar ist. Falls kein LIBOR für diese Währung und Laufzeit verfügbar ist, wird der Zinssatz durch die Bank*

festgelegt und richtet sich unter anderem nach den Verhältnissen am Geld- und Kapitalmarkt (unter Berücksichtigung von Laufzeit und Währung).

Die London Interbank Offered Rate ("LIBOR**") entspricht der Kursnotierung der British Bankers Association um 11:00 Uhr Londoner Zeit gemäss Bloomberg-Seite BBAM 1 für die Währung und Laufzeit, unter welcher der Festvorschuss abgeschlossen ist.*

Translation:

Fixed Advances

The interest rate is given by LIBOR+%, if and where a LIBOR is available for the requested currency and term. Where a LIBOR is not available for the requested currency and duration, the interest rate is determined by the bank with regard to the conditions prevailing in the money markets and the capital markets (taking into account currency and duration of the loan).*

The London Interbank Offered Rate ("LIBOR**") is herein defined as the rate for deposits in the requested currency for the a period corresponding to the duration of the Fixed Advance set by the British Bankers Association at 11:00 a.m., London time, as it appears on Bloomberg screen BBAM 1.*

2.2 Bonds / Capital Market Products

a) Floating Rate Notes

We have reviewed the terms of floating rate notes issued under English law, but have not seen notes issued under Swiss law. The analysis of terms drafted under English law is outside the scope of this report.

b) LIBOR Cap Warrants

LIBOR Cap warrants are marketed in particular as knock-in call options on LIBOR to home buyers with LIBOR-referenced floater mortgages. Without prejudice to further offerings, we limit the description to the terms underlying such warrants offered by two major players in the Swiss market ("**Warrant 1**" and "**Warrant 2**", respectively). In line with the scope of the analysis, the report is limited to warrants that reference CHF LIBOR and provide for the application of Swiss law.

(a) Warrant 1

The terms define the Underlying as:

The Underlying means the 3 Month CHF LIBOR (London Interbank Offered Rate). The rate represents the daily fixed reference rate in the interbank market which is fixed on every business day at 11:00 hrs London time.

Regarding the Price of the Underlying, the terms set forth:

The Price of the Underlying means the price of the Underlying as published on the Relevant Screen Page or a substitute page thereof.

If no such offered quotation appears on the Screen Page as at the Specified Time, the Calculation Agent shall request offices of four banks whose offered rates were used to determine such quotation when such quotation last appeared on the Screen Page (the

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"Reference Banks") to provide the Calculation Agent with its offered quotation (expressed as a percentage rate per annum) for deposits in the Currency for the relevant Interest Period (as defined above) to leading banks in the London interbank market (the **"Relevant Market"**) at approximately the Specified Time on the relevant Fixing Date.

If two or more of the Reference Banks provide the Calculation Agent with such offered quotations, the Reference Rate for such Interest Period shall be the arithmetic mean of such offered quotations, as determined by the Calculation Agent.

If on any Fixing Date only one or none of the Reference Banks provides the Calculation Agent with such offered quotations, the Rate of Interest for the relevant Interest Period shall be the rate per annum which the Calculation Agent determines as being the arithmetic mean (rounded if necessary as specified above) of the rates, as communicated to (and at the request of) the Calculation Agent by the Reference Banks or any two or more of them, at which such banks were offered, as at the Specified Time on the relevant Interest Determination Date, deposits in the Currency for the relevant Interest Period by leading banks in the Relevant Market or, if fewer than two of the Reference Banks provide the Calculation Agent with such offered rates, the offered rate for deposits in the Currency for the relevant Interest Period, or the arithmetic mean (rounded as provided above) of the offered rates for deposits in the Currency for the relevant Interest Period, at which, on the relevant Interest Determination Date, any one or more banks (which bank or banks is or are in the opinion of the Calculation Agent and the Issuer suitable for such purpose) inform(s) the Calculation Agent it is or they are quoting to leading banks in the Relevant Market (or, as the case may be, the quotations of such bank or banks to the Calculation Agent). If the Rate of Interest cannot be determined in accordance with the foregoing provisions of this paragraph, the Rate of Interest shall be the offered quotation or the arithmetic mean of the offered quotations on the Screen Page, as described above, on the last day preceding the Fixing Date on which such quotations were offered plus the Margin (though substituting, where a different Margin is to be applied to the relevant Interest Period from that which applied to the last preceding Interest Period, the Margin relating to the relevant Interest Period in place of the Margin relating to that last preceding Interest Period).

§ 6 provides additional fall-back:

§ 6

Adjustments; Substitute Reference Market

(1) If, in the opinion of the Issuer and the Calculation Agent at their reasonable discretion, a material change in the market conditions occurred in relation to the Relevant Reference Market relevant for the calculation and determination of the price of the reference rate used as the Underlying, the Issuer shall be entitled to effect adjustments to these Conditions to account for these changed market conditions.

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For the purpose of making any adjustment, the Issuer and the Calculation Agent shall at their reasonable discretion determine an adjusted value per unit of the reference rate as the basis of the determination of the Price of the Underlying, which in its result corresponds with the economic result prior to this change, and shall, taking into account the time the change occurred, determine the day, on which the adjusted value per unit of the reference rate shall apply for the first time. The adjusted value per unit of the Underlying as well as the date of its first application shall be published without undue delay pursuant to § 11 of these Conditions.

*(3) If the calculation or publication of the reference rate in the Relevant Reference Market is permanently discontinued while concurrently a calculation and publication is started up or maintained on another reference market, the Issuer shall be entitled to stipulate such other reference market as the new relevant reference market (the "**Substitute Reference Market**") through publication in accordance with § 11 of these Conditions, provided that the Issuer has not terminated the Securities in accordance with § 7 a of these Conditions. In case of such a substitution any reference in these Conditions to the Relevant Reference Market thereafter shall be deemed to refer to the Substitute Reference Market. The adjustment described above shall be published in accordance with § 11 of these Conditions upon the expiry of one month following the permanent discontinuation of the calculation and publication of the Underlying in the Relevant Reference Market at the latest.*

(4) Adjustments and determinations pursuant to the paragraphs above shall be effected by the Issuer or, as the case may be, by the Calculation Agent, at its reasonable discretion, under consideration of the market conditions then prevailing and preserving the value of the previous economic development of the Securities. The Issuer reserves the right to determine at its reasonable discretion in cases of doubt the required adjustment. Any adjustment or determination shall be published by the Issuer in accordance with § 11 of these Conditions and shall be final, conclusive and binding on all parties, except where there is a manifest error.

(5) The Issuer's right of termination in accordance with § 7a of these Conditions remains unaffected.

§ 7a references disruptions in the publication and/or determination of the reference rate as grounds for termination by the issuer:

§ 7a

Termination

*(1) If any of the following Termination Events, as exemplary described below, occurs at any time, the Issuer shall be entitled, but not obliged, to terminate the Securities by way of publication pursuant to § 11 of these Conditions, specifying the Termination Event (the "**Termination**"):*

*A "**Termination Event**", in relation to a reference rate used as the Underlying means any of the following events:*

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(i) The determination and/or publication of the Price of the reference rate is discontinued permanently, or the Issuer or the Calculation Agent obtains knowledge about the intention to do so.

(ii) It is, in the opinion of the Issuer and the Calculation Agent at their reasonable discretion, not possible, for whatever reason, to make adjustments to these Conditions.

(iii) In the opinion of the Issuer and the Calculation Agent at their reasonable discretion, another material change in the market conditions occurred in relation to the Relevant Reference Market.

(2) The Termination shall be effected within one month following the occurrence of the Termination Event and shall specify the calendar day, on which the Termination becomes effective (the "**Termination Date**"). In cases of doubt, the Issuer reserves the right to determine at its reasonable discretion the occurrence of a Termination Event.

(3) In case of Termination the Issuer shall pay to each Security holder an amount in the Settlement Currency with respect to each Security it holds, which is determined by the Calculation Agent at its reasonable discretion and, if applicable, considering the then prevailing Price of the Underlying and the expenses of the Issuer caused by the Termination, as the fair market price of a Security at the occurrence of Termination (the "**Termination Amount**").

§ 8 is a market disruption clause:

§ 8

Market Disruptions

(1) If, in the opinion of the Issuer and the Calculation Agent at their reasonable discretion, a Market Disruption (§ 8 (3)) prevails on the Fixing Date, the Fixing Date shall be postponed to the next succeeding Business Day, on which no Market Disruption prevails. The Issuer shall endeavor to notify the parties pursuant to § 11 of these Conditions without delay of the occurrence of a Market Disruption. However, there is no notification obligation.

(2) If the Fixing Date has been postponed, due to the provisions of § 8 (1), by eight Business Days, and if the Market Disruption continues to prevail on this day, this day shall be deemed to be the relevant Fixing Date. No further postponement shall take place. The Issuer and the Calculation Agent will then, at their reasonable discretion and taking into account (i) the market conditions then prevailing and (ii) such other conditions or factors as the Issuer and the Calculation Agent reasonably consider to be relevant, estimate the Price of the Underlying in relation to the postponed Fixing Date (which for the avoidance of doubt could be zero (0)) on the basis of the last announced Prices of the Underlying.

If, in the opinion of the Issuer and the Calculation Agent at their reasonable discretion, an estimate of the Price of the Underlying is, for whatsoever reason, not possible, the Issuer and the Calculation Agent will, at their reasonable discretion and taking into account (i) the

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market conditions then prevailing, (ii) such other conditions or factors as the Issuer and the Calculation Agent reasonably consider to be relevant and (iii) the expenses of the Issuer, if any, caused by the Market Disruption, determine whether and in which amount, if applicable, the Issuer will make payment of an amount in the Settlement Currency. The provisions of these Conditions relating to the Settlement Amount shall apply mutatis mutandis to such payment.

(3) A „**Market Disruption**“ shall mean in relation to an interest rate used as the Underlying:

(a) a suspension or a failure of the announcement of the Price of the Underlying on any Fixing Date relevant for the determining the Settlement Amount or the Termination Amount, as the case may be, or

(b) a limitation, suspension or disruption of or, subject to Para. (4), a restriction imposed on trading, the latter of which the Issuer and the Calculation Agent consider significant,

(i) on the Relevant Reference Market in general (whether by movements in price exceeding limits permitted by the Relevant Reference Market or otherwise), or

(ii) on the Relevant Reference Market in relation to the interest rate, provided that a major number or a major part is concerned (a number or part in excess of 20 % shall be deemed material), (whether by movements in price exceeding limits permitted by the Relevant Reference Market or otherwise), or

(iii) due to a directive of an authority or of the Relevant Reference Market (whether by movements in price exceeding limits permitted by the Relevant Reference Market or otherwise) or due to a moratorium, which is declared in respect of banking activities in the country, in which the Relevant Reference Market is located, or due to any other reasons whatsoever,

(c) a significant change in the method of price determination or in the trading conditions relating to the interest rate on the Relevant Reference Market (e.g. in terms of the composition, the quantity or the dealing currency).

(d) The occurrence of any other event that, in the opinion of the Issuer and the Calculation Agent at their reasonable discretion, disrupts or impairs the ability of market participants in general to effect transactions in, or obtain market values for the Underlying.

(b) Warrant 2

III. E. a) oo) (ii) provides:

Tritt während der Laufzeit einer Derivateserie (i) bezüglich eines Basiswertes oder der Komponente eines Basiswertes ein (a) in Abschnitt IV beschriebenes ausserordentliches Ereignis ein, (b) ein in

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den Endgültigen Bedingungen (Final Terms) einer Derivateserie beschriebenes ausserordentliches Ereignis ein oder (c) stellt die Emittentin oder die Berechnungsstelle nach freiem Ermessen fest, dass der Basiswert oder die Komponente eines Basiswertes – aus welchen Gründen auch immer – nicht mehr vergleichbar ist mit dem Basiswert zum Zeitpunkt der Emission oder tritt (ii) irgend ein anderes ausserordentliches Ereignis (force majeure) ein, welches es der Emittentin verunmöglicht oder übermässig erschwert, die Rechte aus den Derivaten zu erfüllen oder den Wert der Derivate zu bestimmen, trifft die Emittentin, nach freiem Ermessen die geeigneten Massnahmen und hat, falls notwendig die Bedingungen der Derivate nach freiem Ermessen derart anzupassen, dass der wirtschaftliche Wert des Derivats nach dem Eintritt des Ereignisses so weit möglich dem wirtschaftlichen Wert des Derivats vor Eintritt des Ereignisses entspricht. Spezifische Anpassungsregeln für einzelne Arten von Basiswerten im Abschnitt IV oder in den Endgültigen Bedingungen (Final Terms) gehen dieser Bestimmung vor. Anpassungen der Bedingungen von Derivaten sind gemäss Abschnitt III.G.a) mitzuteilen. Ist nach Ansicht der Emittentin eine sachgerechte Anpassung nach Eintritt eines ausserordentlichen Ereignisses, aus welchen Gründen auch immer, nicht möglich, ist die Emittentin berechtigt, die Derivate durch Mitteilung gemäss Abschnitt III.G.a) im Sinne von Abschnitt III.E.a)ff) vorzeitig zu kündigen.

Translation:

If, during the lifetime of a series of derivatives

(i) with respect to the Underlying or a component of the Underlying

(a) an extraordinary event of a kind specified in Section IV, or

(b) an extraordinary event of a kind specified in the Final Terms of a series, occurs, or

(c) where the Issuer oder the Calculation Agent determines in good faith that the Underlying or a component of the Underlying is no longer comparable to the Underlying at the time of issuance or

(ii) where any other extraordinary event (force majeure) occurs which makes it impossible or impracticable for the Issuer to perform its obligation under the Derivative or to determine the value of the Derivative,

the Issuer will take such measures as it deems appropriate in the loyal exercise of its discretion and will, if so necessary and without prejudice to specific adaptation clauses as provided for in Section IV or the Final Terms, amend the terms of the Derivative in its reasonable discretion such that the economic value of the Derivative after the occurrence of the extraordinary event corresponds as much as possible to the economic value of the Derivative prior to the occurrence of the extraordinary event. Amendments to the terms of a Derivative are to be notified in accordance with Section III.G.a).

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Where the Issuer determines, in its reasonable discretion, that, for whatever reason, the effects of the extraordinary event cannot properly be accounted for by way of amendment to the terms, the Issuer may declare early termination as in Section III.E.a)ff) by way of notice pursuant to Section III.G.a).

III. E. a) rr) provides:

Die Ereignisse, die zu einer Veränderung des Basiswertes oder einer Komponente eines Basiswertes führen sowie die Auswirkungen des Eintritts eines solchen Ereignisses auf die Bedingungen der Derivate sind im Abschnitt „Angaben zu den Basiswerten“ geregelt (vgl. Abschnitt IV).

Darüber hinausgehend ist die Emittentin berechtigt, die Bedingungen der Derivate bei Eintritt eines Anpassungsereignisses gemäss Abschnitt III.E.a)oo) nach freiem Ermessen anzupassen.

Translation:

The events leading to a change in the value of the Underlying or a component of the Underlying and the impact on the terms of the Derivative of such an event occurring are set forth in the Section „Provisions regarding the various Underlyings“ (cf. Section IV).

In addition, the Issuer shall be entitled, upon the occurrence of an event of amendment, to amend the terms of the Derivatives as it deems appropriate in good faith and in the reasonable exercise of its discretion pursuant to Section III.E.a)oo).

III. E. b) aa) (v) provides:

Ist nach Ansicht der Emittentin oder der Berechnungsstelle nach Eintritt einer Marktstörung (vgl. Abschnitt IV.A.b)) oder eines ausserordentlichen Ereignisses (vgl. Abschnitt III.E.a)oo)(ii)), welches nach dem Ermessen der Emittentin oder der Berechnungsstelle eine Anpassung der Bedingungen des Warrants erforderlich machen würde, eine sachgerechte Anpassung der Bedingungen eines Warrants, aus welchen Gründen auch immer, nicht möglich, ist sie berechtigt, aber nicht verpflichtet, die Warrants vorzeitig zu kündigen.

Translation:

If, upon the occurrence of a Market Disruption (cf. Section IV.A.b)) or the occurrence of an event which would in the reasonable discretion of the Issuer or the Calculation Agent call for an amendment of the terms of the Warrant (cf. Section III.E.a)oo)(ii)), it is not possible, in the reasonable discretion of the Issuer or the Calculation Agent for whatever reason to appropriately amend the terms, the Issuer shall be entitled, but not obliged, to declare early termination of the Warrants.

IV. A. c) aa) (vi) defines the notion of market disruption with respect to interest rate derivatives:

(...) der Referenzzinssatz, auf den sich das Derivat bezieht, einen Wert kleiner als Null („0“) annimmt.

Translation:

(...) the reference interest rate underlying the derivative takes on a value inferior to Zero („0“).

Translation:

(...) the reference interest rate underlying the derivative takes value inferior to Zero („0“).

2.3 Derivatives and other OTC Contracts

a) ISDA Standard Contracts and Definitions

In practice, the law governing an ISDA Master Agreement is either English law or the law of the State of New York. Although an analysis is thus outside the scope of this report, for the sake of completeness, we shall nevertheless set forth the pertinent definitions and fall-back provisions.

The ISDA documentation suite is in use both domestically and for cross-border transactions. Regarding interest rate swaps, the 2006 ISDA Definitions provide (under “Article 7 Calculation of Rates for Certain Floating Rate Options”) the definition of the LIBOR Floating Option (7.1.(y)(i)) as well as a fall-back procedure (7.1.(y)(iii)).

Art. 7.1(y)(i) sets forth:

“CHF-LIBOR-BBA” means that the rate for a Reset Date will be the rate for deposits in Swiss Francs for a period of the Designated Maturity which appears on the Reuters Screen LIBOR02 Page as of 11:00 a.m., London time, on the day that is two London Banking Days preceding that Reset Date. If such rate does not appear on the Reuters Screen LIBOR02 Page, the rate for that Reset Date will be determined as if the parties had specified “CHF-LIBOR-Reference Banks” as the applicable Floating Rate Option.

As a fall-back to the above primary definition, Art. 7.1(y)(iii) provides that:

“CHF-LIBOR-Reference Banks” means that the rate for a Reset Date will be determined on the basis of the rates at which deposits in Swiss Francs are offered by the Reference Banks at approximately 11:00 a.m., London time, on the day that is two London Banking Days preceding that Reset Date to prime banks in the London interbank market for a period of the Designated Maturity commencing on that Reset Date and in a Representative Amount. The Calculation Agent will request the principal London office of each of the Reference Banks to provide a quotation of its rate. If at least two quotations are provided, the rate for that Reset Date will be the arithmetic mean of the quotations. If fewer than two quotations are provided as requested, the rate for that Reset Date will be the arithmetic mean of the rates quoted by major banks in Zurich, selected by the Calculation Agent, at approximately 11:00 a.m., Zurich time, on that Reset Date for loans in Swiss Francs to leading European banks for a period of the Designated Maturity commencing on that Reset Date and in a Representative Amount.

b) Schweizer Rahmenvertrag für OTC-Derivate (Swiss Master Agreement for OVER-THE-COUNTER (OTC) derivative instruments)

In 2003, the Swiss Bankers Association ("**SwissBanking**") published an amended version of the domestic OTC derivative documentation first designed by industry participants in 1994. Its significance is purely domestic, where it enjoys a relevant level of acceptance with smaller player. The key players in the domestic market rely on the ISDA documentation.

In form and substance, it emulates the core ISDA standard; the documentation consists of a master agreement, three product type annexes A to C and a credit support annex.

Schedule B 1.2 b) (i) contains the definition of the non-EUR floating rate for interest rate swaps; Schedule B 1.2 b) (iii) is a uniform adverse contingency provision covering the unavailability of either a non-EUR or a EUR floating rate.

Schedule B 1.2 b) (i) compares to "CHF-LIBOR-BBA" in 7.1(y)(i) of the 2006 ISDA definitions.

Schedule B 1.2 (b) (i) sets forth:

In the event that the floating rate payment amount is not denominated in Euro,

*then the floating rate applicable to an interest period will be the rate offered in the interbank market for money market transactions in the relevant currency for the relevant interest period at 11:00 a.m., London time, on the day that is two London banking days preceding the commencement date of the relevant interest period (LIBOR). The Calculation Agent will determine such floating rate based on the BBA Interest Settlement Rate applicable to the interest period specified in the relevant confirmation as published by the British Bankers' Association ("**BBA**") and shall notify the other party of the applicable floating rate.*

Schedule B 1.2 b) (iii) compares to "CHF-LIBOR-Reference Banks" in 7.1(y)(iii) of the 2006 ISDA definitions.

Schedule B 1.2 b) (iii) provides that:

If BBA [or FBE/ACI, respectively], or any other body designated [by them] does not publish the rates referred to in subparagraph (i) [and (ii)] above, the Calculation Agent shall determine the floating rate as the average (rounded upwards to the fifth decimal place) of the rates quoted by four prime banks in the place of payment, selected mutually by both parties, for money market transactions in amounts similar to the agreed notional amount and for the relevant period.

If no agreement can be reached as to the selection of the prime banks, or if, due to other reasons, the Calculation Agent cannot determine the average, then the reference interest rate that was last published for the relevant period by the entities referred to above shall apply.

D.2. Analysis under Swiss Law

3.1 Introduction

Three Benchmark Reforms and three transitional arrangements were reviewed (see **Appendix 1**). Regarding transitional arrangements, there is a clear recommendation to opt for a “deferred start fixed termination date” transition. Any of the Benchmark Reforms would affect CHF LIBOR legacy contracts, some of which contain intricately worded fall-back provisions purportedly addressing adverse contingencies regarding the contractual reference rate.

On this basis, we shall analyze the legal implications of the Benchmark Reforms in greater detail. **Unless otherwise noted, the legal analysis in the following subsections is based on a fictitious *hot switch* transition to a reformed benchmark.** This allows us to illustrate more clearly the potentially relevant principles of Swiss law. The analysis will later be refined so as to base our conclusions on the actual transition recommendation.

a) High Level Summary of Findings

The legal analysis (i.e. the analysis of the contractual fall-back provisions and the general law of obligations) verifies two intuitive hypotheses, both of which had been articulated in oral and written discussions within the CHF work streams early on:

The level of legal uncertainty and the risk of litigious outcomes correlates with the scale of Benchmark Reform: the more the reformed benchmark differs from what LIBOR currently stands for, the higher the level of uncertainty and the more pronounced the risks.

The more sudden the transition, the more drastic the potential consequences.

b) General Observations

The legal risk profile for legacy contracts depends on whether they contain fall-back provisions which would operate to capture the implementation of the contemplated reforms, as well as on the general law of obligations as set forth in the Swiss Code of Obligations (“**CO**”).

The introduction of a new benchmark interest rate methodology gives rise to questions situated at the definitory edges of a number of principles of Swiss contract law. Critically, all of these principles can operate as exceptions to continuity of contracts.

The level of legal uncertainty is potentially higher than during the introduction of the Euro. Continuity of contracts during the introduction of the EURO was guaranteed by a set of (more or less) internationally recognized principles all of which are founded in deference to foreign monetary sovereignty. The replacement of an old currency by a new currency has to be respected by Swiss law, and it is clear that this principle allows for exceptions only in extreme cases.

By contrast, the introduction of a new *private* benchmark interest rate does not invoke questions of international comity in any comparable way, *legally speaking* that is. Thus, private actors are free to test the boundaries of the domestic law of obligations and principles of contract interpretation should they choose to do so for whatever reason.

Figuratively speaking, it is the absence of a unitary sovereign in control of the common good of a nominal benchmark that could result in a higher level uncertainty in the facts underlying the present analysis. Nonetheless, the historical experience of the Economic and Monetary Union and the introduction of the Euro provides examples on how to ease legal uncertainty in the face of far-reaching changes which may inform decision making in the transition to new benchmark rate configurations.

c) Structure of the Legal Analysis

We begin our analysis by briefly summarizing the (potentially) applicable principles of the Swiss Law of Obligations (**3.2**). Thereafter, we review in greater detail the legal risk profile for legacy contracts which do not contain fall-back provisions (**3.3**). The results of this analysis hold true for legacy contract with fall-back provisions as well; none of the existing fall-back provisions operates to mitigate the overall level of legal uncertainty (**3.4**). Finally, we summarize our (largely identical) findings on these two types of legacy contracts and place the findings in the context of the proposed Benchmark Reforms (**3.5**). Unless otherwise noted, the legal analysis is based on the assumption of a *hot switch* transition.

3.2 Applicable Principles of the Swiss Law of Obligations

Four **mutually exclusive** principles / rules of Swiss law (all of which may effectively operate as exceptions to continuity of contract) could bring about legal uncertainty and litigious activity:

1. Supplementary interpretation of contract ("*ergänzende Vertragsauslegung*")
2. Subsequent Impossibility ("*nachträgliche Unmöglichkeit*"),
3. Clausula rebus sic stantibus, and
4. Error as to the Basis of the Contract ("*Grundlagenirrtum*").

These principles will have to be considered, whether a contract contains a fall-back clause or not, and their examination is central to an assessment of the litigious impact of LIBOR reform. The relevant principles / rules may be summarized as follows:

- **1) Supplementary interpretation of contract ("*ergänzende Vertragsauslegung*")**

Note: Strictly speaking, the following addresses two distinct principles (i) supplementary interpretation of contract and (ii) extraordinary termination of contract for good cause

Supplementary interpretation of contract **ensures continuity of contract** where the terms of the contract can be interpreted as applying to changed circumstances. If such interpretation is not possible, the party negatively affected might have a right to extraordinary **termination of the contract** ("*außerordentliche Kündigung aus wichtigem Grund*").

In interpreting a contract, the express terms of the contract are only the starting point. An a secondary level, one must take into account what these express terms reveal as to the intentions of the parties, the purpose the contractual provisions seen in isolation, as well as the purpose of the terms in their entirety etc. Where circumstances affecting the contractual obligations

are not expressly accounted for, this may result in a gap in the contract. Depending on the intentions of the parties and the purpose of the contract, a gap in the contract can be filled by way of supplementary interpretation.

The only practicable way to fill the gap in the contract would be to reference the new benchmark interest rate; a court could not construct a representative benchmark interest rate by itself.

- **2) Subsequent Impossibility ("nachträgliche Unmöglichkeit"), Article 119 CO**

Article 119 CO excuses performance of a contract if performance becomes subsequently impossible. Assuming no party is at fault, the counterobligation is discharged and the **contract effectively terminated**.

Whilst it can never be impossible in legal terms to perform a payment obligation (as evidenced by the existence of insolvency law), Article 119 CO might nonetheless be invoked on grounds that the claimed impossibility would not relate to the payment obligation as such, but to an underlying method used to quantify the payment obligation.

- **3) Clausula Rebus Sic Stantibus (Alteration of contract)**

The principle of *clausula rebus sic stantibus* enables a party to request a court to **alter the terms of a contract** if the circumstances at the time of performance have profoundly changed since the conclusion of the contract. Where an amendment of the contract is not possible, the **contract can be set aside**.

Application of the principle requires that the fundamental changes in circumstances were unforeseeable at the time of the conclusion and that leaving the contract unchanged would unjustly enrich one of the parties (i.e. that the changes in circumstances fundamentally alters the contractual equilibrium). *Clausula rebus sic stantibus* is applied only exceptionally and has rarely been successfully invoked.

- **4) Error as to the Basis of the Contract ("Grundlagenirrtum"), Articles 23 and 24(1) No. 4 CO**

Article 23 provides that if a party to a contract was acting under a material error when a contract was concluded it is not bound by it. The party may effectively **void the contract**.

Article 24 sets out the matters which may be deemed to amount to a material error. Art. 24(1) No. 4 is an exception to the rule that errors in motive are not material. Exceptionally, where the error relates to facts a party deemed essential to the conclusion of the contract, such error will be held material. Critically, there is authority to the effect that such error may relate to the occurrence or non-occurrence of *future circumstances*.

As initially remarked, all of the above principles provide for exceptions to continuity of contract. How they would operate under one of the contemplated Benchmark Reforms shall be illustrated by way of the following table:

| Principle | <u>Supplemental Interpretation</u> | <u>Subsequent Impossibility</u> | <u>Clausula rebus sic stantibus</u> | <u>Error as to the Basis of the Contract</u> |
|---|---|---|---|---|
| Question | Can the terms of a contract that reference "old" LIBOR be interpreted to the effect that the contract references a reformed benchmark rate that replaces "old" LIBOR? | Is the performance of the payment obligation linked to/calculated on the basis of LIBOR impossible? | Does the implementation of the Benchmark Reform constitute an unforeseeable event so severe that it fundamentally alters the contractual equilibrium? | Does the implementation of the Benchmark Reform constitute an event, the future non-occurrence of which was determinative for the party that is now invoking error? |
| Legal consequence if answer positive | Reference to reformed benchmark, or (if answer negative) party negatively affected may terminate | Non-Performance of floating/variable payment obligation is excused. Counterobligation expires | Contract is amended, or (if amendment not possible) terminated | Party in error may void the contract. |
| Factual consequence under legacy contract | <div style="display: flex; justify-content: space-around;"> <u>Continuity</u> <u>Termination</u> </div> | <u>Termination</u> | <div style="display: flex; justify-content: space-around;"> <u>(Modified) Continuity</u> <u>Termination</u> </div> | <u>Termination</u> |

3.3 Contracts *without* Specific Applicable Clauses

A more detailed analysis of the doctrines / principles of

- Supplemental interpretation of contract (see under **a**)),
- Subsequent impossibility (see under **b**)),
- *Clausula rebus sic stantibus* (see under **c**)), and
- Error as to the Basis of the Contract ("*Grundlagenirrtum*") (see under **d**))

will reveal that all three doctrines bear the potential for litigious outcome. The more the reformed benchmark methodology differs from what LIBOR currently stands for, the greater the risks.

a) Supplemental Interpretation of Contract

If one of the contemplated Benchmark Reforms was implemented in a *hot switch* transition the terms of a contract referencing "old" LIBOR would no longer operate. As it would no longer be possible to quantify the floating leg / variable payment obligation, this could be held to constitute a gap in the contract. Under the rules of supplemental interpretation of contract, the contract would have to be construed so as to fill this gap.

As the only conceivable way of filling a gap in legacy contracts would be to insert a reference to the reformed benchmark interest rate, the essential question to be answered is: *is a reference to the reformed benchmark interest rate in line with the hypothetical will of the parties / the purpose of the contractual term that provides for a reference to LIBOR?*

The answer depends on the circumstances of each individual case. In general, we may distinguish two categories:

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- In the case e.g. of a swap with a floating leg linked to LIBOR, it might be that the purpose of the contract was to gain exposure specifically to "old" LIBOR. Upholding the contract by inserting a reference to the reformed benchmark instead of "old" LIBOR would run counter to this purpose.
- In most cases, however, the purpose of referencing LIBOR is to effect an automatic move of the contractual interest rate along with refinancing costs so as to avoid the need to renegotiate the interest rate / payment obligation to account for changed market conditions. In order to account for this purpose in the face of a Benchmark Reform, it would be necessary to fill the resulting gap by reading the contract as referencing the reformed benchmark rate.

The more the reformed benchmark rate differs from what LIBOR currently stands for, the higher the probability that the party negatively affected will object by claiming that the reference to the reformed benchmark rate is beyond what the parties agreed to at the conclusion of the contract. There being no other practicable way of filling the gap other than a reference to the new benchmark, the party negatively affected could in the end have a right to extraordinary termination of the contract.

LIBOR+ would cause the least problems, SARON and OIS do however bear some potential for legal uncertainty:

- Based on the assumption that LIBOR+ would largely conserve the economic properties of LIBOR, inserting a reference to LIBOR+ into legacy contracts would likely not cause much legal uncertainty. LIBOR+ would constitute the only available officially sanctioned proxy for the market rate, the reference to which the parties agreed upon at the conclusion of the contract. If LIBOR+ is implemented such that it deviates only marginally from LIBOR, there is little chance that a party could successfully object to a supplemental interpretation of the contract.
- Given the fact that SARON and OIS would deviate much more substantially from LIBOR, both in terms of spreads, as well as in terms of volatility, there is some risk that a party could successfully argue that the resulting economic properties of the contract would place it in a situation that it did not sign up to. If successful, the party negatively affected could exercise its right to extraordinary termination of the contract ("*außerordentliche Kündigung*").

b) Subsequent Impossibility

The following observations apply equally to the LIBOR+, SARON and OIS Benchmark Reforms.

A party to a legacy contract which expressly references LIBOR might argue that, due to the discontinuation of LIBOR or the unavailability of screen rates at the start of the transitional period, performance of its obligations is no longer possible.

Whilst we may not discount entirely the possibility of a party seeking excusal of non-performance on grounds of subsequent impossibility (sparing such party the need to substantiate the considerably more refined requirements of the other doctrines herein discussed), we nevertheless consider this a low probability event – the attention of local counsel / legal advisors would most

probably and intuitively focus on the doctrines of *clausula rebus sic stantibus* and error as to the basis of the contract ("*Grundlagenirrtum*").

Nonetheless, the doctrine of subsequent impossibility could be grounds for some legal uncertainty, given that it is less burdensome to invoke than the other doctrines discussed herein. Some actors might also take discussions under US law as historical precedent. Uncertainty over questions of impossibility was one of the principal factors motivating the State of New York to legislate for guaranteed continuity of contract ahead of the introduction of the Euro (Wiegand, p. 83).

In the hypothetical case that a party were to invoke subsequent impossibility, such party would essentially argue that it is impossible to perform the variable payment obligation, its floating component *as defined in the contract* (3 month CHF LIBOR) no longer being published. Assuming such interpretation were correct, non-performance of that party's obligation would be excused, and the counterobligation would also expire. Critically, damages would be conditional on culpability of the party obligated to pay the floating rate.

The Swiss law of obligations reserves the doctrine of subsequent impossibility to more clear-cut cases. In analyzing the subsequent impossibility of an obligation to perform, the precise delineation of the obligation, of what is owed *under the contract*, is critical.

In all contracts under consideration, the payment obligation, in terms of the law of obligations, constitutes an *obligation to pay* a sum of money. The *quantification* of that obligation is not vested in the payer of the floating rate:

Where the parties have incorporated a reference rate, it is in the very nature of such *deference to an external calculation* that the calculation is not owed by the payer. Applying the rules on subsequent impossibility correctly, the *factual* impossibility of quantifying the payment obligation should not be held to constitute an event of impossibility *legally speaking*.

As initially remarked, the potential for litigious outcomes cannot be discounted entirely. For illustration, we refer to a 2013 decision by a German Appellate Court (Frankfurt Appellate Court, 22 February 2013, docket number 10 U 47/11) applying the identical doctrine of subsequent impossibility under the German law of obligations. In this case, the quantification of payments owed by the counterparty to an index certificate became impossible because the index publisher fell insolvent and the index ceased to be published (emphasis added):

Hat eine Bank Schuldverschreibungen in Form von Indexzertifikaten emittiert, deren Wert an einen Referenz-Index anknüpft, der sich ausweislich des Konditionenblattes auf die Wertentwicklung eines Hedge-Fonds Portfolios beziehen sollte, und wurden Index und Portfolio von derselben Gesellschaft ("Investmentmanager" or "Indexsponsor") gemanagt, über deren Vermögen später das Insolvenzverfahren eröffnet wurde, ist die Emissionsbank dem Erwerber der Zertifikate nicht gem. §§ 275 I, 311a Abs. 2 BGB schadensersatzpflichtig, weil ihre Verpflichtung auf eine unmögliche Leistung gerichtet wäre denn die Feststellung des Index und des Werts der Zertifikate sind von der Bank nicht als Hauptleistungspflicht geschuldet. Die Hauptleistungspflicht der Bank i.S.d. § 793 BGB ist die

Erfüllung des Zahlungsverprechens. Dieses ist ihr nach wie vor möglich. Dass der Index möglicherweise am Ende der Laufzeit mangels feststellbaren Werts "0" beträgt, ist nicht mit Unmöglichkeit gleichzusetzen.

Translation:

Where a bank has issued negotiable instruments in the form of index certificates whose value is linked to a reference index, which reference index, as provided in the term sheet, is coupled to the performance of a hedge fund portfolio, and where the index and the portfolio are both managed by the same company ("Investment Manager" or "Index Sponsor") and where that company falls insolvent, the issuing bank is not liable for damages to the holder of the certificates under the doctrine of impossibility for not being able to perform its main obligation, because neither the determination of the value of the index, nor the valuation of the certificate are owed by the bank. The obligation of the bank within the meaning of Sec. 793 Civil Code is the performance of the payment obligation. The performance of that obligation is still possible. The fact that the index, for lack of a quantifiable value has to be assigned a value of "0" does not constitute impossibility within the meaning of the law of obligations.

c) Clausula Rebus Sic Stantibus

The principle *clausula rebus sic stantibus* seeks to account for changed circumstances which dramatically affect the equilibrium of contractual obligations primarily by amending the terms such that the disequilibrium brought about by the changes remains within acceptable bounds. Only as a last resort, i.e. where it is not possible to amend the terms of the contract, are the parties relieved of their obligations.

The fact that *clausula rebus sic stantibus* is premised on how materially a change in circumstances impacts on the balance of contractual obligations means that the impact of the Benchmark Reforms under this element of Swiss law is best thought of along a continuum:

- As LIBOR+ largely conserves the economic properties of current benchmark practices, there is little reason to assume that its implementation would cause serious problems under *clausula rebus sic stantibus*,
- The same does not hold true for SAR and OIS, as these Benchmark Reforms constitute a significant departure from what LIBOR currently stands for. Consequently, their implementation could provoke a substantial number of market actors to seek amendment of their contracts. The more pronounced impact of these Benchmark Reforms on the economic properties of the contracts also means that these actors have a higher incentive to incur the costs of litigation.

(a) No Unilateral Amendment of Contract

As an initial observation, where it is sometimes stated that the doctrine of *clausula rebus sic stantibus* enables a party *unilaterally* to alter a contract, this deserves some clarification. A *unilateral* alteration of the contract strictly speaking is possible only where a corresponding fall-back provision exists, where it is triggered, and where the

resulting amendment stands the test of having been undertaken reasonably and in good faith. Conversely, where such a fall-back provision is absent or not triggered, the doctrine of *clausula rebus sic stantibus* only provides for a right to claim for an amendment of the contract; it is not possible for a party to simply declare the terms of the contract changed; where the parties don't agree, the matter remains for a court to decide.

(b) Distinguishing Clausula Rebus Sic Stantibus from Error as to the Basis of the Contract ("*Grundlagenirrtum*")

Under the jurisprudence of the Federal Supreme Court of Switzerland errors relating to *future* circumstances can be held to constitute the basis of an error as to the basis of the contract ("*Grundlagenirrtum*") (Schwenzer, p. 286). In particular, an error referring to *future circumstances* in this sense may materialize in the erroneous assumption of a party to the effect that a future event (e.g. the discontinuation of the benchmark interest rate referenced in the contract) would not occur (Bucher, p. 205).

Consequently, the distinction between the doctrine of *clausula rebus sic stantibus* on the one hand, and the rules on error as to the basis of the contract ("*Grundlagenirrtum*") on the other, is as follows:

- *Clausula rebus sic stantibus* applies to material changes in circumstances which could not be foreseen when the contract was concluded and which the parties did not contemplate,
- the rules on error as to the basis of the contract ("*Grundlagenirrtum*") apply to future circumstances which a party expect would (not) occur, and where the *erroneous assumptions* of the party were *determinative* for it entering into the contract such that it would not have concluded the contract (or contracted on different terms), and where the fundamental importance of that party's assumptions is in line with how a hypothetical reasonable person in lieu of that party would have assessed the situation.

(i) Conditions for Invoking Clausula Rebus Sic Stantibus

As we have set out in the introductory remarks, *clausula rebus sic stantibus* applies to changes in circumstances which could not be foreseen when the contract was concluded *and which the parties did not contemplate*.

The changed circumstances must be such that performance of the contract becomes **excessively onerous**. Performance of the contract becomes excessively onerous where the change in circumstances brings about a **major imbalance** in the contract.

(ii) Major Imbalance in the Contract as a Consequence of Benchmark Reforms?

Upon an initial clarification sub **(A)**, we set out sub **(B)** why the implementation of any of the Benchmark Reforms would bring about a *major imbalance* in the contract (this is not to say that the contract would be set aside).

(A) Caveat

Before analyzing the question in more detail, we shall point out that whether any of the contemplated Benchmark Reforms would result in a *major imbalance* to the contract and consequently open the door to disputes under *clausula rebus sic stantibus* is not a matter of clear-cut considerations. The answer, however, is in no way determinative for the assessment of the level of legal uncertainty and the associated risk of litigation. Hence, we must not opine definitively on the applicability of *clausula rebus sic stantibus* and inquire whether the impact of Benchmark Reform would be held to severely impact on the contractual equilibrium.

The reason why the question of a major imbalance to the contract is not determinative for our risk analysis is that the same questions discussed hereinforth sub (e) would arise *mutatis mutandis* under the topic of supplementary interpretation of contract. In other words: whether the economic impact of a Benchmark Reform is normatively analyzed under the header “supplementary interpretation of contract” or “amendment of a fundamentally altered contract” does not change the ultimate question, and the potential of that core issue to spark litigious outcome: ***is the impact of a Benchmark Reform so severe that it makes sense to uphold the contract in the face of its consequences?*** (in the same vein with respect to the introduction of the Euro, Clausius, p. 3150)

Under a *clausula rebus sic stantibus* analysis, the core question is whether the contract can be amended by substituting the reference to “old” LIBOR by a reference to the reformed benchmark rate, failing which the contract will be brought to an end. If one were to proceed under the rules of supplementary contract interpretation, the core question would be whether the reference to “old” LIBOR may be construed as containing an implicit reference to the new benchmark interest rate, failing which the party negatively affected would be entitled to terminate the contract (“außerordentliche Kündigung” – *extraordinary termination*).

(B) Major Imbalance

All legal systems provide for rules similar to *clausula rebus sic stantibus*, i.e. rules that deal with changes in circumstances that bring about *major imbalances* in the contract. The rules are generically referred to as the doctrine of *hardship* (notwithstanding the fact that this term does not have a fixed connotation in English law). A comparative evaluation of international jurisprudence on *hardship* shows that a *major imbalance* in the

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contract is hardly ever deemed to have occurred if the change in circumstances brings about an alteration of less than 50% of the contractual price, value or consideration (Girsberger/Zapolskis, p. 136).

Assuming however that the contract cannot be interpreted as containing a reference to the closest approximation of the market rate for the respective currency and tenor irrespective of how that rate is calculated, the disappearance of the old rate would in effect bring about such a *major imbalance*:

As we have shown, the immediate replacement of "old" LIBOR with LIBOR+ or a *hot switch* to SARON or OIS would not make performance of the floating rate payment impossible *legally speaking*. This is true even though it would no longer be possible to quantify such payment obligation.

Depending on the type of contract, either of two consequences would materialize:

- in a hypothetical contract with a "pure" LIBOR floating leg, the floating leg would have to be assigned the value "0",
- in case of a contract with a variable payment obligation of e.g. LIBOR+4 %, the hereunto floating payment obligation would become a fixed payment obligation determined solely on the basis of a 4 % interest rate.

In both cases, the disappearance of "old" LIBOR evidently causes a fundamental shift in the contractual equilibrium in terms of the payments exchanged.

(e) Judicial Amendment of Contract or Setting Aside of Contract

If *clausula rebus sic stantibus* is successfully invoked, a judge has discretion to amend the terms of the contract so as to bring the equilibrium back within acceptable bounds.

Notwithstanding delicate doctrinal considerations in other cases, the only conceivable way to effectively amend the contracts that are the subject of this analysis would be to replace the reference to "old" LIBOR by a reference to the new benchmark interest rate. The essential question then becomes whether the contract so amended would still constitute that which the parties initially contracted for (this is no different – *for the purposes of high level risk assessment* – from the analysis that would have to be conducted under the rules of supplementary interpretation of contract).

At first approximation, none of the contemplated reforms would be incompatible with the original equilibrium, even if the value of the reference rate were to contain a minor spread when compared to a hypothetical "old" LIBOR at the same point in time.

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A judge might ask the following control question: should it make a difference whether a slight rise/drop in the reference rate occurs due to changes in monetary policy or due to changes in the calculation methodology of that rate?

Against the backdrop of a rather restrictive jurisprudence in matters of *clausula rebus sic stantibus*, we submit the answer would be in the negative, unless the party invoking hardship is able to substantiate the contract establishes the rate methodology itself as material.

Clausula rebus sic stantibus is applied such that it is concerned with the effect of changed circumstances on the *economic* balance of the contract. Whether or not any expectations the parties may have held with respect to external circumstances are falsified is not the subject of this doctrine.

This is not to deny that a Benchmark Reform built on a materially different methodology such as

- SARON or
- OIS

would be situated at the (blurred) edges of the doctrine of *clausula rebus sic stantibus*. Depending on the circumstances, a party could feel entitled to argue that the contract cannot be amended by reference to that rate and needs to be terminated.

For instance, if SARON or OIS resulted in a spread over the risk free rate substantially higher than the spread indicated by the common bank risk contained in LIBOR, the ensuing balance of obligations could in theory be held to constitute an economic result materially different from the one the parties bargained for.

(f) Exclusion of Speculative Contracts not Applicable

Clausula rebus sic stantibus may not be invoked to avoid bad bargains due to changed circumstances under speculative contracts (in lieu of all, cf. Wiegand, in: Honsell et al., Art. 18 No 103). In other words, where the contract provides (whether explicitly or implicitly) that the party negatively affected is to bear the risk of a change in those circumstances which gives rise to the dispute, such party may not invoke the doctrine in order to have the contract amended.

Under the facts presented, this exception would not, however, operate to exclude OTC derivatives, other "speculative" OTC contracts and LIBOR Cap warrants from the material scope of application of *clausula rebus sic stantibus*.

This would (potentially) only be the case where unforeseen circumstances affected the floating payment whilst the reference rate *agreed upon* remained unchanged. In the facts presented, however, it is the reference rate itself as the object of the speculation that changes. This is a risk that none of the parties can be said to have assumed at the formation of the contract.

d) Error as to the Basis of the Contract ("*Grundlagenirrtum*")

The following observations apply to all Benchmark Reforms. Even so, the risk of attempts to set aside contracts on grounds of error as to the basis of the contract ("*Grundlagenirrtum*") increases with every additional deviation from what LIBOR currently stands for.

The general rule regarding errors in motive is set forth in Art. 24(2) Swiss Code of Obligations ("**CO**"):

However, where the error relates solely to the reason for concluding the contract, it is not fundamental.

The exception to this rule, the error as to the basis of the contract ("*Grundlagenirrtum*"), is provided by Art. 24(1) No 4 CO:

An error is fundamental in the following cases in particular: (...)

4. where the error relates to specific facts which the party acting in error considered in good faith to be a necessary basis for the contract.

As No. 4 sets forth in a highly condensed format, invoking a *Grundlagenirrtum*, beyond a causal error, requires the presence of two qualified elements, one subjective ("*considered to be necessary basis*"), one objective in nature ("*in good faith*"), the latter carrying a more pronounced normative imprimatur (and thus open to interpretation).

- Subjectively, the party must be able to assert that it would not have concluded the contract (on the same terms), had it known the correct facts. In other words, the party must assert that its error was determinative for its conclusion of the contract / its acceptance of the contractual terms in question.
- The error must also be material objectively speaking. The control test is a positive answer to the question *would a third person acting in good faith operating under the erroneous assumptions invoked by the party also have held these assumed facts determinative for the conclusion of the contract / its acceptance of the terms in question?*

Applying these criteria, any *hot switch* to a benchmark reference rate calculated on the basis of a different methodology raises the specter of unilateral avoidance of contract on grounds of error as to the basis of the contract ("*Grundlagenirrtum*").

Whilst it may seem a remote possibility for retail customers to argue subjective materiality of the interest rate methodology, the same does not necessarily hold true for commercially sophisticated parties.

It may be a fundamental difference whether the floating rate in a contract is linked to a benchmark interest rate calculated on the basis of secured versus unsecured transactions and whether the transactions are hypothetical or actual observed market transactions.

For the purposes of our risk analysis, the primary question is not whether a Swiss court would be inclined to follow such reasoning (there are, in theory, arguments for both sides, and a somewhat resolute answer presupposes a much more fine-grained analysis). The precise delineation of the doctrine of error is a matter of case law, and the jurisprudence of the Swiss courts in matters of error as to the basis of the contract is all but difficult to condense into a definitive set of rules.

3.4 Contracts Containing Contingency / Fall-Back Provisions

a) Existing Fall-Back Provisions not Applicable

Regarding the impact of the proposed Benchmark Reforms on contracts containing contingency / fallback provisions, the end result of the analysis is no different than for contracts with pre-existing fallback provisions.

None of the existing fallback provisions would capture a proposed Benchmark Reform. The wording of the provisions draws on experiences gained during the recent financial crisis. On a high level of abstraction, the clauses may be portrayed as seeking to address the collapse of interbank lending markets. This is a different set of circumstances from the implementation of a Benchmark Reform, not only in real-life terms, but in legal terms as well.

Seen in isolation, the fact that the contracts address certain contingencies in highly differentiated terms whilst they remain silent on others might well be taken to indicate that each party is to bear individually the consequences of later changes to the contractual reference rate. When placed in the historical context, however, it becomes clear that the parties simply did not contemplate the possibility that the contractual reference rate would ever become the subject of material changes. Put differently, the only assumption that is rightfully attributable to the parties on the basis of their contract is that they assumed their contractual reference rate would remain in existence over the lifetime of the contract (SAR and OIS hypothesis) and not fall subject to far-reaching changes (LIBOR+ hypothesis). How one accounts for this is a matter of the general law of obligations, which provides the principles we have discussed in detail in the analysis of contracts without fall-back provisions.

For a detailed analysis of existing fallback provisions as to their operability, we refer to **Appendix 4**.

b) Impact of Benchmark Reforms under Assumed Operability of Fall-Back Provisions

Even if one assumed that all or some of the existing fall-back provisions were held applicable, the levels of legal uncertainty and litigation risk would ultimately not be materially different from those prevailing with respect to incomplete contracts.

The most common fallback provision in essence vests the right in one party unilaterally to amend the terms of the contract to account for the changed circumstances. This right of unilateral amendment gives rise to the same level of legal uncertainty as the doctrine of *clausula rebus sic stantibus* (see under **a**). Where an amendment of the terms is deemed impossible or impracticable, some of the fallback terms provide for a right of early termination (see under **b**).

(a) Unilateral Amendment of the Contract / Determination of the Floating Rate Obligation

The distinction between a right to unilateral amendment in a fallback provision on the one hand, and judicial amendment on grounds of *clausula rebus sic stantibus* on the other is of limited practical importance in relation to the proposed benchmark reforms.

The criteria to be applied in the final analysis are largely comparable (first bullet point) and regardless of the specific circumstances under which a dispute might arise, it would quickly evolve to such a material analysis (second bullet point).

- Regarding the normative benchmark, a provision vesting in the calculation agent the right to unilaterally alter the terms of a contract on the one hand, and an amendment of the contract via the doctrine of *clausula rebus sic stantibus* on the other, entail similar consequences. Whether expressly clarified in a corresponding fall-back provision or not, a unilateral amendment by the calculation agent may in no case have a negative impact on the economic position of the other party which would be unreasonable or contrary to good faith. Similarly, the doctrine of *clausula rebus sic stantibus* aims precisely to rectify situations in which changed circumstances impact so substantially on one party's position that it would be unreasonable or contrary to good faith to uphold the terms of the contract unchanged. In both cases, there is thus a potential for litigious outcome if one party seeks to reap a windfall gain at the detriment of the other or where such other party opts for a holdup to obtain amended terms more advantageous than the law provides for.
- How potential disputes would play out depends only initially on whether existing fall-back provisions (i.e., clauses that allow for unilateral amendment) operate to capture a modified LIBOR / the introduction of a new reference rate altogether. If a unilateral amendment fall-back provision captures the switch to a new reference rate, the initiative is, in principle, on the calculation agent to declare the terms amended. A potentially costly dispute would only be triggered if a security holder / debtor decided to object and seek materially better terms. The risk of this occurring would seem to depend in particular on the prevailing interest rate conditions and the maturity of the warrant / loan. Conversely, where the calculation agent remains passive upon the introduction of a new reference rate, the initiative would be on the security holder / debtor to invoke the doctrine of *clausula rebus sic stantibus*. The calculation agent could then object by pointing to the existing fall-back provision(s). At some point before the next fixing date, the calculation agent would have to declare an amendment to the contract, thereby provoking a situation not materially different from the initial hypothesis, if the debtor/security holder continues to insist on another solution.

(b) Early Termination

Lastly, some fall-back clauses allow the payer of the floating rate to terminate the contract where, in its reasonable discretion, it is not possible to adapt the terms to the changed circumstances. This is in line with the doctrine of *clausula rebus sic stantibus* where a termination of the contract only occurs if the changed circumstances are so grave that the contractual risk allocation cannot be brought within acceptable bounds. The test is thus essentially similar.

3.5 Summary

The legal analyses of contracts without fall-back provisions (**3.3**) and contracts with fall-back provisions (**3.4**) have shown that this typological distinction is not material to the assessment of litigation risks and the level of legal uncertainty.

The more substantial the Benchmark Reform, the higher the level of legal uncertainty as well as the risk of litigious outcomes. Three principles of Swiss law have to be considered seriously in structuring the transition phase:

- (i) Supplementary Interpretation of Contract,
- (ii) *Clausula rebus sic stantibus*, and
- (iii) Error as to the Basis of the Contract ("*Grundlagenirrtum*").

The principles differ in that

- (i) Supplementary Interpretation of Contract seeks to uphold the contract by filling a gap in its terms. Where it is not possible to interpret the contract accordingly, the party negatively affected may declare termination of the contract.
- (ii) *Clausula rebus sic stantibus* seeks to restore a severely imbalanced contract to an acceptable state, and only where an amendment is not possible to set aside the contract.
- (iii) Error as to the Basis of the Contract ("*Grundlagenirrtum*") enables a party to void the contract.

Regarding their potential to engender legal uncertainty and provoke litigation, all three principles are similar. Their conditions carry a pronounced normative imprimatur that is highly susceptible to argument and their precise scope of application is dependent on the circumstances of every individual case.

a) "Hot Switch" Transition Hypothesis

Under a *hot switch*, any of the Benchmark Reforms has the potential to cause serious legal problems. The more the reformed benchmark deviates from the methodology underlying LIBOR and its economic properties, the more serious its potential impacts. LIBOR+ would cause the least problems.

An immediate implementation of a Benchmark Reform should be accompanied by globally coordinated legislation guaranteeing continuity of contract. This is true even for the set of changes that would be brought about by LIBOR+. Such coordinated legislation would be years in the making whilst still exerting the potential for legal uncertainty in and of itself.

The implementation of any of the Benchmark Reforms submitted by the Reference Rate Menu work stream in a *hot switch* transition would thus constitute the worst outcome in terms of legal risks.

b) Gradual Implementation of Benchmark Reforms

From a legal perspective, the gradual implementation of a Benchmark Reform is the only realistic option.

A gradual phasing out *without* a fixed transition period would be the best solution. If it were possible to keep the "old" LIBOR operational until expiry of all legacy contracts, no serious legal risks would have to be accounted for.

In light of the fact that forcing market participants to continue to submit quotes under the old “LIBOR” over a prolonged period of time would risk creating other problems, implementing the Benchmark Reform over a fixed transition period would seem to constitute a realistic compromise and this is reflected in the final proposal of the Transition Design workstream.

Regarding those legacy contracts whose maturity would extend beyond the transition period, the impacts of SAR and OIS would be more severe than the impact of the LIBOR+ proposal.

D.3. Analysis of Existing Fall-Back Provisions

In the following, we highlight the relevant issues regarding the operability of existing fall-back provisions in the syndicated loan market (4.1), in the terms of widely used exchange-traded derivatives, namely, LIBOR Cap Warrants (4.2), and finally, in the two standard OTC documentation packages used in Switzerland (4.3).

4.1 Fallback Provisions in Syndicated Loan Documentation

As initially has been pointed out, the standard documentation in use in Switzerland is a “light” form of the LMA standard package. Under the LMA Terms, if LIBOR becomes unavailable, quotations from Reference banks are to be sought, and, as a fall-back, the interest is to be calculated on a funding cost basis. Upon request of the Company or the Agent, a market disruption event has to be answered by negotiations with a view to agreeing on an alternative basis of interest.

a) Triggering of the Fall-Back Provisions

Until the July 2013 revision, the LMA Terms define the Screen Rate for LIBOR as *the London interbank-offered rate administered by the British Bankers Association*. In their most recent revision, the LMA terms have been amended such that the Screen Rate for LIBOR is now defined as *the London interbank-offered rate administered by the British Bankers Association (or any other person which takes over the administration of that rate)*. Legacy documents lack this clarification, so the mere fact that LIBOR is no longer under the BBA’s administration may be sufficient in and of itself to trigger the fall-back provisions, and such a literal reading of the contract would be in accordance with the general rules on interpretation of contracts as provided by Swiss law.

Notwithstanding the above, it is improbable that the mere discontinuation of BBA sponsorship would give rise to problems. Rather, fall-back provisions could be triggered where a party believes that the reformed LIBOR no longer corresponds in substance to the LIBOR prevailing at the conclusion of the contract.

b) Operability of the Fall-Back Provisions

Whether or not the Fall-Back Provisions in the LMA documentation would be held applicable to a situation in which a new LIBOR (albeit different economically) is introduced is a point of substantial legal uncertainty, but of great importance, as the second fall-back (cost of funds) vest a unilateral right of price determination in the lender.

If not, the general rules of the Swiss law of obligations would take effect. Due to the overall structure of the clauses, the answer to this question hinges on the definition of a Market Disruption Event. It is questionable whether the introduction of a reformed LIBOR or a different reference altogether would be

held by a Swiss court to constitute a Market Disruption. Not only might the court be inclined to fashion its analysis along the (stricter) lines usually applied to standard terms, it would also take a view to the historical purpose of the market disruption provisions emanating from the 2008/2009 credit crunch – a situation which is altogether not comparable to the LIBOR reforms under discussion here.

In summary, it is conceivable that, if the question were raised in court, the court's analysis would proceed as if no fall-back provisions were present.

c) First Fill-Back: Reference Banks

Practically speaking there is the risk that an insufficient number of Reference banks be willing to provide a quote or that Reference banks decline to provide further quotations altogether (as pointed out in FMLC XII 2012, p. 23 et seq.). In this hypothetical, the determination of the interest rate on a cost of fund basis would be invoked.

d) Second Fall-Back: Cost of Funds

This type of fall-back clause has been described as bearing some potential for litigious outcome under English law (FMLC, Op. Cit., p. 24), and this characterization also holds true under Swiss law. Under the applicable rules on unilateral price determination clauses, a lender could be held to disclose sensitive information in order to substantiate its *individual* cost of funding. As the documentation clearly reflects the practice of matching, there would be little room for a lender to resort to general market conditions as a proxy for its cost of funding.

e) Alternative Basis of Interest or Funding

Agreeing on an alternative basis of interest might prove similarly difficult, and this difficulty could be compounded depending on the internal governance of the syndicate.

f) Summary

In summary, whilst the adverse contingency provisions in LMA or "Swiss Style" LMA documentation do provide some fall-back, they are by no means guaranteed to ensure a smooth transition to a new form of LIBOR/reference rate. All previous observations provided under English law apply *mutatis mutandis* to "Swiss Style" LMA Terms.

4.2 Fall-Back Provisions in LIBOR Cap Warrants

LIBOR Cap or LIBOR Warrants constitute the single most important type of exchange traded derivative linked to LIBOR in Switzerland.

The terms of Warrant 1 and Warrant 2 provided by way of representative examples, although worded differently, provide for the same overall system of fall-back based on the rules on material adverse change as they have developed in the Swiss law of obligations. If these provisions were triggered, the issuer has the right, in *good faith*, to make adjustments to the terms (The terms of Warrant 1 interpose an additional objective fall-back in the form of Reference Banks quotes, and the above comments regarding the corresponding provisions in LMA documentation apply *mutatis mutandis*). Where it deems adjustment impossible, the issuer may declare early termination against payment of a termination amount.

a) Triggering of the Fall-Back Provisions

Unlike legacy LMA / "Swiss Style" LMA documentation, the LIBOR definitions in the final terms of the warrants make no mention of BBA sponsorship. Rather, they define the underlying simply as the 3 Month CHF LIBOR.

Consequently, mere changes to the governance of LIBOR would not suffice to trigger their cascade of contractual contingencies. They could, however, be invoked in case of a material change to LIBOR / the introduction of an altogether new set of reference rates.

b) Operability of the Fall-Back Provisions

The fall-back provisions (again, identical in substance on this point) are conditioned on the presence of

- a material change in the market conditions in relation to the Relevant Reference Market,
- the discontinuation of the calculation or publication of the reference rate in the Relevant Reference Markt and the introduction of the calculation on another reference market, or
- any other event which makes it impossible for the calculation agent to price the derivative.

The introduction of a materially different LIBOR or a new reference rate altogether could be held to fall under the material scope of application of these provisions – although the fact that they give rise to a unilateral right of pricing / early termination certainly would put them under enhanced scrutiny. At first approximation, the Terms of Warrant 2 (III. E. a) oo) (ii) of the issuance program seem to give a clear indication as to the circumstances to which these provisions were intended to apply, namely a situation in which it is *impossible or impracticable for the calculation agent to perform its obligations or to determine the value*. The pricing of the derivative would still be possible, however, namely by determining its value on the basis of the reformed benchmark rate. Whether a reformed benchmark controls is not a question that should be left in the discretion of the issuer / calculation agent.

c) First Fall-Back: Unilateral Adjustment of the Terms

Whilst the terms allowing the calculation agent to adjust the reference rate to account for changed market conditions don't raise the risk of dispute regarding transparency of the counterparty regarding its funding base, considerable room for argument does exist.

Namely, any amendment is a potential subject of judicial review provoked by the holder of the warrant. In determining the payment amount, the calculation agent has to exercise its discretion *reasonably*, has to base it primarily on the prevailing market conditions and may only take into account such other conditions or factors as it *reasonably* considers relevant (Terms of Warrant 1, § 8(2)); in other words, the adjustment must be such that *the economic value of the derivative after the occurrence of the unforeseen event corresponds as much as possible to the economic value of the derivative before the occurrence of the unforeseen event* (Terms of Warrant 2, III. E. a) oo) (ii).

This necessarily generic wording leaves considerable room for interpretation and argument.

d) Second Fall-Back: Unilateral Termination

The terms of Warrant 1 and 2 provide for a right of early termination by the calculation agent (identical with the issuer) where it is, in its reasonable discretion, not possible, for whatever reason, to adjust the terms of the contract.

4.3 Fall-Back Provisions in OTC Derivative Documentation

Regarding the Fall-Back Provisions in the Swiss Master Agreement for OTC Derivatives, the same considerations as under 4.1 and 4.2 above apply. They would most probably not operate to capture a *hot switch* transition to a reformed benchmark rate.

D.4. References

| | |
|----------------------|---|
| Bucher | Eugen Bucher, Schweizerisches Obligationenrecht: Allgemeiner Teil ohne Deliktsrecht (2. Aufl., Zürich 1988). |
| Clausius | Kurt Clausius, Vertragskontinuität und Anpassungsbedarf, Neue Juristische Wochenschrift 1998, 3148-3152. |
| Cunningham/Werlen | Daniel Cunningham/Thomas Werlen, The US prepares for European Emu, 16 Int'l Fin. L. Rev. 23-26 (1997) |
| FMLC XII 2012 | Financial Markets Law Committee, Benchmark Transition: Observations on proposals for benchmark reform (December 2012) |
| Girsberger/Zapolskis | Daniel Girsberger/Paulius Zapolskis, Fundamenal Alteration of the Contractual Equilibrium under Hardship Exemption, 19 Jurisprudencija 121-141 (2012). |
| Honsell et al. | Honsell/Vogt/Wiegand (Hrsg.), Basler Kommentar: Obligationenrecht I, Art. 1–529 OR (5. Aufl., Basel 2011). |
| LMA Terms | Loan Market Association, Multicurrency Term and Revolving Facilities Agreement, Revision as of 30/07/2013. |
| Maurenbrecher/Frick | Maurenbrecher, Benedikt/Frick, Jürg, Konsortialkredite, in Emmenegger (Hrsg.), Kreditrecht: SBT 2010 – Schweizerische Bankrechtstagung 2010 (Basel 2010), 47-101. |
| Ranieri | Filippo Ranieri, Europäisches Obligationenrecht (3. Auflage, Wien et al. 2009). |
| Schwenzer | Schwenzer, Ingeborg, Schweizerisches Obligationenrecht: Allgemeiner Teil (6. Aufl., Bern 2012). |
| Stöckli | Stöckli, Hubert, Der Kreditvertrag, in: Emmenegger (Hrsg.), Kreditrecht: SBT 2010 – Schweizerische Bankrechtstagung 2010 (Basel 2010), 1-17. |
| Weber/Häusermann | Weber, Philippe/Häusermann, Marco, Konsortialkredite, in: Reutter/Werlen (Hrsg.), Kapitalmarkttransaktionen V (Zürich 2010), 1-41. |
| Wiegand | Wolfgang Wiegand, Zivilrechtliche Auswirkungen der Einführung des Euro aus dem Blickwinkel eines Drittstaates, in: Hadding/Hopt/Schimansky (Hrsg.), Einführung des Euro in der Bank- und Unternehmenspraxis; Bankdienstleistungen im Internet: Bankrechtstag 1997 (Berlin 1998), 41-91. |

Appendix E. Outreach Appendix

E.1. List of Outreach Contributors

The group reached out to the following institutions:

- 5 large commercial and private banking players, including their Treasury Management, Debt Capital Market and Syndication desks, and their loan departments (Credit Suisse, Julius Bär, Pictet, UBS, Zürcher Kantonalbank)
- 1 leading broker (Cosmorex)
- 2 large corporates (Nestlé, Novartis)
- 4 insurance companies (Swiss Re, AXA, Swiss Life, Zurich)

2 industry associations (ACI¹¹, Swiss Banking Association) declined to comment because they feel that they do not have any information to add in light of our already broad based survey.

¹¹ ACI: Membership of the Financial Markets Association (Association Cambiste Internationale, ACI) includes affiliated associations in some 65 countries across the world. Each national association serves the local financial community (mainly members working with financial institutions or a financial services provider). Most members work in the financial trading or sales environment in global financial markets.

E.2. Full Questionnaire

Introductory Letter

The Swiss Franc workgroup of the Financial Stability Board (FSB) is writing you to ask for your cooperation with regard to the fact finding process associated with the benchmark reform initiated by the Financial Stability Board (FSB), an organization by the G20 countries.

The FSB has established a high-level Official Sector Steering Group (OSSG) of regulators and central banks, with the responsibility for coordinating reviews of existing interest rate benchmarks and their compliance with IOSCO principles – especially principle 7. The OSSG has established a Market Participants Group (MPG) charged with examining the feasibility and viability of adopting additional reference rates and potential transition issues.

For more information about these efforts and the membership of the OSSG and MPG, please see: http://www.financialstabilityboard.org/publications/r_130829f.pdf

The MPG has concluded that its recommendations to the OSSG would benefit from direct outreach to a diverse set of market participants, organized by region. The Swiss Franc work stream of the MPG will focus primarily on Swiss Franc issues. However, aspects relating to benchmark rates in other currencies are of interest as well.

We would appreciate a discussion with you on these issues. To facilitate our conversation, we have drafted a Conversation Agenda, which we attached to this letter.

Conversation Agenda

- Benchmark rates currently used by your firm:
 - Products that are linked to interest rate benchmarks
 - Name of benchmarks
 - Business driver of position
 - Exposure profile (size by currency and by tenor)
 - Re-set frequency
 - Nature of the link to Libor (based on contract, through mark-to-market processes, accounting treatment or tax effects, other)
 - Nature of the link to CHF Reference Rates
 - Type of legal documentation (adequate long-term fall-back provisions)
 - Potential alternatives to Swiss Franc Libor
 - Do you see alternative benchmarks? If so, please list them
 - Advantages and disadvantages of benchmark rates other than Libor
 - Are there other potential benchmarks if market evolution were to occur
 - General description of benchmark setting needed
 - Which markets could evolve into providing benchmarks
 - What do you see as precondition
 - Impact of a potential change in fixing mechanisms (transition away from Libor)
 - Economic
 - Legal
 - Legacy issues (litigation risk)
 - Renegotiation / Close-out of contracts
 - Administrative burden
 - Accounting (P&L impact etc.)
 - Operational aspects
- What should be considered by the MPG making its recommendation
 - Is there a need for new benchmarks or primarily desire for strengthening of existing ones?
 - Key properties of the ideal benchmark rate(s) for your firm Ideas for improving the existing mechanism or establishing a new benchmark
 - Desired level of government involvement
 - Willingness and flexibility to switch to alternate benchmarks
 - International x-currency coordination
 - Broader market participants inclusion

E.3. Full Report

The complete write-up of the findings of the Swiss Franc outreach workstream is shown.

Benchmark usage by outreach contributors

Products that are linked to interest rate benchmarks, such as Libor

- Retail loans are usually linked to Libor. Retail loans include rollover mortgages, such as a 1-month Libor mortgages, fixed advances and Lombard loans
- Commercial loans and syndicated loans (rollover) are also often linked to Libor
- Plain-vanilla interest rate swaps (IRS), and overnight index swaps (OIS) are always linked to benchmark interest rates. A large variety of interest rate swaps is used by banks to hedge their interest rate exposure. Non-financial corporations appear to focus primarily on plain-vanilla interest rate swaps
- Term loans and term deposits are typically priced using the Libor based IRS curve. Thus, they are linked indirectly to Libor. They are not subject to a regular test, but in the absence of a Libor Based IRS curve another curve would be needed
- Benchmark rates are also often used for pricing internal interest rate curves. The link is not always explicit. Additionally, stakeholders appear reasonably flexible to adapt to any changes to benchmark interest rates. These curves are mostly used for internal funds transfer pricing
- Other instruments that are linked indirectly to Libor include FX-Swaps (1 month to 12 month maturity) and Cross-Currency Swaps (>1y)

Benchmarks used in Switzerland

- Stakeholders mentioned three benchmark reference rates that they use most often: Libor, TOIS and Swiss Average Repo Rates (such as SARON)
- Stakeholder use primarily the US Dollar and Swiss Franc denominated LIBOR rates
- TOIS-Fixing is used as the floating leg in Swiss Franc denominated OIS contracts
- Swiss Average Repo Rates (SAR) are fixed daily by the Swiss Exchange. SAR reference rates are based on transactions on the electronic repo trading platform in Switzerland. Index calculation began in 2009, though index data is available since 1999. SAR are still not referenced in financial products

Business driver for position

- Hedging of assets and liabilities by use of derivatives
- Direct and indirect pricing of client transactions
- Libor / swap and OIS curves are used as basis for transfer pricing
- Long term funding of corporates and banks as bond issuances are usually quoted against the mid-swap rate and are hedged with swaps

Most relevant exposures by instrument and tenor

- Most of the market risks (FX, interest risk and basis risks) are directly or indirectly linked to Libor. These include tenors between 1 month and 30 years
- Loans typically have a maturity of around 5 years (frame contract)
- Interest rate swaps primary in the tenors 3 to 10 years. However, some interest rate swaps have maturities of up to 30 years
- Overnight Index Swaps (OIS) have typical maturities of up to 2 years. Notional appears to be small
- Some stakeholders mentioned that they require a complete curve with fixings at every 1 month point between 1 month and 1 year

Re-set frequency

- 1 day (TOIS)
- 1 month, 3 month, 6 month (LIBOR)

Type of legal documentation (adequate long-term fall-back provisions)

- All stakeholders reported that they use the standard master agreements for virtually all their money market instruments and derivatives. The Swiss local OTC "Rahmenvertrag" is not widely used by the key stakeholders. Smaller players in the domestic market appear to use the "Rahmenvertrag" more
- Most loan contracts (retail and commercial) have no fallback provisions. Where fallback provisions exist, it is unclear whether it is feasible to rely on these provisions over longer periods of time. Fall-back provisions typically rely on the cooperation of banks to quote interest rates that are similar to Libor. Given the recent anonymization of the contribution of Libor rate, it is unlikely that banks will offer such services on a voluntary and regular basis

Potential alternative reference rates

Alternative benchmarks

- Stakeholders are generally of the opinion that Libor must continue to be published. All stakeholders favored a strengthening of the fixing mechanism and of the oversight governing Libor setting
- Stakeholders don't see an obvious IOSCO compliant alternative to Libor
- Alternative interest rates to Libor do exist, but they either fail to follow a proper fixing mechanism or they fail to have sufficient market activity to reliably provide reference rates
- Currently, stakeholders evaluate measures to make the TOIS fixing and SARON (both overnight rates) more robust on the basis of the IOSCO principles. A curve could then be constructed based on swap contracts that reference either TOIS (unsecured) or SARON (secured)

- Stakeholders considered the role of an expert panel to support the fixing of benchmark rates in case too few data points are available. However, it is generally seen that such a panel will suffer from the same weaknesses as Libor has in the past
- Stakeholders did not consider a benchmark rate based on government debt a viable alternative in Switzerland

Advantages and disadvantages of benchmark rates other than Libor

- **OIS (Overnight Indexed Swaps):** Tom/Next (or Overnight) unsecured money market based OIS curves are a potential source of alternative reference rates. However, this is only true as long as the OIS-Swap market is deep and liquid. Unlike current Libor, OIS term rates (example 3 month) do not contain a "liquidity premium". Hence, OIS rates do not fully reflect the refinancing costs of the banking industry. If loans are linked to an OIS rate, the bank bears the volatility of its short term (3-6m) wholesale funding spreads in full. To cover this risk, loans of all durations would likely become more expensive
- **Secured rates:** A secured rate like SARON might serve as a benchmark for the secured funding market. Stakeholders mentioned that SAR are not suited as a benchmark for cost of funding (although banks typically rely on secured funding)

Other potential benchmarks if market evolution were to occur

- Any benchmark setting should be simple and the calculation methodology should be transparent. Ideally it should be transaction-based or based on tradable-quotes in relevant size. Furthermore, reference rates could be enhanced with a broader range of products and market participants (not just unsecured interbank, but also new issuance, secondary market etc.). Stakeholders asked for stringent oversight governance to enhance credibility and reliability of all reference rates
- One participant does not believe that a sensible alternative can be found. Some stakeholders envision using the FX Swap market and a foreign benchmark rate. Most stakeholders take issue with such an approach, because such a solution would introduce basis risk and trigger new challenges when it comes to the technical implementation (limitation of foreign currency management capabilities of market participants). Also, such a curve based on FX swaps would reflect a derivative price curve, which might not be relevant for the pricing of cash instruments
- One participant mentioned that the Libor benchmark could be replaced by a dual-track system with survey-based lending rates running alongside transaction-linked indices. The main advantage of this being that it would not decrease market confidence and not increase expenses relating to changes in the benchmark
- One stakeholder suggested the establishment of an unsecured Swiss interbank rate under Swiss law that incorporates tradable lending quotes to prime counterparties (as opposed to Libor's borrowing rate)
- Banks' willingness to enter into money market transactions is impaired by the leverage and liquidity ratio capital requirements. This also affects their ability to quote reference rates

Transitions

Economic Considerations

- Economic consequences include realized and unrealized losses, opportunity costs as well as an increase in uncertainty. Transaction costs and administrative expenses are considered separately below
- The most frequently mentioned concern is the cost of no longer having access to a Libor fixing. Most contracts do not have adequate fallback provisions and in the relatively rare instance where fallback provisions do exist, they are often not suitable to be relied upon over longer periods of time. A material change or a termination of Libor would lead a number of stakeholders to renegotiate all their contracts. In such a renegotiation one stakeholder would need to compensate his counter-party in the amount equal to any profits that such a contract accumulated over its life time or vice versa. A new contract would then be drafted to replicate the previous risk exposure. Theoretically, such a transaction would compensate both parties fairly. In reality though, many stakeholders fear that they will incur material transaction costs in renegotiations. Additionally, it is unclear whether the new benchmark rate will be able to replicate the same characteristics that Libor represented. Apart from the uncertainty introduced, it will also be non-trivial for many players to determine the fair spread between the old rate and the new rate. Most stakeholders view the cost of the uncertainty introduced as substantial. The longer the transition takes, the higher the cost of the uncertainty becomes
- Banks fear that a transition from Libor toward a new benchmark would materially reduce the number of investors in certain products (loans and derivatives). This may adversely affect a bank's and the general public's ability to transfer risk
- If the change to Libor leaves the fundamental economic properties of Libor intact, most of the above-mentioned concerns become manageable for stakeholders. The economic cost of a moderate change is considered low for most stakeholders
- The fallback provisions in some contracts foresee that banks are asked to provide a benchmark rate if Libor fails to publish. However, it is highly unlikely that banks are willing to quote such benchmark rates

Legal Considerations

- Legal costs include both the cost of possible litigation and the cost of legal advice in renegotiating contracts. Derivatives and loans are typically covered by master agreements. Since the vast majority of market participants hold a portfolio of contracts, there is a strong incentive to mitigate legal risks
- As mentioned above, most contracts would need to be renegotiated, particularly where there is no fall back provision. Due to the number and the notional size of the contracts such an effort would not only absorb a significant amount of capacity in the legal department of stakeholders, but it would also take a significant amount of time
- Should one stakeholder negotiate poorly during the switch to the new contract, litigation could be triggered ex-post. Most stakeholders are not aware of relevant legal precedent for such a situation (though the switch from the European currencies to Euro has been cited by some)

- Contracts that have fallback provisions also face significant litigation risk since such clauses have not been tested in court

Accounting (e.g. P&L impact)

- Economically, stakeholders understand that they could closing out contracts to protect themselves from adverse P&L impact. Thus, most do not expect a P&L impact from closing their position. Furthermore, since no successor benchmark rate has been determined yet, it is hard to quantify the accounting impact of a change
- Most players are concerned about the significant impact of a possible change on IFRS and US-GAAP hedge accounting. Offsetting Libor IRS with "new" IRS may no longer be possible, leading both to growing balance sheets and to more volatile net income
- A renegotiation may accelerate tax recognition and thus lead to costs

Operational aspects

- Any change, even a relatively small change, will lead to significant operational costs. Some stakeholders mentioned IT costs and costs in the back office. Others simply referenced the operational dependencies that developed due to the longstanding consistency of Libor
- While most stakeholders agree that operational costs are significant, some mentioned that they are manageable

Other considerations

Need for new benchmarks or desire for strengthening of existing ones?

- Stakeholders were not unanimous in their assessment of the seriousness of Libor's problems. Some reported to have suspected that large players influenced Libor fixings; others think that manipulation did not move the needle enough to make it a significant issue. However, all agreed that there is significant room for improvement, for more oversight and for more transparency. Most agreed that the fixing mechanism needs to be strengthened

Key properties of the ideal benchmark

- All stakeholders asked for a transparent fixing mechanism, that the rate is based on a liquid and representative market, that was widely accepted and that the fixing is robust to manipulation
- Such a system does not have to use transactions exclusively. It can also include tradable, realistic quotes in sufficient size
- Generally, stakeholders favor a broad range and a large number of market participants that contribute to the benchmark
- Some stakeholders strongly favored simple solutions. More complex solutions (such as FX Swap implied rates) would demand a comprehensive effort to educate the broader public

- Some stakeholders asked for experts that could enhance the quality of any fixing mechanism if a sufficient number of transactions were unavailable. Such experts could draw on other market pools to find an appropriate fixing rate. Some expressed concern that such an expert panel would introduce the same conflict of interest that exists in Libor today
- Many stakeholders mentioned that the government should take some role in strengthening reference rate fixing mechanisms. However, opinions on how far such involvement should go remain divided (see below)

Desired level of government involvement

- Some stakeholders favor international macro-prudential oversight, others wish for oversight by the central bank, again others wish that the Swiss Exchange serves as a central data aggregator and supervisor
- Few consider direct government intervention necessary. No stakeholders find FINMA, the Swiss regulator, an appropriate agent for calculating a benchmark rates. However, a government role in providing a regulatory framework is generally accepted
- Frequently, stakeholders mentioned that an endorsement of a benchmark rate by the Swiss National Bank (SNB) would add credibility. However, most were uncertain about what role the SNB should play exactly in such process. One stakeholder mentioned that significant participants in the Swiss Franc financial markets ought to be compelled to contribute rates for finding benchmark rates

Willingness and flexibility to switch to alternate benchmarks

- Generally, the willingness of stakeholders to switch to a new benchmark was low. Most think that a cost/benefit analysis only warrants a strengthening of the existing benchmark (Libor). The more dramatically benchmark rates are changed, the higher the costs to stakeholders will be
- Most favor a long transition period, where old benchmark rates continue to be fixed and new products based on new benchmark rates will replace the old. However, there is a vocal minority that feels that running a trading book with products based on two different benchmark rates will incur significant basis risk and arbitrage opportunities. Those players will either switch over all at once or stick to the old benchmark as long as possible

International x-currency coordination

- Most stakeholders favour a solution that takes the specific situation of the Swiss market in account. However, given the significant amount of business in other currencies as Euro and US Dollars, they also favour some harmonization between markets

Broader market participants' inclusion

- Most stakeholders find it important that benchmark rates are not only set by a small group of international banks. A large pool of participants would help in restoring trust. This will reduce manipulation opportunities and strengthen the acceptance of the new benchmark among the key players as well as among the broader public.

Market Participants Group on Reforming Interest Rate Benchmarks

JPY Currency Report

March 2014

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Executive Summary

Introduction

The role of the Japanese Yen work stream was to discuss and study potential new indexes which will be IOSCO compliant and primarily anchored in arms-length transactions. The workgroup encountered major headwinds in finding such indexes.

- First of all, Japan fell into a vicious circle and is still struggling to get out of it where the combination of prolonged deflationary economy and the BOJ's accommodative policy led to the mixture of super low rate circumstances and excessive fund-surplus conditions among the corporate and household sectors. Consequently funds-needs in the economy disappeared and there exists few transactions in the short-term money market for the present.
- Secondly, due to those macro-economic and financial environments, financial innovations have been proceeding quite slowly so that we don't sufficiently have financial infrastructure such as data collecting engine, trading platform and so on. Under prolonged slow market conditions, there has been little incentive to develop those infrastructures even compared with other countries.

It is difficult to resolve these issues artificially and immediately, but we recognize it is our responsibility to put the priority on the index-users' convenience and provide the potential framework for indexes anchored by transactions without excessively focusing on the current situations. To do that, we need to use expert judgment with solid governance and study further how to collect transaction data assuming economic recovery and following pickup of financial market activities in the future.

Summary of Major Findings by Workstream

a. Reference Rate Menus

Our recommendation menu is classified into two categories according to its application. In Japan the indirect financing (i.e. bank loans) plays the important role for corporate sector. The existing indexes are primarily used for bank loans. Therefore, when developing a new index, consideration of whether it can be used for bank loans is very important in terms of viability. Taking these into consideration, we separately recommend indexes for transactions linked with bank loans (including derivatives) and indexes for transactions not linked with it while the existing indexes such as TIBOR/YEN LIBOR cover both of these functions. The former is TIBOR+ and Unsecured Interbank Money Rates. The latter is TDB, OIS and Uncollateralized Overnight Call Rate (average).

We originally recommended Synthetic Bank Rates in the interim report which consists of TDB and bank credit component such as bank CP/Bond, but we couldn't find good solution to utilize bank credit component. Therefore, we dropped this menu from our list. Separately we added TIBOR+ which is calculated by a wide range of interbank transactions such as interbank money borrowing, CD/CP and large Term deposit. We have conducted sampling survey of transaction data involving the BOJ. Analysing the survey data, it turned out that it is quite difficult to use TIBOR+ as an alternative of the existing indexes at this point due to

insufficient transaction volume and its choppiness. (Expansion of the coverage to transactions with corporates would be difficult due to legal concern caused by possible discontinuity of the existing indexes.) Also we should consider the fact that indexes calculated only by transactions can be manipulated easily under extremely illiquid market conditions. Therefore we recommend this menu on condition that market conditions improve and sufficient transactions constantly take place in the future.

b. Fixing Methodologies

Short-term money market is strongly and directly influenced by monetary policy of central banks because short-term money market is traditionally the target of central banks operations. For example, now, the BOJ purchases TDB, JGB, CP, SB at short-term money market, and supplies funds to interbank money market on a large scale.

Under the extremely large-scale monetary easing policy taken by the BOJ, remarkable pickup of active transactions in the money market is less likely to happen for the time being. In such situation, while the working group set a high value on using real transactions in fixing methodology, consideration of using quotes such as offer/bids, expert judgment is recommended as a back-up solution. In order to ensure credibility of the alternative benchmark, continuity and stability are the important factors as well as transparency and fairness.

As we mentioned above, we have conducted sampling survey with the BOJ. Its fixing method is that we, three of each Japanese MPG member who share roughly 40% ~ 60% in Japan, collected all actual transaction data of the interbank transactions and submitted the weighted average rate and transaction volume of each product to the BOJ. Then, the BOJ aggregated all the data and fed it back to us. TIBOR+ is the weighted average rate calculated based on that data. However it turned out that sufficient transaction volume was not observed and it is quite difficult to use TIBOR+ as an alternative of the existing indexes at this point.

Considering this result, we concluded that establishment of a framework for a continuous use of expert judgment as a back-up solution is necessary so as to let the benchmarks of short-term money market including alternatives be able to adapt themselves of any kind of monetary policy.

Besides, in order to enhance usage of the transaction and transfer data, we have an idea that the BOJ, industrial associations, clearing corporations and depository centers collect and publish transaction and transfer data. But we need to confirm its feasibility and their intentions.

c. Transitions

If "similar" reference rates including reformed LIBOR/TIBOR are acceptable by majority of market participants especially corporate and institutional users, move to them shall be most preferable because it will not require actual transition process. In that case, it would be better to keep the name of LIBOR/TIBOR. But if new name will be required, official declaration as the successor by administrator will be necessary to avoid amendment of enormous amount of contracts though "amendment of reference rate name" itself is very simple.

From transition point of view, move to “different” reference rates is less preferable. But if MPG’s recommendation is “different” one and market participants will not be satisfied to reformed LIBOR/TIBOR, it shall be the choice. In this case, public comments process for confirming market participants’ opinions for / against transition and parallel run process for trial usage of new reference rates shall be necessary.

d. Market Footprint

On notional amount basis, OTC derivatives, especially IRS, is the most popular products. Bilateral commercial loans, syndicated loans and FRNs are also popular but personal loans and residential mortgages are not usually referenced to LIBOR/TIBOR. Some derivatives embedded deposits are linked to LIBOR/TIBOR but not major products.

e. Legal Analyses

It would be desirable to explicitly amend the legacy contracts by executing an amendment agreement between the relevant parties to the extent practically possible. The practicality of doing this varies for each transaction, and it may be too onerous for the parties to do in many cases. Similarly, derivatives cleared at a CCP or traded at an exchange should accommodate the transition through an amendment to the relevant business rules and procedures of the CCP or exchange.

Without an amendment agreement, “a rational interpretation of the intention regarding the original agreement” and “doctrine of circumstantial change.” may be applicable but uncertainty will remain.

If parties are not able to agree on an amendment, and the benchmark rate prescribed in the original agreement becomes unclear, there is a possibility of dispute between the parties, which might lead to court proceedings or alternative dispute resolution proceedings.

The more similar to LIBOR/TIBOR (especially in terms of the “cost of unsecured borrowing in the interbank market” element) that the new benchmark rate is, the more feasible it is to enter into amendment agreements, because transitioning to a new benchmark rate is not advantageous or disadvantageous to either party.

f. Outreach to Market Participants

We conducted a quite intensive survey which covered more than 80 companies including 14 end-users (i.e. corporates). According to our Outreach survey, the vast majority agreed that the existing indexes with enhanced governance and reinforced transparency will be preferred; willingness to transit to alternatives is quite limited. Additionally, we got the feedback from the end-users that they don’t want to use indexes which tend to be volatile and diverse excessively from market rate caused by outlier transactions and express concern about the procyclicality that indexes calculated only by transactions may amplify disturbance during financial crisis. Some of them indicated that banks should absorb that volatility to some degree, which makes the indexes more useful and acceptable for them. Given those voices from index-users, we concluded that achieving both of clarity and stableness is important from the viability perspective.

1. Market Footprint

1.1. Approach

The Japanese Yen (GBP) Market Footprint analysis aims to quantify the volumes and estimate the projected maturities of key classes of financial instruments that reference JPY-LIBOR and TIBOR. Outstanding volumes have been estimated by asset class. Due to the lack of consolidated data, timing and depth of data are different by asset class. This information is intended to inform the MPG Workstreams tasked with choosing reference rate menus and designing transition strategies.

Wherever possible, volume data was taken from official public sources. However, public data is not sufficient to provide a complete picture and so this was complemented with a combination of private data and estimations.

The main data sources used are summarized in the table below:

Table 1 Key data sources

| JPY LIBOR | Key data sources |
|-----------------------------------|--|
| Syndicated Loans | <ul style="list-style-type: none"> • Thomson One (LIBOR) |
| Corporate and retail Loans | <ul style="list-style-type: none"> • Bank of Japan statistics |
| Bonds | <ul style="list-style-type: none"> • Japan Securities Dealers Association (JSDA) |
| Securitised products | <ul style="list-style-type: none"> • JSDA / Japanese Bankers Association (JBA) |
| Derivatives | <ul style="list-style-type: none"> • DTCC • (BIS derivatives statistics) |
| Deposits | <ul style="list-style-type: none"> • Bank of Japan statistics |
| Mutual Funds | <ul style="list-style-type: none"> • The Investment Funds Association of Japan |
| TIBOR | |
| Loans | <ul style="list-style-type: none"> • JBA |
| OTC Derivatives | <ul style="list-style-type: none"> • JBA |
| Others | <ul style="list-style-type: none"> • JBA |
| Listed Futures | <ul style="list-style-type: none"> • Tokyo Financial Exchange Inc (TFX) |

1.2. Summary of Findings

The notional volume of outstanding financial contracts indexed to JPY-LIBOR is estimated to be greater than \$30 tn. The main types of contracts indexed to JPY-LIBOR include Over-the-Counter (OTC) derivatives, corporate loans especially syndicated one and FRNs. 3-month and 6-month are the most commonly referenced tenors across all product groups. Other JPY-LIBOR tenors are rarely used except interpolating purpose for "odd" initial or final calculation periods. JPY – LIBOR is mostly used to wholesale / interbank products.

In the case of TIBOR, estimated outstanding notional amount is \$ 5 tn or more. The main types of contracts are OTC derivatives, corporate loans including syndicated loans and listed futures. As same as JPY LIBOR, 3 month and 6 month are the most commonly referenced tenors, but for loans 1-month is also popular and for listed futures only 3-month is the referenced tenor. As same as JPY – LIBOR, TIBOR is mainly used in wholesale / interbank area.

An overview of the Market Footprint findings is presented in Figures 1 and 2 below.

Figure 1: JPY-LIBOR Market Footprint overview

| Asset class | | Outstanding volume (JPY TN) | % LIBOR- related | Direct or indirect | % non- domestic | O/n | 1w | 1m | 2m | 3m | 6m | 12m |
|------------------------|-------------------------------|--------------------------------|---------------------|-----------------------|--------------------|-----|-----|--------|-----|--------|--------|-----|
| Level 1 | Level 2 | | | | | | | | | | | |
| Loans | Syndicated loans | 75 | High | | | | | | | | | |
| | Corporate loans (bilateral) | 339 | 20% | Direct | Low | | Low | Medium | Low | Medium | Medium | Low |
| | Commercial mortgages | | | | | | | | | | | |
| | Retail mortgages | 124 | 0% | | | | | | | | | |
| | Credit cards | | 0% | | | | | | | | | |
| | Auto loans | | 0% | | | | | | | | | |
| | Consumer loans | | 0% | | | | | | | | | |
| | Student loans | | 0% | | | | | | | | | |
| Bonds | Floating Rate Notes (FRNs) | 5 | 65% | | 71% | | | | | Medium | Medium | |
| Securitisation | RMBS | 2 | Low | Direct | | | | | | | | |
| | CMBS | 0.3 | Low | Direct | | | | | | | | |
| | ABS | 0.4 | High | Direct | | | | Low | | | Low | |
| | CLO | 0.4 | | | | | | | | | | |
| OTC Derivatives | IR Swaps | 4,088 | 60% | Direct | | | | Low | | Medium | High | Low |
| | FRAs | 4 | 60% | Direct | | | | | | Low | | |
| | Swaption | 391 | 60% | Direct | | | | | | Medium | High | |
| | Basis Swaps | 394 | 50% | Direct | | | | | | Medium | High | |
| | IR Options | 29 | 80% | Direct | | | | | | Medium | Medium | |
| | X-currency swaps | 269 | 40% | Direct | | | | | | Medium | Medium | |
| ETD | IR Options | 0 | 100% | Direct | | | | | | Low | | |
| | IR Futures (3m EyroJPY TIBOR) | 44 | 100% | Direct | | | | | | Medium | | |
| Deposits | Retail deposits | 506 | Low | Direct | | | | | | | | |
| | Corporate deposits | 187 | Low | Direct | | | | | | | | |
| Mutual funds | MMF+MRF+CRF | 12 | Low | Indirect | | | | | | | | |

- "% LIBOR-related" for OTC derivatives, FRNs and Corporate loans are rough estimates
- Detailed sources and assumptions can be found in the appendix to this report.

Figure 2: JPY-TIBOR Market Footprint overview

| TIBOR related transactions | | (JPY tr.) | | | | | | | | | | | | | |
|----------------------------|----------------------|-----------|-------|------|-------|------|------|--------|------|------|------|------|------|------|--------|
| | | 1W | 1M | 2M | 3M | 4M | 5M | 6M | 7M | 8M | 9M | 10M | 11M | 12M | Total |
| Loans | No of Cont (ratio) | 2% | 33% | 4% | 36% | 2% | 1% | 17% | 0% | 0% | 0% | 0% | 0% | 4% | 100% |
| | Outstanding Notional | 2.37 | 18.90 | 2.09 | 25.65 | 1.21 | 0.98 | 26.47 | 0.54 | 0.54 | 0.54 | 0.52 | 0.58 | 1.54 | 81.92 |
| Derivatives | No of Cont (ratio) | 0% | 11% | 0% | 42% | 0% | 0% | 45% | 0% | 0% | 0% | 0% | 0% | 1% | 100% |
| | Outstanding Notional | 0.07 | 7.13 | 0.32 | 30.50 | 0.31 | 4.44 | 108.36 | 0.06 | 0.00 | 0.00 | 0.00 | 0.09 | 1.26 | 152.54 |
| Others | No of Cont (ratio) | 0% | 10% | 2% | 23% | 4% | 1% | 59% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| | Outstanding Notional | 0.00 | 1.72 | 0.06 | 2.07 | 0.03 | 0.07 | 3.40 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 7.41 |
| Listed Futures | Outstanding Notional | | | | 43.65 | | | | | | | | | | 43.65 |

- "Others" includes derivative-embedded loans/deposits, notes & bonds, Specified ABS, ABCP, trust notes, trust receipts, commitment lines, factoring etc.
- Source: Japanese Bankers Association' ad-hoc survey during Aug 2013. 17 TIBOR submitters and 4 other banks participated.

OTC derivatives

- Market size (outstanding notional amount):
IRS is around \$ 49 TN, IR Options around \$ 10 TN, CUR \$ 5 TN as of the end of 2012 based on BIS survey. IRS is divided Fix/Float, Fix/Fix and Float/Float and BIS survey does not show the composition. But majority seems to be Fix/Float and the main reference rate for Float leg is LIBOR (my estimation is at least more than 60%). Based on JBA's unofficial survey, estimated notional amount of TIBOR related seems to be \$2–5 tr.
- Maturity Distribution:
In respect of IRS, 46% is 3 years or less, 63% is 5 years or less, 88% is 10 years or less. 12% is more than 10 years and the longest one is more than 30 years.
- LIBOR/TIBOR tenors and prevalence (outstanding notional amount):
6m 87%, 3m 13%, a few in 1m and 12m regarding to LIBOR. In respect of TIBOR, 6m 71%, 3m 20%, 1m 5% and 12m 1%.

Listed Futures and Futures Options

Listed products linked to JPY reference rate are:

| | |
|------------|---|
| TFX | <ul style="list-style-type: none"> • Euro Yen 3m interest rate futures/futures options (3m Euro Yen TIBOR) • Euro Yen LIBOR 6m interest rate futures (6m JPY LIBOR) |
| CME | <ul style="list-style-type: none"> • Euro Yen Futures / Options (3m Euro Yen TIBOR) |
| SGX | <ul style="list-style-type: none"> • Euro Yen TIBOR Futures / Options (Euro Yen 3m TIBOR) • Euro Yen LIBOR Futures / Options (JPY LIBOR) |

The only product with significant liquidity is TFX Euro Yen futures referring to Euro Yen 3m TIBOR. Other listed futures/futures options are with almost no transactions and no open interests

- Maturity Distribution:
20 quarterly months and 2 serial months. But nearest 8 to 9 quarterly months are with transactions and open int. especially first 2 quarterly months are active.
- Tibor tenors and prevalence:
Euro Yen 3 month TIBOR only

Corporate Loans

Typical medium or longer term Corporate Loans in Japan are with periodical floating rate interest payments. It seems that majority of them are lenders' (banks') own base rate. In some cases, panel bank's submission rate for LIBOR/TIBOR is used as such. TIBOR is mainly used for Japanese domestic loans and LIBOR is for international transactions.

- Maturity Distribution

It's just a rough estimation, 1/3 is equal or less than 1 year, 1/2 is more than 1 year on floating rate basis and the rest is more than 1 year on fixed rate basis. Regarding floating rate corporate loans with more than 1 year maturity, portions are roughly equal among 1 – 3 years, 3 – 7 years, 7 years or more and without maturity (e.g. perpetual).

- tenors and prevalence

1, 3 and 6 months are most popular tenors. Usage of other tenor is rare except the case of interpolation for odd initial or final calculation period.

Syndicated Loans

- Maturity Distribution

Less than 10 years seems to be most popular but 10 years – 20 years are also observed. In several cases 60 years loans can be found.

- Libor tenors and prevalence

3 months and 6 months are the most popular tenors.

Deposits etc.

There are some deposits, especially deposit embedded derivatives, linked to TIBOR/LIBOR but market size is relatively small. Retail mortgage loans, auto loans etc. is normally not reference to LIBOR/TIBOR but each bank's own lending rate.

2. Reference Rate Menu

- In Japan, interest rate indexes such as TIBOR and Yen LIBOR are mainly used as base rates for bank loans and corporate bonds and their related derivatives used for hedging.
- In particular, since the indirect financing (i.e. bank loans) plays the important role for corporate financing in Japan, when developing a new interest rate index, consideration of whether it can be used for a bank loan is very important in terms of viability.
- After analyzing a wide range of short-term interest rate money market products from various perspectives, including not only current market conditions but also potential usefulness in the future, we have concluded that Treasury Discount Bills (TDB), Overnight Index Swaps (OIS), TIBOR+ and Unsecured Interbank Money Rates are our primary candidates.
- We think TIBOR+ and Unsecured Interbank Money Rates are suitable for transactions linked with bank loans (including derivatives), TDB and OIS for transactions not linked with it.
- However, it is quite difficult to use TIBOR+ as an alternative of the existing indexes at this point due to insufficient transaction volume and its choppiness, according to the sampling survey which we have conducted involving the BOJ.
- Additionally we put Uncollateralized Overnight Call Rate (average) on our list which is published by BOJ daily basis.

2.1. Introduction and Approach

This chapter of the MPG report summarizes our recommended Japanese Yen (JPY) reference rates. We recommend four classes of term reference rates, based respectively on TDB, OIS, TIBOR+ and Unsecured Interbank Money Rates.

We conducted an intensive analysis of market environment, transaction situation, market size and characteristics, scoping a wide range of short-term interest rate money market products in Japan.

Currently actual transactions in the financial markets are concentrated in a short-term zone, within 1 month, the same as in most other currencies, and an actual transaction base index within 1 month can be devised relatively easily, but challenging for above 3 months.

However, when examining the feasibility and viability of new indexes, it is necessary to consider their potential usefulness and the possible change in market conditions without excessively focusing on the current situations.

After analyzing the usage situation of interest rate indexes and their characteristics, we came to the conclusion that TIBOR+ and Unsecured Interbank Money Rates for transactions linked with bank loans (including derivatives), TDB and OIS for transactions not linked with it are feasible and viable candidates.

In addition we put Uncollateralized Overnight Call Rate (average) on our list for O/N tenor which is published by BOJ daily basis and obviously IOSCO compliant.

2.2. Treasury Discount Bills (TDB) (2 - 3m,6m,12m)

TDB (Treasury Discount Bill) market is one of the most active and liquid interest rate markets in Japan. There are a variety of market participants including banks, and securities dealers and other form of investors.

It is widely accepted as collateral for the BOJ lending and other operations, settlement of funds, CSA and so on, and has ample trading volume.

Although it is steadily issued in various tenors in the primary market, there is limited activity in the secondary market because the investors are mainly “buy and hold” investors.

The characteristics of TDB are as follows.

- TDB rates tend to be volatile due to idiosyncratic factors such as quarter-end flows, and auction schedules. (Idiosyncratic factors)
- TDB yields do not include credit risk premium other than Japanese government. As a result of safe asset preference, TDB rates could fall excessively. Further, TDB rates tend to move asymmetrical of bank funding cost. (Capital flight)
- TDB is affected by government fiscal policies and central bank’s operations. (Fiscal and Monetary policy dependence)

Given the above, TDB is not suitable for transactions linked with bank loans (including derivatives) because of the lack of bank credit component and its high volatility driven by supply-demand of the securities, but the hurdle to use TDB for transactions not linked with bank loans is relatively low.

Additionally its potential viability is relatively high because TDB is very popular among a wide range of end-users and issued at various tenors.

Although TDB transactions are largely concentrated in the primary market and securities dealers would need to use “expert judgment” to provide indications on days when no auction takes place, we can regularly confirm the rates anchored by auctions which take place frequently (*). The auction price is determined by various market participants, so it is quite transparent and reliable. The Fixing method report describes further ideas of fixings.

(*) 3month bill: weekly, 2month/6month/1y bill: monthly

We recommend TDB rates (2 · 3m, 6m, 12m) for transactions not linked with bank loans.

2.3. Overnight Index Swaps (OIS) (1w,1~3m,6m,12m)

The number of daily Yen OIS transactions has sharply decreased especially after 2007 due to the prolonged low rate environment. It used to be traded actively during 2006-2007 when the BOJ raised policy interest rate. Currently Yen OIS transactions are concentrated in maturities of less than 2 months.

Non-Japanese financial institutions (mostly securities firms) account for more than 90% of the transaction volume, so it may not reflect the domestic actual money transactions of the mainstreet in Japan. Additionally, because of its high responsiveness to the policy rate, it tends to be driven by speculative transactions. By that nature the rate level often swings excessively.

Also, we feel that it may not be appropriate as a reference rate for cash transactions like bank loans because it is a derivatives transaction where no transfer of funds take place.

On the other hand, we can imagine it will be viable because it has been broadly considered to be appropriate for discounting collateralized derivatives and it is already used for it.

Further we recognize its usefulness as a risk-free rate to some degree as it does not include sovereign credit and, unlike TDB, it is not affected by supply and demand of securities.

Given the above, OIS is not suitable for transactions linked with bank loans (including derivatives) because of the lack of bank credit component, high volatility driven by speculative transactions and unfamiliarity among non-financial companies. However, the hurdle to use it for transactions not linked with it is relatively low.

Under the current market conditions, its feasibility as an alternative index anchored solely by transactions may be low. However, considering its superiority to TDB in some respects we mentioned above, we can expect it to be feasible and viable as risk-free rate assuming it will be constantly active in the future. Currently we can get the OIS rates which are published by the clearing house to discount cash flows on derivatives contracts. We may be able to utilize it with enhancement of reliability and transparency. The Fixing method report describes further ideas of fixings.

We recommend OIS rates (1w, 1~3m, 6m, 12m) for transactions not linked with bank loan.

2.4. Unsecured Interbank Money Rates (1w, 1~3m, 6m, 12m)

We have major indexes in JPY which measure interbank money rates, TIBOR and Yen LIBOR. Both of them are under reform process to enhance governance system and transparency of rate submission process in accordance with IOSCO standard. We don't know if Reformed TIBOR and LIBOR will be judged as IOSCO compliant by OSSG yet, therefore, we don't put these on the recommendation list at this point.

In Japan, TIBOR is widely used for indirect financing (i.e. bank loans), the main form of corporate finance, private-subscribed bonds and their related hedge products.

TIBOR is administered by the JBA (Japanese Bankers Association) and is currently under reform process initiated by the JBA with the involvement of outside knowledgeable persons, such as lawyers and certified public accountants, to meet the IOSCO standards. The reform includes the following.

- Measures to enhance the governance system of reference banks and the JBA including mitigation of conflict of interest, internal oversight, and external audit.
- Measures to enhance the transparency of the rate submission process of reference banks
- The clarification of definition regarding the meaning of a number of terms including "prime bank"
- The reduction in the number of tenors

There has been no problem with TIBOR. However, the reliability and transparency will be enhanced by advancing such a reform so that reliable and stable rates will be provided under conditions where there is limited liquidity.

TIBOR is used for estimating a whole yield curve so that companies can visually confirm their funding/investment options; thus TIBOR serves as a Yen market infrastructure.

Although we believe these reform initiated by JBA will be judged IOSCO compliant by OSSG, we have to wait for the result of IOSCO review.

Yen LIBOR is widely used for international loans, including syndicated loans and corporate bonds and their related hedge products.

Measures are being taken to restore confidence in LIBOR as a reliable benchmark, including the reduction of published currencies and maturities, the oversight of administrator, and regulatory oversight of benchmark publishers, in order to make it IOSCO compliant.

One thing to be addressed is it may be less feasible than TIBOR which is determined by overall consideration of various kinds of short-term interest rate products transactions in Japan mentioned above including monetary policy of BOJ. In fact, according to our outreach, we got the idea from many stakeholders that the alternative of Yen LIBOR would be TIBOR. That is certainly one possibility, but we think it is quite difficult considering the difference of time zone and the definitions between these.

Although we don't put these on our recommendation list at this point, we discussed the possible candidates among interbank money rates camp. What we think "feasible and viable" interbank money rates is the following. First of all, robust governance system of the administrator and the reference banks is necessary. In addition it is necessary for us to establish a code of conduct which stipulates the reference banks to make procedure regarding data input and control of qualitative information to clarify the methodology.

As for methodology, it will be anchored by primarily unsecured interbank money/NCD transactions and then related market transactions including TDB, Repos, OIS and NCD for wholesale and retail clients etc. which are executed or observed by reference banks. The

degree of using expert judgment depends on the definition of the index. It will be permitted for supplemental purpose to represent what the index measures. We believe this concept is quite IOSCO compliant, so we put it on our recommendation list.

Again, we reiterate that financial indexes should be selected by users, so we should let them to judge whether this is useful and acceptable for them or not.

2.5. TIBOR+ (1w,1m)

Separately we have discussed other type of indexes which include bank credit component. We have been studying possibility to utilize actual transaction data for calculation of the index which will be referred to as TIBOR+ in this paper, even if it is not its official name. For this purpose, we have conducted transaction data analysis involving BOJ.

Concretely saying, three of Japanese MPG members have conducted sampling survey which covers all of our transactions with financial institutions in interbank money borrowing, CD/CP and large Term deposit which is at least more than JPY 1 billion. The observation period is the recent 3 months (i.e. from Nov.2013 to Jan.2014). Additionally we widened our survey coverage to transactions with corporates because insufficient volume with financial institutions was expected. We, 3 mega banks, share roughly 40%~60% for bank lending, deposit, total asset and CD issuance, therefore, we think the sampling coverage is wide enough.

We analyzed these data and the major findings are the following.

1. Transaction frequency

- Interbank transactions can be observed constantly for O/N and 1 week, 50-60% of business days for 1 month, almost zero over 1 month.

2. Transaction volume

- Sufficient volume of transactions (let's say more than JPY 100 billion) took place only in O/N and 1 week.
- As for 1 month, we observed about JPY 50 billion of uncollateralized call, CD transactions which may be feasible but uncertain.
- We cannot see sufficient transactions over 1 month no matter what product is.
- In terms of transactions with corporates, we can't observe sufficient volume across the curve.

3. Rate movement

- It fluctuates choppy for 1-week and 1-month. We didn't have transactions at some business days of 1-month, most of 3 months and all of 6-months and 12-months.
- As for transaction with corporate, it is even more volatile than with financial institutions. Rate level of CD and Term deposit for corporates is determined by not only market rate but also commercial bank business incentives such as clients' relationship, commercial campaigns, deposit insurance fee and so on. As a result it often differs from market rate so much.

Based on the findings above, we think these issues below should be addressed for TIBOR+ to use as an index.

- ✓ TIBOR+ may not be able to be published every business day except 1 week considering transaction frequency.
- ✓ Its choppiness and insufficient volume would make the index not feasible and viable. Especially it must be difficult to use TIBOR+ for bank loan application.
- ✓ If transactions with corporates included, TIBOR+ would not be an interbank rate. It would be completely different from TIBOR by nature because it would be affected by business incentives rather than market rate. That would cause legal concern for transition.
- ✓ Also, it is uncertain for reference banks to accept to disclose their transaction date due to business confidentiality issue.

Taking the analysis mentioned above into account, it is quite difficult to use TIBOR+ as an alternative of the existing indexes at this point. Not only dislocation of financial market but also muddle of bank loan business would be expected. We need expert judgment at least until sufficient and meaningful transactions take place constantly and framework to cope with noise-like volatility gets established.

Economy, monetary policy and market conditions are cyclical. Therefore, it is worthwhile to study possibility of TIBOR+ further, we recommend TIBOR+ on condition that they will be better in the future. The Fixing method report describes further ideas of fixings.

2.6. Uncollateralized Overnight Call Rate (average) (O/N)

Uncollateralized Overnight Call Rate (average) used to be BOJ's target rate for its monetary operations while its policy target has shifted to monetary base since April 2013. It is updated and released by BOJ every business day, to enhance the information available to market participants regarding its market operations and the money markets. "Provisional results" is published at 17:15 of the day and "Final results" at 10:00 of the next day. We believe this should be IOSCO compliant and put it on our recommendation list.

2.7. Others (~ 1m)

Other possible candidates are described below, but as they are inferior to the candidates mentioned above, we don't put these on our recommendation list at this point.

Call

The call market, which is an interbank money market in Japan, is a major short-term funding market and highly liquid, but almost 80% of transactions have maturities of 2 months or less. Nevertheless, since call transactions include a bank credit component, the call rate is suitable as the base rate for bank loans. The rough average rate data is published monthly by the BOJ. (We recommended this rate only for O/N mentioned above.)

Repos

GC Repo market is the most active short-term funding market in Japan. Also, its trading volume is more stable even during times of stress compared to unsecured call market. However, its transactions are weighted toward overnight and tomorrow next, and GC Repo rates are largely driven by supply and demand dynamics of securities-borrowing side. So, although it is feasible within short term tenor, its viability may be low. Transaction data may be able to be obtained from the clearing house.

NCD/CP

NCD/CP issued by banks include bank credit component, so it will be suitable for transactions linked with bank loans (including derivatives). Most of NCDs are issued directly to their clients and there is no secondary market practically. CP market is quite illiquid currently because there is limited demand for banks to borrow money and for investors to invest at such a low rate. NCD has some possibility to be on the list because there already exists the framework to get the issuance data which each banks report their issuance information to BOJ weekly.

2.8. Reference Rate Menu

Table 2 - Recommended reference rates by tenor

| | TDB | OIS | TIBOR+ | Interbank Money Rates | Call | Repos | NCD/CP |
|------------------|-----|-----|--------|--------------------------|---|-------|--------|
| O/N | | | | | ✓ Uncollateralized Overnight Call Rate (average) | ✗ | ✗ |
| 1 week | | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 1 month | | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 2 months | ✓ | ✓ | | ✓ | | | |
| 3 months | ✓ | ✓ | | ✓ | | | |
| 6 months | ✓ | ✓ | | ✓ | | | |
| 12 months | ✓ | ✓ | | ✓ | | | |

✗ Not recommended this time

3. Fixing Methodologies

3.1. Recommendation

In Japan, short-term money market has been an operational target of monetary policy conducted by the central bank traditionally; therefore it will be influenced directly and strongly by monetary policy. The Bank of Japan purchases an outstanding amount of Japanese government bonds(JGB), Treasury Discount Bills(TDB), CP, and corporate bonds from money market and supplies a large quantity of funds into interbank market. As a result, the amount of transactions in short-term money market overall is expected to stay low.

In such situation, the working group set a high value on using real transactions in fixing methodology. Consideration of using quotes such as offer/bids is recommended as a back-up solution where the amount of transactions is insufficient. If no transactions are observed, then expert judgment will be exercised. It means that in the short-term money market as OTC market, transactions and even quotes will be unable to observe under market stress or the extremely large-scale monetary easing policy especially for instruments without centralized clearing systems.

On the other hand, under the monetary policy before the Lehman Shock, the size of BOJ's market operations is much smaller than the present, and the amount of transaction data available is more sufficient. As it shows, reference rates in money market including alternatives needs to correspond not only to market environment but to monetary policy, and the current market environment should not be the only basis for any consideration. In order to ensure credibility of the alternative benchmark, transparency and fairness are the important factors as well as continuity and stability. Calculation of the alternative benchmark after structuring the decision hierarchy for the use of transactions, quotes, and expert judgments contributes to ensure transparency and robustness of the benchmark.

To adopt transaction-based methodology, more analysis is required to decide at which point of time contributors reference transactions and which transactions should be referenced. Specifically, since market participants are not obligated to close deals at specific places for OTC transactions, there may be different terms of contracts for deals closed at the same time. When collected data is of transactions in the previous day or the past days, adequacy of a reference based only on actual transactions as a benchmark should be confirmed by users through public comments which show their intentions. As of Japan, industrial associations or clearing organizations publish closing rates or settlement rates for certain instruments in TDB or OIS transactions. These closing rates and settlement rates may function as reference rates for the following day, and the simplest way is to use them as they are. However, the methodology for using closing rates in practice needs further consideration since they are based on transactions on the previous day.

Although constructing the system for BOJ, industrial association, or clearing organizations to collect and publish the transaction data is one of our ideas, its effectiveness and their intentions for this matter is not clear. It suggests that since MPG is not in a position to seek opinions from industrial associations or clearing organizations officially, supports from authorities and BOJ is essential.

3.2. Treasury Discount Bills(TDB)

The TDB market is the largest market with an outstanding balance of JPY120 trillion (as of June, 2013) in Japanese money market. Treasury auctions are conducted every week for 3-month bills, every month for 6-month and 12-month bills, and a number of times per year for 2-month bills. Results are posted on the website of the Ministry of Finance Japan(MOF) on the day the auction is held. Most of TDB transactions are OTC while bulletin boards are provided by brokers (BB, ICAP, etc.) for financial institutions. Bulletin boards make them possible to observe offer/bids and prices. Although the primary market is the main market for TDB transactions, and the secondary market is stagnant for the present, reasonable amount of transactions take place. Considering the above, submitting rates by referencing transaction prices and offer/bids of the day and the previous day seems feasible.

Observing a broker's Bulletin board for days, quotes exist almost every day. The levels of quotes are nearly equal to the auction levels. In fact, Bulletin board we use for TDB is the one on the PTS (Proprietary Trading System), which means deals can be executed instantly.

However, offer/bids are not quoted for all day long. When these cases where quotes do not exist for certain periods of time, only offers or bids are quoted, or amounts quoted are too small arise, it may not fulfill IOSCO principles completely.

To state TDB as an alternative reference rate, the selection of the panel is an identified issue. Current TIBOR and LIBOR panels are composed of banks only, while they are the main participants in the unsecured interbank money market. It means that submission of a benchmark should be made by the main players in the market being referred to, such as banks and security companies, but willingness of financial institutions other than banks to join the panel is unknown considering the litigation risk of contributing benchmark rates.

Remaining duration of TDB is unlikely to correspond to the tenor as it shortens every day. In such case, interpolation and extrapolation are suggested. For the tenor of 1W, 1M, 2M, and 3M, a weighted average approach of 2 3-month bills whose remaining durations are the closest to the tenor can be envisioned since 3-month bills are issued every week. For the tenor of 6M and 12M(1Y), interpolation and extrapolation can be used to compensate for infrequency of issuance of 6-month and 12-month bills which is once a month. As interpolation and extrapolation may bring complication to the methodology, more analysis for the way of use is necessary. An alternative simple solution is to reference the name of 3-month bills which has the closest remaining duration to the tenor.

The use of quotes such as offer/bids will be considered where the amount of transactions is insufficient. If no transactions are observed, then expert judgment will be exercised. Adequacy of expert judgment can be inspected looking through published value of TDB auctions on MOF website periodically considering 3-month bills being issued every week, 6-month and 12-month being issued every month.

It is necessary to be aware that for TDB, the yield curve will be affected by changes in the market environment, BOJ's stance for operations, and etc. Further analysis is essential to make sure methodologies such as weighted average, interpolation, and extrapolation would work in cases of an inverted yield curve or negative interest rates. Intentions of users (especially non-financial institutions such as industrial corporations) for the case where

interest rates are negative. The fact that unlike market participants, government-owned corporations and industrial corporations are not familiar with TDB should be well concerned.

3.3. Overnight Index Swaps(OIS)

OIS is an interest rate swap involving the overnight rate being exchanged for a fixing rate for a certain period. Its outstanding balances around JPY100 trillion (as of July 2012, BOJ). Most of the transactions are OTC while offer/bids can be observed by the bulletin board. However, OIS market is extremely illiquid in terms of activity. If such environment continues, scarcity of transaction data is easily assumed and needs to be noted and handled.

Although there is an idea to use central counterparty (CCP) as a clearing organization for gathering and publishing transaction data, its intention and feasibility has not been confirmed.

To state OIS as an alternative reference rate, the selection of the panel is an identified issue. It means that submission of a benchmark should be made by the main players in the market being referred to, and willingness of financial institutions other than banks to join the panel is unknown, considering the litigation risk of contributing benchmark rates.

Compared to TDB, OIS is not widely familiar; users should be well-informed about its features.

3.4. Unsecured Interbank Money Rates

Unsecured interbank market rates have been the operation target of BOJ traditionally. It is the market influenced directly the most by the monetary policy, and also the factor with most influence to the money market in Japan. We can see the responsiveness of this market from the fact that more than twice the current outstanding transaction were transacted before the Lehman Shock. Since there is no institution to manage the transactions, a measure to collect the data does not exist. There are two forms of transaction in this market: broker through and direct dealing.

Collecting the transaction data from brokers would be considered as one of the options. However, the share of broker through transaction is smaller than direct dealing, and it could not be said to represent the market. Constructing the system for BOJ, industrial associations, or Brokers Association to manage/publish the transaction data would be beneficial, but their intention for this matter is not clear. Considering the organization of infrastructure and the system for management and publication, realization will be after several years.

3.5. TIBOR+

TIBOR+ is an index which is calculated by actual transactions of a wide range of unsecured bank borrowing such as interbank money borrowing, CD/CP and large Term deposit for financial institutions. This product coverage is contingent on further analysis.

As Reference rate menu report describes, we have conducted sampling survey with the BOJ. We think it will be a model case for the fixing.

What we did is that we, three of each Japanese MPG member, collected all transaction data of the products mentioned above and submitted the weighted average rate and transaction volume of each product to the BOJ. Then, the BOJ aggregated all the data and fed it back to us. TIBOR+ was calculated based on that data. Taking this scheme into consideration, the issues to be addressed are the following.

Administrator / Data submission

As mentioned above we don't have data collecting infrastructure and system at the present. Therefore, our proposal is that reference banks submit transaction data itself or calculated rate to authorized administrators. Because this kind of data is business confidential, the administrator should be authorized, we may need supports from the authorities and legal compulsion.

Reference banks

As for reference banks, the present reference banks of TIBOR could be the candidates, possibly widen to other banks which have certain share of market transactions. But we expect voluntary participation to reference banks will be quite limited, therefore, we need solid rationale to make reference banks to submit confidential data in any cases.

Calculation

In terms of calculation, it can't be devised yet. The candidates are simple average, weighted average, weighted differently by products, moving average and so on. They need to be examined. Also framework to cope with noise-like volatility should be established.

Publication

The publication may be practical in the next business day in the fastest considering collection and calculation process. We should take notice of the fact that TIBOR+ is collected historical transaction data while TIBOR is estimated transaction rate of a time point with the use of expert judgments on the day.

3.6. Back-up Solution

Although alternative reference rates should be supported by the transactions, there is a risk of insufficiency of data since the environment of money market is highly influenced by monetary policy or liquidity risk. When Japanese banks face a liquidity crisis, they might arrange financing without relying on market-based funding in a way of asset reduction or increasing cash deposit. For such cases, a back-up solution should be provided with specific criteria to secure continuity of reference rates.

1. reference a series of transactions in previous days
2. reference rates of previous days
3. reference other benchmark in the money market

The solutions should be used under expert judgments with clear rules while they carry over rates of the past or reference different types of benchmark. If a lack of transactions and exercise of expert judgments lasts for a number of days, it would not reflect market activity properly. However, as extending unprecedented and large-scale monetary easing, and therefore experiencing the slow money market overall, establishment of a framework for a continuous use of expert judgments as a back-up solution contributes to improve credibility of the reference rate.

4. Transitions

4.1. Overview

Transition method is different product by product rather than currency by currency or jurisdiction by jurisdiction because transition is mostly related to bilateral contracts and linked to property rights which are similar in developed countries. Within three JPY reference rates, Yen TIBOR and JPY LIBOR are two main references and Euro Yen TIBOR is the main reference only in listed futures and future options. Derivatives especially IRS is the most popular product directly linked JPY reference rate.

Main products to be affected are OTC Derivatives, especially JPY IRS referring to Yen TIBOR and JPY LIBOR, Japanese domestic loans for corporate clients referring to Yen TIBOR and international loans including syndicated loans linked to JPY LIBOR, some deposits linked to Yen TIBOR and JPY LIBOR and listed futures and future options linked to Euro Yen TIBOR.

Challenges in transition will be mainly related to OTC bilateral transactions without using standardized contract, e.g. non ISDA based derivatives, derivatives embedded deposits and corporate loans in Japan if transition will cause spread adjustment.

The transition with less burden, especially for SME and retail clients, is the shift to the "similar" reference including the reformed existing one. If we will shift to different reference rates and need to adjust spreads in each affected transactions, transition process will be with very high hurdle because it will affect various areas such as operations, legal, tax and accounting etc.

Though there are several rates in reference rates menu, Transition process shall be classified roughly to two, i.e. transition to "similar" reference rates and to "different" reference rates.

- **Transition 1** – Transition from TIBOR/LIBOR to new reference rates with similar economic terms, i.e. term borrowing rates with each submitter's or prime bank's credit risks. In this case transition process will not to be difficult. New reference rates includes the rate with new fixing methodologies, e.g. risk free rate plus bank spread either submitted by panel banks or determined by administrators using average transaction prices, effective bids/offers etc. and reformed TIBOR/LIBOR. Almost no transaction pass is necessary. This is the undoubtedly preferable transition path.
- **Transition 2** – Transition to new reference rates with different economic terms, e.g. risk free rates such as TDB or OIS. In this case, transition process will be much more difficult comparing to Transition 1. Because administrators of existing reference rates will try to reform them to be IOSCO compliant, we can imagine with a certain probability the situation that we will have both "similar" and "different" reference rates candidates. In this case, transition process will be parallel-run of those rates for 1 to 2 years for collecting information about market participants' choices. Please refer to 3.2 for further details.

4.2. Background

YEN TIBOR is the main reference rate in floating rate loans in Japan. So it is also the major reference rate in OTC derivative products, e.g. IRS, options, swaptions and basis swaps in Japan. JPY LIBOR is used for international financial products, e.g. syndicated loans, FRNs, so also used for OTC derivative products in international market. EURO YEN TIBOR is similar to the JPY LIBOR so it is not so popular as JPY LIBOR and currently the main usage is the reference rate for listed futures and futures options on Tokyo Financial Exchange. There are other listed futures and futures options for JPY short term interest rates outside of Japan, e.g. CME and SGX, almost no trade is done.

4.2.1. JPY Market

Main products referring to the existing reference rates are OTC derivatives, corporate loans, syndicated loans, listed futures. Important information such as market sizes and major participants are mentioned in outreach and market footprint reports, additional information is as follows:-

1) OTC derivatives

- Maturity Distribution:
In respect of IRS, 46% is 3 years or less, 63% is 5 years or less, 88% is 10 years or less. 12% is more than 10 years and the longest one is more than 30 years.
- LIBOR/TIBOR tenors and prevalence (on outstanding balance basis):
6m 87%, 3m 13%, a few in 1m and 12m regarding to LIBOR. In respect of TIBOR, 6m 71%, 3m 20%, 1m 5% and 12m 1%.

2) Corporate Loans

Typical medium or longer term Corporate Loans in Japan are with periodical floating rate interest payments. It seems that majority of them are lenders' (banks') own base rate. In some cases, it is panel bank's submission rate. TIBOR is mainly used for Japanese domestic loans and LIBOR is for international transactions.

- Maturity Distribution
It's just a rough estimation, 1/3 is equal or less than 1 year, 1/2 is more than 1 year on floating rate basis and the rest is more than 1 year on fixed rate basis. Regarding floating rate corporate loans with more than 1 year maturity, portions are roughly equal among 1 – 3 years, 3 – 7 years, 7 years or more and without maturity.
- tenors and prevalence
3 months and 6 months are most popular tenors and 1 months is the next one. Usage of other tenor is rare except the case of interpolation for odd initial or final calculation period.

3) Syndicated Loans

- Maturity Distribution

Less than 10 years seems to be most popular but 10 years – 20 years is also observed. In several cases 60 years loan can be found.

- Libor tenors and prevalence
3 months and 6 months are the most popular tenors.

4) Listed futures

3 month Euro Yen TIBOR futures on TFX are the only active traded listed products relating JPY reference rates.

- Maturity Distribution:
20 quarterly months and 2 serial months. But nearest 8 to 9 quarterly months are with transactions and open int. especially first 2 quarterly months are active.
- Tibor tenors and prevalence:
Euro Yen 3 month TIBOR only

4.2.2. Transition Precedents

No particular precedents.

4.3. Transition Paths

Not changing the definition of reference rate or transition to different reference rate

If we pick up the alternative reference rate which is most appropriate from the transition point of view, it shall be the one with identical definition, i.e. just modifying calculation method / fixing methodologies or clarifying transaction prices to be anchored. In this case, transition process is fairly simple. Just adding new calculation method, hierarchies etc to the reference rate definition or code of conduct etc. It seems that no additional modification in product contracts side is required because the economic implication of the relevant reference rate shall remain the same.

One actual example is LIBOR. Although the definition of LIBOR has not been changed, submitters had been required to clarify its calculation method, e.g. more usage of actual transaction price and tradable bids/offers and setting hierarchies of input data etc. As a result, LIBOR becomes at least slightly different. But no major “transition” is recognized at this moment.

If the alternative reference rates will be with different economic terms, we have to think about the potential effects of transition and choose transition process carefully.

Mandatory or mutual agreements

Possible ways for transition in this category are mandatory transition by the regulation / rule and mutual agreements. The former is easy to follow by market participants but who will set such regulation / rule is the issue. Different from the EURO conversion, TIBOR and LIBOR are private, i.e. not created based on laws or regulations, so mandatory transition by

regulation seems to be difficult. The usage of TIBOR / LIBOR is not based on the agreement with the relevant administrator, so it will be difficult for them to control such transition even in the case that the administrator of the alternative reference rate is the same as the existing one. Most likely scenario shall be mutual agreements.

Treatment of legacy transactions

Application of new reference rates to new transactions is not a difficult issue. Though it will need a certain lead time for preparation, e.g. implementation to both the industrial standard documentations such as ISDA Master Agreement and private/individual contract such as bank's corporate loan agreements, it will be relatively simple process. Time consuming and difficult issues are relating to legacy transactions.

If we exclude the existing transactions from transition focus, there will be no transition burden but it means quotation of existing reference rate must be continued more than 30 years from now. It will not be the choice.

Short term / Medium term

In order to transit legacy transactions to new "different" reference rates, we have to set the length of transition period which is enough for major market participants to handle all process not only contract amendments but also infrastructural preparations etc. In order to reduce the impact of transition, we have to consider the possibility of periodical or gradual transition.

Using conversion ratio / bilateral agreement

Because most of the legacy contracts are bilateral, leaving them to related counterparties is the natural way for transition. The alternative would be setting some kind of conversion ratio, i.e. $LIBOR = \text{New Reference Rate} + \alpha bp$, and apply to all related agreements / contracts. But in doing so, we have to carefully consider about its enforcement power.

4.3.1. Product by product

Futures / Options on futures (listed)

The simplest one shall be listed products. Just discontinuing the existing one and listing new one. If necessary some overlap can be, e.g. to set Mar 15 as the final new listing of existing one and start listing Sep 14 for new one.

OTC derivatives

At the expected transition timing, more transactions will be centrally cleared and based on CCP's clearing business rules. It means fairly large portion of transition will be done by the amendment of CCP's clearing business rules and it will be relatively simple process. Much bigger hurdle will be for non CCP cleared transactions. How many transactions are in this category will be depend on the content of mandatory clearing regulations. But end user transactions will normally be exempted from mandatory clearing rules in many countries, many transactions will be remained un-cleared though relatively small in aggregated notional amount basis.

Because majority of the non-cleared transactions is and will be based on ISDA Master Agreement, it is preferable that ISDA will issue its protocol for transition. But there still be a certain number of transactions on non-ISDA basis e.g. agreements in local languages or simplified individual contract.

FRNs

In respect of the private placement FRNs, transition will be as same as it for corporate loans, i.e. mutual agreement between the issuer and the investor(s) and amendment of documentations. Public issues will be more difficult. As same as other amendment of notes terms, approval by more than half in bondholders meeting will be necessary.

Corporate loans and syndicated loans

Contracts of corporate loans are usually standardized by each lender so transition shall be done by mutual agreement between lenders and borrowers and amendment of such contracts. For syndicated loans, standardized contract format set by Loan Market Association, Asia Pacific Loan Market Association or Japan Syndication and Loan-trading Association are more commonly used. So amendment of such standardized documents or issuing of transition protocol will help the transition process.

Deposits

Most of deposits, i.e. ordinary deposits, current deposits, term deposits, NCDs etc, are based on banks own quotations. Some structured deposits such as derivatives embedded deposits include reference to the benchmark rates. Transition will be based on mutual agreement between the depositor and the bank and amendment of contract on one by one basis.

4.3.2. LIBOR / TIBOR to "similar" reference rates

Even if hierarchy of input data, calculation method or fixing method will be different, as far as the definition of the reference rate is similar to the existing LIBOR/TIBOR, i.e. interbank non-collateralized money market offered rate for submitters or prime bank, no actual transition process shall be necessary. As a fact, LIBOR has already been reformed and submitters prepared their own calculation model and specified hierarchy for input data etc. Strictly speaking submitted rates are slightly deferent from previous one. But no "transition" process, e.g. adjustment of spreads and amending contracts etc, was there. Considering to the wide usage of existing LIBOR/TIBOR, it will be better to avoid the small change such as introducing new name to LIBOR/TIBOR though changes in ISDA Definitions or using protocol will ease transition burden in products using standardized contract format.

4.3.3. LIBOR / TIBOR to "different" reference rates

As mentioned above, if we create reference rate with different economic terms, the transition process will involve many market participants and require huge resources including support from lawyers, accountants and tax advisors. Excluding legacy transactions is a way to reduce such burden but it means existing reference rates will be continued for more than 30 years. It is not realistic. (If it can be accepted, the question why it can't be applied to new transactions will arise.) In respect of JPY, the most practicable alternative is [treasury yields] from the "active market" point of view. But in reality treasury yield can't

be considered as “risk free” even in major currencies. For example, during the very short period from the late September to early October US 1m t-bill yields hiked from less than 5bp to more than 30bp. It was not link directly to the credit situation of international blue chip corporates and G-SIBs. Because banks are major source of funding by corporates, bank risk reference rate plus spread is reasonable even in FRNs and other direct funding because corporates compare direct funding with indirect funding. But if their funding is based on treasury yield plus spread and treasury yield moves dramatically due to the government’s independent and particular reason, corporates will take additional and unnecessary risks.

We can’t imagine all of such potential risks incorporated in the transition to alternative reference rate with different economic terms. Under such circumstance it would be difficult for end users to estimate the benefit, burden and potential risks relating to the transition and to decide whether they will prefer and accept such transition.

On the other hand, It seems like that administrators of LIBOR/TIBOR is trying to reform them to be compliant to IOSCO principles. In spite of whether they are in MPG’s focus or not, it shall be considered as one of market participants’ choice at this stage.

Considering the above, the best possible way for “different” reference rates will be 1) seeking public comments by the relevant administrator and 2) if positively responded, preparing the relevant rates, including nomination of administrator and setting its internal control framework, and conducting parallel-run for a certain period, e.g. 1 to 2 years. During such period end users who are still worried about reformed LIBOR/TIBOR will try to use “different” reference rate in several new transactions, and it will become majority, banks will try to activate spread market or basis swap market for their hedging purpose. During the parallel-run period, both market participants and regulators will be able to have much clearer views for transition.

Once majority of market participants accept new reference rates, the administrator will set the termination date of existing reference rate, which will be at least 1 year later to keep sufficient time for actual transition. Providers of market standard documentation will prepare and issue protocols, advisory letters etc and make necessary amendments of definitions, master agreements and standard format of contracts etc. If spread market grows during the parallel-run period, conversion factor from the existing reference rate to new “different” one also can be set. Reference rate administrator(s), industry groups and market participants will make every effort to create devices to lower the hurdles for transition with supports from regulatory authorities and central banks etc. But we have to keep in mind that bilateral agreement is the main part of transition and some counterparties may choose not to shift to new reference rates. In that case, they may use fallback clause incorporated in the contracts or terminate transactions. We hope that we can reduce such as small as possible but it would also be the benefit of market participants to leave some room for such choices.

4.3.4. Contingency

As I mentioned above, transition to “similar” reference rates will be much easier and hopefully may not even require actual transition process. But it would be fair to mention the possibility of potential voluntary movement by whom not accepting the relevant transition.

As IOSCO requires new reference rates shall be more anchored to actual transactions. And anchored market is with different liquidity tenor by tenor, more precisely more liquidity in

shorter tenors. Without use of active expert judgement, it will result in more volatility in reference rates with longer tenors, e.g. 6 month and 12 month, than shorter tenors' one.

As shown in outreach reports, market participants, especially end users, prefer not only transparency but also reasonable stableness. Even in shorter tenors' actual transactions will be affected by noise, e.g. transaction size, time difference between transaction time and submission time, events between such period, less competitive transactions etc. Without a well-considered filtering or weighting, simple calculation method, e.g. simple average or volume weighted average, will not be able to remove undesirable volatility or bias.

Once market participants recognize such weakness incorporated in a certain tenor of new reference rate even if in the case of "similar" reference rates, they may shift to another tenor or terminate transactions. Such reaction can be additional burden relating to the transition.

4.4. Transition Recommendations

4.4.1. Transition 1 – Move to "similar" reference rates

If "similar" reference rates including reformed LIBOR/TIBOR are acceptable by majority of market participants especially corporate and institutional users, move to them shall be most preferable because it will not require actual transition process. In that case, it would be better to keep the name of LIBOR/TIBOR. But if new name will be required, official declaration as the successor by administrator will be necessary to avoid amendment of enormous amount of contracts though "amendment of reference rate name" itself is very simple.

"Seamless" and "Successor Rate" paths are included in this category. But "Successor Rate" seems to be less feasible because if the new reference rate will be different enough that "seamless" path will not be able to choose, transition 2 will be safer way to reduce legal risks.

4.4.2. Transition 2 – Move to "different" reference rates

From transition point of view, move to "different" reference rates is less preferable. But if MPG's recommendation is "different" one and market participants will not be satisfied to reformed LIBOR/TIBOR, it shall be the choice.

"Parallel with Cut-Over" and "Market-Led" paths are included in this category. The more preferable one is "Market-Led" because it will be less legal risks and transition burdens. But we have to keep in mind that inertia will be problematic especially from regulators' point of view. We are not sure whether they will consider that the treatment, such as the ban to refer existing reference rates in new contracts, will be enough or not. Especially in the case that the existing reference rates will not be compliant to IOSCO principles, we have to assume the situation that "Parallel with Cut-Over" will be the only choice.

4.5. **Recommendable Path for Each New JPY Reference Rate**

Final JPY Reference Rate Menu shows four new reference rates for transition. Recommendable path for each rate is as follows:

- Unsecured Interbank Money Rate (“UIMR”): “Seamless” path
- TIBOR+: Either “Seamless” or “Parallel with Cut-Over” path
- TDB: “Parallel with Cut-Over” path
- OIS: “Market Led” or “Parallel with Cut-Over” path

For UIMR, TDB and OIS, selected paths are self-explanatory because of the similarity or difference between each rate and the existing LIBOR/TIBOR. In the case of TIBOR+, it is hard to imagine how similar/different it is to the existing LIBOR/TIBOR because at this moment what degree of expansion in anchored market will be necessary is unclear. If the anchored market will need to be expanded to banks’ transactions with corporates with various credit levels, various size and various industries and to smaller transactions, resulting TIBOR+ will be much different to the existing LIBOR/TIBOR. In that case, recommendable path will be “Market Led” or “Parallel with Cut-Over” path rather than “Seamless” path. In other words, to create TIBOR+ to which “Seamless” path will be applicable is preferable to mitigate transition risks. As it is difficult to decide how much difference can be acceptable by market participants to choose “Seamless” path, public consultation process will be necessary for TIBOR+ before deciding which path will be chosen.

4.6. **New Reference Rate Candidates and Reformed Existing Reference Rates**

Assuming existing benchmarks after reform will be compliant to IOSCO principles, they shall be included in the reference rate menu as well as new candidates such as OIS and treasury. And the transition path to the reformed one is, as we experienced in LIBOR reform, “Seamless” path which is the most preferable way with less legal risks and less transition burdens.

From cost/benefit point of view, additional benefits by introducing new reference rates with different economic terms to existing reference rates is not so large because residual risks contained in reformed one will be relatively small. On the other side cost for introducing new reference rates is not small in various areas in affected entities such as legal, accounting, risk management, operations and IT areas. Especially end users will prefer to avoid such actual and immediate costs. When the new reference rates will have clear and large benefit and advantage comparing to the reformed one, market participants will be willing to accept such transitional costs.

4.7 Transition Table

The table below is a quick reference guide for potential transition challenges by reference rate. The markers denote whether the challenge applies and to what extent.

| Possible transition challenges | Reformed LIBOR / TIBOR | TDB | OIS | Synthetic Bank Rates | Interbank Money Rates | Call, Repo, CD/CP | Comments |
|--|------------------------|-----|-----|----------------------|-----------------------|-------------------|--|
| CHALLENGE 1 Contract Frustration | | | | | | | Transition to new reference rates without most popular tenors, i.e. 3m and 6m, will cause difficulties in addition to the burden relating to spread adjustments and amendments of bilateral contracts. If new name is used, a certain degree of frustration will occur. |
| CHALLENGE 2 Accounting / Tax | | | | | | | If fair spread adjustment can be done, accounting and tax treatment shall not be a big hurdle. (though amendment of accounting standard for hedge accounting etc. shall be necessary) |
| CHALLENGE 3 System etc. | | | | | | | System/Application for bookkeeping, accounting/tax, operations, risk management etc. shall be amended except the transition to "similar" reference rates without name change. |

5. Legal Analysis

5.1. Overview

This report analyses legal impacts and possible risk-mitigation treatments in respect of a transition in JPY reference rates from the point of view of Japanese laws and is composed of two parts, Phase 1 and Phase 2.

The Phase 1 section provides a general analysis of legal risk in the context of benchmark transition and an analysis of the most common financial contracts and instruments linked to JPY LIBOR/TIBOR governed by Japanese law.

The Phase 2 section focuses on transition path applicable to each candidate proposed in the JPY Reference Rate Menu and the applicability of risk-mitigation treatments.

5.2. Phase 1

This report identifies possible legal risks for contracts which refer to LIBOR/TIBOR and are governed by Japanese law.

Transitioning to new benchmark rates without any explicit amendments to the legacy contracts would cause considerable confusion in the financial markets. Therefore, it would be desirable to explicitly amend the legacy contracts by executing an amendment agreement between the relevant parties to the extent practically possible. The practicality of doing this varies for each transaction, and it may be too onerous for the parties to do in many cases.

A large scale market-led initiative to amend existing market standard contracts through protocols by the relevant industry groups (such as the International Swaps and Derivatives Association (“ISDA”)) would facilitate a smooth and harmonious transition. Similarly, non-binding guide by the industry groups would be supportive for the same purpose.

The characteristics of the succeeding benchmark will affect the significance and smoothness of the transition. If the new benchmarks succeed to the essential quality of the existing LIBOR/TIBOR, namely, the “cost of unsecured borrowing in the interbank market”, the transition to the new benchmarks will be relatively smooth. If the new benchmarks are recharacterized to be “secured borrowing rates”, certain credit costs for borrowing will be added to the calculation of payouts under the legacy contracts upon the transition (if not terminated), and that process may cause more significant issues. The methodologies of fixing benchmarks, such as (i) an indicative reference (or “poll-based”) method or a transaction-anchored method, and (ii) the adoption of interpolation/extrapolation methods would affect the transition process to some extent. The liquidity of JPY based trades is lower than USD based or EUR based trades. Hence, the adoption of interpolation/extrapolation methods would be more important.

To facilitate a smooth transition, both the existing and succeeding benchmarks should be available concurrently for an appropriate period [3-5 years].

5.2.1. Introduction

Financial contracts denominated in JPY are predominantly governed by Japanese law in cases where both parties thereto are Japanese entities, and largely by UK or NY law in cases where one or both parties thereto is/are non-Japanese entities. This report identifies possible legal risks for legacy contracts which refer to LIBOR/TIBOR and are governed by Japanese law. In respect to transactions denominated in JPY but governed by UK law or NY law, please refer to the GBP or USD Legal Issues Analysis report.

Please also refer to the attached memorandum prepared by NISHIMURA & ASAHI for more detailed analysis from a legal perspective.

5.2.2. Product profile: market standard terms

Standardized contracts are often used for OTC derivatives, syndicated loans and FRNs. However, regarding OTC derivatives and loans, non-standardized contracts such as, instruments prepared in the Japanese language, and/or simpler forms of confirmations, are also used, especially for domestic transactions by small/medium sized end-users. OTC derivatives cleared by a Central Counterparties ("CCP") are executed in accordance with the business rules and procedures of the relevant CCP. For listed derivative products, the relevant exchange sets their own rules, procedures and standardized contracts.

5.2.2.1. OTC derivatives

OTC derivatives include three major categories.

The first category is CCP cleared transactions. These are governed by the business rules of the relevant CCP. In accordance with the global OTC derivatives reforms, G20 countries are required to implement mandatory clearing for standardized OTC derivatives. Therefore, this category of OTC derivative is expected to increase significantly in the future.

The second category is non-cleared transactions based on ISDA documentation.

The third category is non-cleared transactions based on non-ISDA documentation. This third type will decrease, but will remain to some extent, especially in Japanese domestic transactions due to various reasons, such as the difficulty for small/middle end users to use ISDA documentation because of its complexity, and the language hurdle.

The business rules of JSCC, which is currently the only CCP in JPY OTC derivatives, and related definitions/provisions in ISDA documentation are explained in Appendix B.1.2 and B.1.3.

5.2.2.2. Listed derivatives

Listed derivatives are usually governed by exchanges' own rules and agreements between exchanges/clearing houses and exchange participants/end users. The TFX trading regulations, which provide the most liquid listed derivatives referring to JPY interest rate benchmarks, are explained in Appendix B.2.4.

5.2.2.3. *Syndicated loans / Corporate loans / FRNs etc.*

Most international syndicated loan contracts are prepared using the standardized documentation provided by LMA. In Japan, the Japan Syndication and Loan-trading Association (“JSLA”) also provides a standardized contract format. For FRNs, although there is no such standardized format, documentation for prospectus, MTN programs etc., is often based on standard wording which is uniform throughout the industry. For example, reference to the ISDA definitions for reference rate clauses can be seen frequently.

Regarding corporate loans, each lender usually has a standard contract format. In Japan, generally speaking, terms and conditions tend to be simpler than those in Europe or other major financial centres partly because in Japan, the so-called Agreement on Banking Transactions is often used.

A more detailed analysis can be found in Appendix B.2.

5.2.3. **Legal risk profile for legacy contracts**

5.2.3.1. *General*

(a) Execution of amendment agreements

A transition to a new benchmark rate can be explicitly agreed upon by the relevant parties executing an amendment agreement. From a legal point of view, the execution of an amendment agreement is the clearest method of transitioning to a new benchmark rate. However, in practice, executing amendment agreements for each of a number of transactions, one-by-one, might incur significant time and costs.

(b) Rational interpretation of the intention of the relevant parties

Even if an amendment agreement is not entered into by the relevant parties, there would be a possibility that, as a rational interpretation of the intention regarding the original agreement, the parties intended to shift to a new benchmark rate upon the abolition of LIBOR/TIBOR. Generally speaking, if the new benchmark rate is similar to LIBOR/TIBOR (especially in terms of the “cost of unsecured borrowing in the interbank market” element), such interpretation would become more plausible. However, it is not necessarily clear whether such interpretation is possible or not, and such possibility would heavily depend on the provisions of an individual agreement.

(c) Doctrine of circumstantial change

Even if it cannot be interpreted that the parties intended to shift to a new benchmark rate upon the abolition of LIBOR/TIBOR by an interpretation of the intention in the original agreement, there is a possibility that a court could apply the new benchmark rate to the original agreement by the so-called “doctrine of circumstantial change.” However, although the Supreme Court’s precedents generally theoretically affirm this doctrine, we understand that there are no Supreme Court precedents that have explicitly affirmed the application of this doctrine. Therefore, the criteria for applying this doctrine are still unclear.

(d) Legal risks regarding transition to a new benchmark rate

If parties are not able to agree on an amendment, and the benchmark rate prescribed in the original agreement becomes unclear, there is a possibility of dispute between the parties, which might lead to court proceedings or alternative dispute resolution proceedings. Further, even if an amendment agreement is entered into by the relevant parties, or the business rules, trading regulations, etc. of the CCPs or the exchanges are revised to a new benchmark rate and those proceedings are not conducted properly, the relevant trading participants might challenge the transition on the grounds of breach of proceedings, mistake, abuse of authority or for other reasons. In addition, if the transition process is not conducted properly, the relevant authorities might take some kind of action against the transaction participants, such as issuing an order to cease using the previous benchmark rate.

(e) Conclusion

It is unclear whether a transition to a new benchmark rate under the existing transactions without explicit amendments can be achieved, and if that transition is not recognized, the effect under those transactions will become uncertain. Therefore, in order to avoid disputes between the relevant parties, it would be desirable to explicitly amend the agreements by executing amendment agreements between the relevant parties to the extent practically possible. Similarly, derivatives cleared at a CCP or traded at an exchange should accommodate the transition through an amendment to the relevant business rules and procedures of the CCP or exchange.

The more similar to LIBOR/TIBOR (especially in terms of the “cost of unsecured borrowing in the interbank market” element) that the new benchmark rate is, the more feasible it is to enter into amendment agreements, because transitioning to a new benchmark rate is not advantageous or disadvantageous to either party.

5.2.3.2. OTC derivatives

In the case of CCP cleared OTC derivatives, CCP will amend its business rules etc. subject to its board approval. Once such amendment has been done, clearing members will automatically accept the amendment based on an existing agreement between them. The existing CCP, i.e., JSCC, normally invites public comments before deciding on significant changes to its business rules etc. The majority of the board members and shareholders of JSCC are major market participants and it is expected that JSCC would only make decisions which market participants would be able to accept. Therefore, as a practical matter, there doesn't seem to be a high possibility that dispute would occur among market participants of CCP cleared OTC derivatives due to a transition to a new benchmark rate.

In the case of OTC derivatives based on ISDA documentation, it is expected that the ISDA will formulate a unified protocol regarding the abolition of LIBOR/TIBOR and transition to a new benchmark rate, and the approval of that transition by any transaction between market participants will be conditioned on their submission of an adherence letter. In addition, the ISDA may publicize a non-binding guide setting out the best practice regarding the treatment of the transition to a new benchmark rate under the legacy contracts.

In the case of other OTC derivatives, it would be desirable for the relevant parties to execute explicit amendment agreements to the extent practically possible, as described above.

5.2.3.3. Listed derivatives

In the case of listed derivatives, exchanges will choose to abolish legacy contracts and to create new contracts. Currently, the maturity of TFX 3 month JPY interest rate futures with outstanding balance is no later than March 2016. Therefore, it is expected that the process of terminating legacy contracts and executing new contracts will happen smoothly. Considering those circumstances, as a practical matter, there does not seem to be high possibility that dispute would occur among the market participants of listed derivatives due to a transition to a new benchmark rate, as long as proper transition processes are proposed by exchanges.

5.2.3.4. Syndicated loans / Corporate loans

In the case of corporate loans including syndicated loans, it would be desirable for the relevant parties to execute an explicit amendment agreement to the extent practically possible, as described above.

5.2.3.5. FRNs

In the case of FRNs issued by Japanese companies and governed by Japanese law, changes in terms and conditions applicable thereto require a resolution by a majority of attending noteholders, on an outstanding amount basis, at a noteholders' meeting. The relevant resolution must also be approved by the court in charge. Considering the cost and administrative burden of those proceedings, it is often expected to be unfeasible to convene a noteholders' meeting. Therefore, as long as the transition to a new benchmark rate does not undermine noteholders' interests, that transition would often have to take place factually without proper legal proceedings, in spite of the uncertainties.

5.3. Phase 2

Regarding to JPY, current candidate for new reference rates are as follows:-

- Unsecured Interbank Money Rates ("UIMR")
- Transaction based Bank's Unsecured Term Funding Rates (TIBOR+)
- Treasury Discount Bills ("TDB")
- Overnight Index Swap Rates ("OIS")

In the interim report, Synthetic Bank Rates ("SBR") was included, but after further consideration of its feasibility, we concluded that it is difficult to create the SBR anchored to the active market due to the lack of bank risk spread market. Additionally, as similar to the other currencies, transaction based banks' unsecured term funding rates (TIBOR+) is added.

Fixing methodology shall be published for transparency as same as the existing reference rates. UIMR and TIBOR+ is the representative of cost of unsecured funds for submitters or prime banks and TDB and OIS are representing risk free rates.

Administrator, publishing time, publication venue, calculation agent and publication agent shall be the same as those of the existing reference rates but other entities can be take over those roles. Especially whether panel banks' submission or calculating from transaction data (possibly including executable indicative prices) will affect such selection.

5.3.1. Bucketing and Mitigants

UIMR and TIBOR+ are categorized in Bucket 1a "No action". There is a little possibility that TIBOR+ can be categorized in Bucket 1b "Parallel track". TDB and OIS will be categorized in Bucket 2 "Parallel track".

We imagine that UIMR includes only minor changes in fixing methodology, e.g. more adherence to actual interbank money markets transactions etc. TIBOR+ shall be the same. But if the rates are affected by CDs and CPs, TIBOR+ can be the rate with different characteristic to existing reference rates. TDB and OIS are risk free or quasi risk free rates, so Bucket 2 is self-explanatory.

As shown in Appendix B.2, Japanese lawyers recommend amending the relevant contracts or business terms, and the risks of ADRs or litigations if not reach to agreement by relating parties. Whether the effects by changes in fixing methodology is small or big is hard to predict especially in future crisis period, getting legal opinion for maintaining contractual continuity broadly seems to be difficult. Also Japanese lawyer pointed out uncertainty regarding to "Doctrine of circumstantial changes" in the interim report.

Generally speaking, legislation regarding to the transition to new reference rates is questionable. Regulators will allow publication of reference rates which compliant to IOSCO principles and will set the ban to publish "incompliant" reference rates. But it will be difficult to legislate the transition from existing rates to certain new reference rate. Usage of existing reference rates in various financial products and accounting etc., are not based on the user agreement between users and administrators. Administrator will not have legal obligation for transition and users are responsible for transition of their own financial contracts. Once existing reference rates will be banned by the relevant regulator due to incompliance to IOSCO principles, transition will follow voluntarily, not mandatorily. Role of regulators will urge the administrator of existing reference rates, potential administrators or financial industry (e.g. banking associations) to prepare new reference rates for possible choices.

5.3.2. Supplemental Questionnaires

Parallel run / dual-track

The length of parallel run / dual-track is longer the better because it will give enough time for evaluating the effects of changes, discussing between effected parties, amending existing contracts, preparation for accounting / tax changes, preparation IT modification and transition protocol for standardized contracts or other devices for helping smoother transition. It will also reduce the number of "legacy" contracts to be amended. But if we can set longer notification period, actual parallel run / dual-track period can be shortened. But even in such case, enough period to monitor actual features of new reference rates and for creation of spread market shall be kept.

The most important incentive for transition will be the eagerness and intention for transition to new reference rates. The more benefits to market participants than the costs and burdens relating to the transition, the more incentives. Confirming eagerness and willingness of market participants before entering into transition process will be the key to the smooth transition to new reference rates. After confirming the consensus for transition, the schedule of parallel run and the termination date of publishing existing reference rates shall be broadly announced at the beginning of such process. Because the effected parties are many and broad, enough notification period shall be set.

6. Outreach to Market Participants

6.1. Outreach Approach

We conducted the Outreach survey interviewing with a number of the leading companies in a wide range of business industries by distributing the questionnaire and having face-to-face meeting. The questionnaire contents are (1)business purpose of interest rate indexes and its referring indexes, (2)potential alternative indexes (or characteristics), (3)the reason they chose it, (4)impact of transition and measures to mitigate it. (For details Appendix C)

Our scope is originally the 41 leading financial and non-financial companies which represent each business industries. We interviewed financial companies which are chair of their business associations and could get opinions from the association members; therefore, our current number of the responses that we have collected is more than we contacted directly, about 80 companies.

The companies we contacted are the following:

| | |
|-------------------------------------|----|
| • Financial institutions | |
| – Banks | 47 |
| – Insurance companies | 6 |
| – Brokers/Securities firms | 5 |
| – Asset managers | 1 |
| – Government financial institutions | 2 |
| • Exchanges and Clearing houses | 3 |
| • Corporates | 14 |
| • Legal firms and Auditors | 2 |
| • Others | 1 |

6.2. Benchmark Usage by Outreach Contributors

6.2.1. Financial institutions

According to our research mainly Yen LIBOR and TIBOR are used in Japan. The frequently used tenors are 3m and 6m, both are heavily used for cash and derivatives transactions.

- As for banks usage, they are primarily used for floating rate bank loans and IRSs for hedge tool of them. Both of Yen LIBOR and TIBOR are frequently referred. The frequently used tenors are 3m and 6m, but not limited to them. Secondly, corporate bonds (Yen LIBOR 3m/6m) and syndicated loans (Yen LIBOR and TIBOR), thirdly, currency swaps, interest rate options (Yen LIBOR), deposits (TIBOR) etc.
- As for non-bank financial companies' usage, they are heavily used for IRSs, some currency swaps and FX forward (indirectly). Mainly Yen LIBOR is used for them, but TIBOR is still used.

6.2.2. Corporates

According to our research TIBOR is heavily used in this space even though Yen LIBOR is still popular. The frequently used tenors are 3m and 6m.

They are primarily used for floating rate bank loans and IRSs for hedge tool of them. Other than that it is used for internal transactions. Typically the referred index for floating rate bank loans is the same for IRSs to hedge them.

6.3. Potential Alternative Reference Rates

6.3.1. Financial institutions

The vast majority of stakeholders favored the existing indexes like TIBOR and Yen LIBOR with enhancement of governance. OIS and TDBs were mentioned as a candidate for new rates, but with little enthusiasm.

The major comments are the following.

- As for the existing indexes they are going to be acceptable after clarifying the methodologies and strengthening governance.
- Any indexes are acceptable for alternatives if they are reliable as indexes which measure short-term financial market and other stakeholders want to use them.
- We favor rates which are actually traded and deemed to be difficult to be manipulated. However, it should be taken into consideration that low liquidity tends to cause the transactions to be executed at completely different level from market rates, possibly intentionally.
- Methodologies should be contrived under consideration of the possibility that using raw transaction data to calculate indexes would distort what the indexes intend to measure. "Prime bank" type of indexes like TIBOR and EURIBOR generally don't have this kind of issues that is useful for us.
- When you calculate indexes based solely on transactions it should be taken into consideration that there would be stronger incentive of moving market rates to the specific level or direction for manipulation purpose.
- OIS will be relatively acceptable for alternatives because it will be widely used to discount cash-flows on derivatives contracts. However the rate level often swings excessively, therefore, we need to use this rate carefully for index purpose.
- From a client-based business standpoint of view, there seems no alternative due to difficulties for the clients to understand.
- Alternative indexes would be used for long-term contracts, continuity and stability should be necessary.

6.3.2. Corporates

Generally we can't find any demands to replace the existing indexes among corporate camp. Also they don't have any specific view on potential candidates. However we got information about characteristics which financial indexes should have. Their comments are the following.

- They prefer an index which is familiar to them and is simple enough to understand. They are not professional in terms of financial science, so they don't like advanced financial engineering to be used for indexes.
- They agree a transaction based index is fair, however, they think excessive volatility should be avoided during normal conditions or even crisis time. Corporates don't want to use indexes with excessive and unreasonable volatility.
- They think transparency is important. On the other hand, stability is also important for them. From corporate standpoint of view, it's not acceptable that the borrowing cost fluctuates so much just because of whether or not they are lucky enough to be able to borrow on a day when the market is calm. Also, they think it may be favorable for banks to absorb excessive price volatility to some extent especially during financial crisis to avoid amplification of disturbance.
- They generally accept an index which is already accepted by other stakeholders. Moreover they are not interested in the methodologies.
- Immediate publication of submission rate from each reference bank would be helpful for them while it is published with 3month delay in LIBOR that is inconvenient.
- They regard whether hedge will work or not quite important.
- They favor an index which prevails widely and has the same nature as the existing indexes.
- They favor as many reference rate contributors as possible so that it enhances the reliability of the indexes.
- They agreed an index based solely on transactions is one option, but from the very beginning they do not believe there exists "correct" prices of financial products. The important issue is whether you can trust banks or not, therefore, it is critical to strengthen the governance not to let collusion between banks happen.
- They think being widely public and easy to obtain the data is very important for financial indexes as well as transparency. If it costs to get the data, they hesitate to use them.
- They agreed that the existing indexes are unclear to some extent, but it's not the issue of the design but the underlying market conditions. They're concerned that it would end up superficial solutions to create new indexes under illiquid market conditions like now.

6.4. Transitions

6.4.1. Financial institutions

Their major comments are the following.

- If we move to OIS or something new, it should take long time for the market to grow enough for price-develop mechanism to work from both of interbank transactions and client business standpoint of view. Therefore transition period should be long enough.
- It will be quite difficult to negotiate every clients to change the existing contracts not only because huge paper work will be needed but also it will be quite uncertain for the clients to accept the new terms. Therefore, transition should be designed to let new indexes parallel-run with the existing ones so that we don't need to change the contracts.
- We should take the possibility into account that supply/demand balance between products which refer the existing indexes and products which refer new one during transition period would be distorted when we let them parallel-run.
- Depending on the new indexes, banks will have to bear basis risk between the funding cost and the bank loan asset. As the result the clients will end up borrowing at expensive rate. That would be difficult negotiations.
- Banks need to negotiate new spread level with their clients that would be unclear and difficult.
- The solution to let the existing indexes survive and enhance their reliability and transparency would be much acceptable for the market and the clients.
- There will be uncertainty in those issues like necessity to change rule about fair value measurement, effectiveness of hedge by IRS. If hedge does not work we should stop using hedge accounting that would be serious issue.

6.4.2. Corporates

Their major feedback is the following.

- They expressed concern of potential expensive borrowing cost via bank borrowing and bonds issuance.
- Also they're concerned how the existing contracts will be treated.
- It will cost a lot to revise contract documentations.
- It may need to take ample transition period to let the new market grow enough for them to understand and observe its trade conditions.
- Multiple indexes would be favourable from a comparison standpoint of view.
- Forming consensus in the industries is important. If it has, they don't hesitate to follow the industries' consensus.

Market Participants Group on Reforming Interest Rate Benchmarks

JPY Currency Report Appendix

March 2014

Appendix A. Market Footprint Sources and Assumptions

Figure 2 – JPY-Libor Market Footprint

| Asset class | Level 1 | Level 2 | Outstanding volume (JPY TN) | % LIBOR-related | | | | | | | Source/ Comment: | | |
|---|---------|---|-----------------------------|-----------------|-----|-----|--------|-----|--------|--------|------------------|--|------------|
| | | | | | O/n | 1w | 1m | 2m | 3m | 6m | | 12m | |
| Loans | | Syndicated loans | 75 | High | | | | | | | | Thomson One (floating rate only) | |
| | | Corporate loans (bilateral) | 339 | 20% | | Low | Medium | Low | Medium | Medium | Low | BOJ Jan2013 | |
| | | Commercial mortgages | | | | | | | | | | | |
| | | Retail mortgages | 124 | 0% | | | | | | | | | BOJ 2012Q4 |
| | | Credit cards | | 0% | | | | | | | | | |
| | | Auto loans | | 0% | | | | | | | | | |
| | | Consumer loans | | 0% | | | | | | | | | |
| | | Student loans | | 0% | | | | | | | | | |
| Bonds | | Floating Rate Notes (FRNs) | 5 | 65% | | | | | Medium | Medium | | JSDA 31Mar2013 | |
| Securitisation | | RMBS | 2 | Low | | | | | | | | JSDA/JBA FY2012 closed | |
| | | CMBS | 0.3 | Low | | | | | | | | | |
| | | ABS | 0.4 | High | | | Low | | | | Low | | |
| | | CLO | 0.4 | | | | | | | | | | |
| OTC Derivatives | | IR Swaps | 4,088 | 60% | | | Low | | Medium | High | Low | DTCC 27Sep2013 (DTCC HP) | |
| | | FRAs | 4 | 60% | | | | | Low | | | | |
| | | Swaption | 391 | 60% | | | | | Medium | High | | | |
| | | Basis Swaps | 394 | 50% | | | | | Medium | High | | | |
| | | IR Options | 29 | 80% | | | | | Medium | Medium | | | |
| | | X-currency swaps | 269 | 40% | | | | | Medium | Medium | | | |
| ETD | | IR Options | 0 | 100% | | | | | Low | | | TKX 09Oct2013 (TKX HP) | |
| | | IR Futures (3m EyroJPY TIBOR) | 44 | 100% | | | | | Medium | | | | |
| Deposits | | Retail deposits | 506 | Low | | | | | | | | BOJ Jan2013 | |
| | | Corporate deposits | 187 | Low | | | | | | | | | |
| Mutual funds | | MMF+MRF+CRF | 12 | Low | | | | | | | | The Investment Trusts Association, Japan | |
| Corporate Loans, Deposits and Retail Mortgage | | Bank of Japan Statistics (5) Deposits and Loans http://www.boj.or.jp/en/statistics/pub/boj_st/index.htm/ | | | | | | | | | | P103-108, 145-148 P172 | |
| FRNs | | JSDA's handbook of public and corporate bonds http://market.jsda.or.jp/shiraberu/saiken/kousyashi/kousyashi/binran154.html | | | | | | | | | | | |
| RMBS, CMBS, ABS and CLO | | JSDA/JBA Securitization Market Trends Survey Report – Issuance Trends in the Fiscal 2012– http://www.jsda.or.jp/shiraberu/syoukenka/doukou/index.html | | | | | | | | | | | |
| MMF, MRF, CRF | | The Investment Trusts Association, Japan http://tskl.toushin.or.jp/FdsWeb/view/FDST010000.seam?largeCategoryCd=000&categoryCd=002 | | | | | | | | | | | |

Appendix B. Legal Appendix

B.1. Transition hypotheses

There are some conceivable options regarding the characteristics and fixing methodologies of the succeeding benchmarks. Such factors would affect the significance and smoothness of the transition.

(a) Transition to another unsecured benchmark

If the new benchmarks succeed to the essential quality of existing LIBOR/TIBOR, namely, the “cost of unsecured borrowing in the interbank market”, the transition to the new benchmarks will be relatively smooth.

(b) Transition to a secured benchmark

If the new benchmarks are recharacterized to be “secured borrowing rates”, certain credit costs for borrowing will be added to the calculation of payouts under the legacy contracts upon the transition (if not terminated). Conflicts of interest will arise between the fixed amount payer and the floating amount payer in a legacy contract when determining the amount of the credit costs. Hence, litigious issues would occur.

(c) Transition to a new fixing methodology

The methodologies of fixing benchmarks, such as (i) an indicative reference (or “poll-based”) method or a transaction-anchored method and (ii) the adoption of interpolation/extrapolation methods would affect the transition process to some extent. The liquidity of JPY based trades is lower than USD based or EUR based trades. Hence the adoption of interpolation/extrapolation methods would be more important.

B.2. How the Abolition of LIBOR/TIBOR and the Shift to a New Index Affect Existing Transactions

B.2.1. Introduction

Specific content of the problem:

In today's market, various financial transactions referencing LIBOR/TIBOR¹ are conducted, voluminously.² Accordingly, we need to carefully examine what effect it will have on existing financial transactions if a new index to replace LIBOR/TIBOR ("New Index") is formulated, and the current LIBOR/TIBOR is consequently abolished.

Types of transactions that will be affected:

We deem that introduction of a New Index will mainly affect the following financial transactions referencing LIBOR/TIBOR:

1. Over-the-counter derivatives (Cleared through a CCP and uncleared)
2. Deposits
3. Loans (including commitment lines)
4. Bonds (including ABS, ABCP, etc.)
5. Listed products
6. Over-the-counter derivatives (Cleared through a CCP and uncleared)

Trading conditions

Over-the-counter derivative transactions referencing LIBOR/TIBOR, such as interest rate swaps, are conducted voluminously. Among them, there are transactions that are cleared through a central clearing organization ("CCP"), such as the Japan Securities Clearing Corporation (the "JSCC"), and transactions that are not cleared through a CCP.

B.2.2. Related provisions contained in the ISDA Definitions

The provisions of the Definitions published by the ISDA (such as the 2006 ISDA Definitions/2000 ISDA Definitions) are of essential importance with regard to the

¹ This memorandum assumes an index regarding the Japanese yen interest rate, as its premise. Although we deem that analyses provided in this memorandum will also mostly apply to other currencies, such as the U.S. dollar and the Euro, we must pay attention to the effect that may arise from differences in the prevailing trade practices in the market, and so forth (e.g., the scope of concentration of clearing of over-the-counter derivative transactions, the CCP, the listing system and so forth).

² In these transactions, the amount of interest, etc. to be paid out is calculated pursuant to a certain formula agreed upon between the parties by using LIBOR/TIBOR.

introduction of a New Index, since many of these over-the-counter derivative transactions reference the ISDA Definitions. Hereinafter, we will examine some important provisions contained in the 2006 ISDA Definitions.

(1) Provision regarding "Price Source Conversion"

The 2006 ISDA Definitions provide that with respect to a "Swap Transaction" if a "Successor Price Source" and a "Successor Price Source Effective Date" have been agreed upon as between the parties, then the "Floating Rate Option" can be amended pursuant to the agreement (see Sections 1.1., 7.4. and 7.5.). However, we deem that the application of this provision in introducing a New Index will be difficult, since such agreements are not normally made under the currently prevailing trade practices in the over-the-counter derivative market.

(2) Provision regarding fallback

The 2006 ISDA Definitions provide for "JPY-LIBOR-Reference Banks" as a fallback for JPY-LIBOR,³ whereas they provide for "JPY-TIBOR-TIBM-Reference Banks" as a fallback for JPY-TIBOR.⁴

"JPY-LIBOR-Reference Banks" means that the rate will be determined by requesting that the "Reference Banks" (four major banks in the London interbank market (Section 7.3.(c)(iv))) provide a quotation of its rate (Section 7.1.(l)(vi)), whereas "JPY-TIBOR-TIBM-Reference Banks" means that the rate will be determined by requesting that the "Reference Banks" (ten major banks in the Tokyo interbank market (Section 7.3.(c)(xxxi)); provided however that with respect to "JPY-TIBOR-TIBM (5 Banks)," five major banks in such market (Section 7.3.(c)(xxx))) provide a quotation of its rate (Section 7.1.(l)(xiii)). However, we deem that in the case of the abolition of LIBOR/TIBOR, the continuous calculation of figures by such methods as the above method will be extremely difficult, from a practical perspective.

(3) Interpolation

The 2006 ISDA Definitions provide that if a "Linear Interpolation" has been agreed upon as between the parties, the rate in respect of the relevant "Calculation Period" shall be determined through the use of straight-line interpolation (Section 8.3.). However, interpolation is merely a method to calculate the interest rate through the use of a linear method, in the case of a partial lack of the index tenor; accordingly, it cannot be used in the case of a total abolition of LIBOR/TIBOR.

³ Regarding JPY-LIBOR, the 2006 ISDA Definitions provide for "JPY-LIBOR-FRASET," "JPY-LIBOR-BBA," and "JPY-LIBOR-BBA-Bloomberg" (Section 7.1.(l)(iii)-(v)), for all of which "JPY-LIBOR-Reference Banks" is provided as a fallback.

⁴ Regarding JPY-TIBOR, the 2006 ISDA Definitions provide for "JPY-TIBOR-TIBM (10 Banks)," "JPY-TIBOR-TIBM (5 Banks)," "JPY-TIBOR-TIBM (All Banks)," "JPY-TIBOR-TIBM (All Banks)-Bloomberg," and "JPY-TIBOR-ZTIBOR" (Section 7.1.(l)(viii)-(xii)), for all of which "JPY-TIBOR-Reference Banks" is provided as a fallback.

Possible resolutions

(1) Method under which the determination of the rate will be left to the rational interpretation of the intention of the parties to the agreement

As a rational interpretation of the intention regarding the original agreement, we could consider that the parties intended to shift to a New Index upon the abolition of LIBOR/TIBOR and the introduction of a New Index, without separately executing a new memorandum, etc. However, it is not necessarily clear whether this interpretation is possible or not; it may incur major confusion.

(2) Method under which a new memorandum or amendment agreement, etc. will be executed between the parties to the agreement

The shift to a New Index can be expressly agreed upon by executing a new memorandum or amendment agreement, etc. However, the execution of a memorandum or amendment agreement, etc. for each of a number of transactions, one-by-one, would incur significant time and cost.

(3) Method under which the ISDA will formulate a protocol

Under this method, the ISDA will formulate a unified protocol regarding the abolition of LIBOR/TIBOR and the shift to a New Index, and the approval of a shift to a New Index by any transaction between market participants will be conditioned on their submission of an adherence letter. There is a past case where the ISDA adopted this protocol method when consensus formation among market participants was deemed necessary; accordingly, it is desirable that the ISDA take similar procedures regarding the abolition of LIBOR/TIBOR and the shift to a New Index.⁵

(4) Clearing of existing transactions and introduction of a New Index by amending CCP's business rules, etc.

We expect that, regarding over-the-counter derivative transactions cleared through a CCP, the CCP's business rules, etc. will be amended, and the business rules, etc. after such amendment will enable abolition of LIBOR/TIBOR and the introduction of a New Index in a unified manner.

For example, in the case of JSCC, the "Interest Rate Swap Clearing Business Rules" (the "Business Rules") and the "Handling Procedures of Interest Rate Swap Business Rules" (the "IRS Procedures") have been established regarding the clearing of interest rate swap transactions, in order to set forth matters necessary between JSCC and the clearing

⁵ Recently, the ISDA published the "ISDA 2013 Discontinued Rates Maturities Protocol" as of October 11, 2013 (<http://www2.isda.org/functional-areas/protocol-management/protocol/16>). According to the protocol, in the case where the provision of an index corresponding to a specific tenor for the "Floating Rate Option" (2006 ISDA Definitions Section 6.2.(h)) has been ended, but the provision of an index corresponding to another tenor longer or shorter than the said tenor is still conducted, the specific interest rate to be affected thereby can be determined by the straight-line interpolation method that uses the index corresponding to the other longer or shorter tenor.

participants/clearing customers in respect of assumption of obligation by JSCC and the clearing contracts.⁶

Accordingly, when amending the Business Rules and the IRS Procedures for the introduction of a New Index, it will be necessary to take the due procedures set forth therein.^{7 8}

B.2.3. Deposits/loans/bonds

Trading conditions

In today's market, a number of deposits/loans/bonds and other financial transactions are conducted whose interest, etc. is calculated by reference to LIBOR/TIBOR. The specific method of calculation of the amount of interest, etc. to be paid out using LIBOR/TIBOR is specifically provided for in the terms of deposit, the loan agreement, and the terms and conditions of bond, etc. However, there are many cases where the measures to be taken at the time of the introduction of a New Index are not expressly agreed upon.

Possible resolutions

- (1) Method under which the determination of the rate will be left to the rational interpretation of the intention of the parties to the agreement

As a rational interpretation of the intention regarding the original agreement, we could consider that the parties intended to shift to a New Index upon the abolition of LIBOR/TIBOR and the introduction of a New Index, without separately executing a new memorandum, etc. However, it is not necessarily clear whether this interpretation is possible or not; it may incur major confusion.

⁶ As an expected effect of the abolition of LIBOR/TIBOR and the shift to a New Index over the interest rate swap clearing business carried out by JSCC, we, for example, raise the point that whereas the interest rate swap transactions subject to clearing by JSCC shall be limited to "Eligible IRS Transactions" (Article 4 of the Business Rules), one of the requirements to qualify as an Eligible IRS Transaction is that the method to determine the floating interest rate be limited to "JPY-LIBOR-BBA" or "JPY-TIBOR-ZTIBOR" as mentioned above (Article 9(5) of the IRS Procedures).

⁷ As a specific procedure for amendment, we deem that it may be necessary to consult with the IRS Management Committee pursuant to Article 122, item 1 of the Business Rules, since this amendment will require amendment of the definition of the "Eligible IRS Transactions" set forth in Article 4 of the Business Rules, as described in footnote 6. Further, it will also be necessary for JSCC to notify the clearing participants of the amendment before the effective date of the amendment (Article 121 of the Business Rules). In this regard, we deem that it will also be necessary to exercise caution so that no changes shall accrue to existing transactions, from an economic perspective, as a result of the shift to a New Index.

⁸ Article 2, item 2 of the sample form of the interest swap clearing participant agreement (Exhibit Form 2 attached to the IRS Procedures), which is entered into between JSCC and a clearing participant, sets forth that the Business Rules shall be incorporated into the agreement, and Article 2, item 3 sets forth that in the case of amendment of the Business Rules pursuant to the provisions thereof, the contents of the agreement shall also be amended as a matter of course to reflect such amendment on or after the amendment date. Accordingly, as long as the procedures of amendment of the Business Rules corresponding to the abolition of LIBOR/TIBOR and the introduction of a New Index are duly taken, we deem it possible to enable the effect of such amendment to extend to clearing participants and clearing customers.

- (2) Method under which a new memorandum or amendment agreement, etc. will be executed between the parties to the agreement

The shift to a New Index can be expressly agreed upon by executing a new memorandum or amendment agreement, etc. However, it is expected that execution of a memorandum or amendment agreement, etc. for each of a number of transactions, one-by-one, would incur significant time and cost.⁹

⁹ However, we deem that examination of the method of execution of a new memorandum or amendment agreement, etc. will be necessary, since it would be difficult to accept the confusion to be incurred in the case of adopting a method under which the determination of the rate will be left to the rational interpretation of the intention of the parties to the agreement, whereas it would be difficult to adopt the protocol method, as opposed to the case of over-the-counter derivative transactions. Still, it will not necessarily be the case that the counterparty would accept negotiations to amend the existing agreement. In this respect, there is a civil law principle called the principle of circumstantial change, which is not expressly stipulated in the law, but which is generally affirmed pursuant to the good faith principle, according to which, cancellation of an agreement or revision of the contents of an agreement can be requested, if the following requirements are satisfied: (i) there has been a change in the circumstances that were the basis of the formation of the agreement at that time; (ii) the change was not foreseen or foreseeable by the party; (iii) the circumstantial change has occurred due to an event not attributable to the party; and (iv) as a result of the circumstantial change, binding the party to the content of the initial agreement would be deemed to be extremely unfair in light of the good faith principle (however, although the Supreme Court's precedents generally theoretically affirm this principle, there are no Supreme Court precedents that have eventually affirmed the application of this principle).

B.2.4. Listed products

We expect that, regarding over-the-counter derivative transactions listed at an exchange, the exchange's business rules will be amended, and the business rules after such amendment will enable taking procedures to delist the relevant transaction (and list a new transaction), as well as abolition of LIBOR/TIBOR (and the introduction of a New Index) in a unified manner.

For example, regarding the Tokyo Financial Exchange ("TFX"), its Trading Regulations set forth matters necessary for market derivative transactions at TFX.¹⁰ In amending the Trading Regulations, etc. in relation to the introduction of a New Index, it will be necessary to take the due procedures set forth therein. Article 1, paragraph 2 of the Trading Regulations sets forth that an amendment to the Trading Regulations shall require (i) a resolution of the board of directors, or (ii) both a resolution of the board of directors and the consent of the self-regulatory committee. Accordingly, we deem that taking of the said internal procedures in the due manner would enable the effect of such amendment corresponding to the abolition of LIBOR/TIBOR and the introduction of a New Index to extend to trading participants.¹¹

¹⁰ As an expected effect of the abolition of LIBOR/TIBOR and the shift to a New Index over the interest rate swap clearing business carried out by TFX, we, for example, raise the point that regarding the standardized yen interest rate swap contract which shall be the basis for the calculation of the financial indices regarding yen interest rate swap futures ("¥ Swapnote™"), out of the products to be traded for the market derivatives transactions, the floating interest rate is defined as Euroyen LIBOR (Articles 3 and 3-2 of the Trading Regulations).

¹¹ In this regard, it is not unquestionable that merely taking these internal procedures would enable the effect of the amendment of the Trading Regulations to extend to trading participants since the aforementioned consents of the board of directors and the self-regulatory committee are nothing more than TFX's internal procedures that do not require consent, etc. of trading participants. (However, there may be a provision in the agreement entered into between TFX and a trading participant to the effect that the trading participant shall be bound by amendments to the Trading Regulations, although we have not yet been able to confirm this during the course of our investigation up to date.)

Appendix C. Outreach to Market Participants

C.1. Full questionnaire

(QUESTION 1)

Please list the benchmarks currently used by your organization and for what products and if relevant what tenor. (Currency Japanese Yen)

Example for usage: Floating rate bank loan, IRS, Corporate bonds etc.

Example for indexes: TIBOR(3M), YEN LIBOR(6M) etc.

(QUESTION 2)

Using the list provided by your answer to Question 1, please identify potential candidates for replacement Benchmarks for each of the existing Benchmarks by product. If there are multiple potential replacement Benchmarks for a given product, please list each.

Example for alternatives: TIBOR, YEN LIBOR, Overnight Index Swaps, TDBs, Repos, Bank issuing CD/CP etc.

(QUESTION 3)

Please provide reason why you choose the indexes in Question 2.

(QUESTION 4)

Please indicate what issues will arise in transitioning from a legacy Benchmark to a replacement Benchmark assuming the indexes that you currently use should be replaced by the new one. Please consider how those impacts would be mitigated.

Market Participants Group on Reforming Interest Rate Benchmarks

Emerging Markets Report

March 2014

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Executive Summary

1. Market Footprint
 - 1.1. Approach
 - 1.2. Summary of Findings

2. Outreach to Market Participants
 - 2.1. Outreach approach
 - 2.2. Benchmark usage by outreach contributors
 - 2.3. Potential alternative reference rates
 - 2.4. Transitions
 - 2.5. Other feedback

Appendix A. Outreach to Market Participants

- A.1. List of Outreach participants
- A.2. Full questionnaire

Executive Summary

This section of the MPG report discusses the implications for emerging markets (EM) of reforming reference rates in the “major” currencies, particularly USD and to some extent EUR. Foreign banks provide a substantial amount of loans and take a significant amount of deposits in these global currencies, particularly USD. Thus, any change to these global benchmarks will have an impact on participants in emerging markets, particularly banks, corporate borrowers, and depositors.

Our work on emerging-market implications occurs in two work streams: Market Footprint and Outreach. Of course, there is no emerging-market MPG work to be done with respect to recommending EM reference rate menus or fixing methods. Some of the implications for transition strategies are covered in part by the MPG’s major-currency Transition reports, particularly USD, which lays out recommended timing for transition of USD benchmarks. Unfortunately, the MPG does not have the resources to recommend specific jurisdiction-by-jurisdiction transition strategies for legacy EM global-currency loans that take account of local conditions. We recommend, at a minimum, that regulators in all affected emerging market countries be kept apprised by the FSB and major-currency regulators of plans for changes in global interest rate benchmarks, so as to provide maximum time for local transition planning, thus minimizing disruption.

In terms of total volumes, major-currency benchmark use is greatest in North-East Asia, South-East Asia, South Asia, and Africa, where foreign currency loans and deposits are generally between \$100 billion and \$1 trillion outstanding in each of these regions, with the biggest concentration in South-East Asia. In Asia generally, USD 3-month and 6-month Libor is the dominant benchmark for floating-rate loan products. In the Middle East and in Eastern Europe, both USD and EUR benchmarks are used significantly among floating-rate foreign currency products. At the median across the various EM regions, about 14% of total loans and about 10% of total deposits are in foreign currencies. The Market Footprint workstream has used its best sources and efforts, but in many cases the available data are somewhat sketchy, and gleaned largely from the annual reports of banks.

The EM Outreach workstream has conducted a relatively extensive survey of emerging market participants of various types. The Outreach results are summarized in Section 3. Banks in emerging markets reported that pricing, valuation, and price volatility will be their major transition concerns. There is generally a market convention to price from Libor curves. Transitioning to replacement benchmarks would thus cause mark-to-market impacts for existing positions, which would have a proportionally larger impact on longer-dated securities and derivatives positions. EM banks were also concerned about operational transition issues.

During Phase 2 of the MPG project, additional outreach contacts were made with selected operating companies and financial institutions in South Asia and South America in order to better ascertain the extent and types of transition risks in these regions. These contacts confirmed the sorts of findings obtained in Phase 1 of the Outreach workstream. The MPG is grateful for the help of OSSG members in these regions, who assisted the MPG chair with contact information.

1. Market Footprint

1.1. Approach

Compared to the derivatives world, there is a distinct lack of published information on Libor and Euribor-related loans and deposits outside of the home countries. On that basis, the EM Market Footprint Workstream took a two-pronged approach – bottom up and top down.

Despite the lack of data, the workstream was able to make some broad estimates from bottom-up analyses of Banks annual reports for regional foreign currency loans and deposits across Asia, South America and Eastern Europe.

Bottom up: Building a picture from Bank Annual Reports

Loan and deposit volumes for Asia were built up on a country-by-country approach. Data from outside Asia was sourced from the annual reports of the 10 largest banks per region.

The following assumptions were made:

- **Currency mix** – often only a ‘foreign currency’ bucket is reported. For many countries, USD is likely to be the bulk of foreign currency loans and deposits and we do not expect to be able to source meaningful data on the other currencies – so the analysis focuses on USD
- **Fixed vs. floating mix** - the proportions of USD assets and liabilities (when they are reported)
- **Client segment mix** – no assumption is made (and therefore no breakdown is provided) for retail vs. SME vs. commercial

Top down: Selective approaches to regulators

Selective approaches were made to regulators to see whether they would share unpublished data.

1.2. Summary of Findings

The tables below show the percentage mix of foreign to domestic Currency L&D. Anecdotally, USD Libor products make up the majority (>80%) of the Foreign Currency L&D (using 3-month and 6-month benchmarks) except for Eastern Europe and the Middle East where EUR L&D represent 25-40% of the overall mix. The annual reports for the Latin American Banks had very limited data, so the data there should be handled with care.

See appendix for detailed results.

Figure 1: Foreign Currency Loans and Deposits in Emerging Markets

| | South East Asia | | North East Asia | | South Asia | | Eastern Europe | | Middle East | | Africa | | Latin America | |
|----------------------------------|-----------------|----------|-----------------|----------|------------|----------|----------------|----------|-------------|----------|------------|----------|---------------|----------|
| | \$BN | Of Total | \$BN | Of Total | \$BN | Of Total | \$BN | Of Total | \$BN | Of Total | \$BN | Of Total | \$BN | Of Total |
| Foreign Currency Loans | 176 | 11% | 825 | 27% | 106 | 18% | 24 | 27% | 16 | 14% | 252 | 5% | 58 | 7% |
| Foreign Currency Deposits | 154 | 10% | 715 | 24% | 73 | 10% | 52 | 25% | 15 | 21% | 215 | 4% | 60 | 8% |

| | |
|---------------|-----------------|
| High | >\$1TN |
| Medium | \$100BN>x>\$1TN |
| Low | <\$100BN |

| Country | Region | Date | Loans (LC bn) | | | Deposits (LC bn) | | |
|-------------|------------|--------|---------------|---------|---------|------------------|---------|---------|
| | | | Total | FC | USD | Total | FC | USD |
| China | NE Asia | Dec-12 | 42,913 | | 3,541 | 65,077 | | 2,286 |
| Hong Kong** | NE Asia | Jun-13 | 6,098 | 2,608 | 1,566 | 8,481 | 4,314 | 2,590 |
| India | South Asia | Mar-13 | 31,839 | 5,759 | | 38,551 | 3,965 | |
| Korea** | NE Asia | Jun-13 | 1,372,286 | 105,354 | 89,551 | 1,297,591 | 58,704 | 55,182 |
| Singapore | SE Asia | Jun-13 | 570 | 301 | 143 | 627 | 298 | 110 |
| Malaysia** | SE Asia | Jun-13 | 1,164 | 44 | | 1,470 | 80 | |
| Indonesia** | SE Asia | Jun-13 | 2,994,835 | 440,559 | 319,719 | 3,276,717 | 506,616 | 372,995 |
| Thailand | SE Asia | Dec-12 | 6,257 | 657 | 532 | 6,727 | 269 | 148 |

| Loans (USD bn) | | Dep (USD bn) | | Exch rate |
|----------------|------------|--------------|------------|-----------|
| (USD/FC) | % floating | (USD/FC) | % floating | |
| 568 | 100% | 367 | 100% | 6.23 |
| 202 | 100% | 334 | 100% | 7.76 |
| 106 | 100% | 73 | 100% | 54.28 |
| 78 | 70% | 48 | 30% | 1,142 |
| 113 | 100% | 87 | 100% | 1.27 |
| 14 | 100% | 25 | 100% | 3.16 |
| 32 | 100% | 37 | 100% | 10,004 |
| 17 | 100% | 5 | 100% | 30.59 |

| | Date | Loans (USD bn) | | | Deposits (USD bn) | | |
|----------------|--------|----------------|-----|-----|-------------------|-----|-----|
| | | Total | FC | USD | Total | FC | USD |
| Latin America | Dec-12 | 895 | 58 | | 736 | 60 | |
| Eastern Europe | Dec-12 | 927 | 252 | | 842 | 215 | |
| Middle East | Dec-12 | 437 | 62 | 24 | 495 | 110 | 52 |
| Africa | Dec-12 | 299 | 16 | | 351 | 15 | |

| Loans (USD bn) | | Dep (USD bn) | |
|----------------|------------|--------------|------------|
| (USD/FC) | % floating | (USD/FC) | % floating |
| 58 | 100% | 60 | 100% |
| 252 | 100% | 215 | 100% |
| 24 | 100% | 52 | 100% |
| 16 | 100% | 15 | 100% |

| | Banks under | Loans | | Deposits | |
|-----------|-------------|---------|---------|----------|---------|
| | | FC | USD | FC | USD |
| Indonesia | | 138,751 | 100,693 | 192,994 | 142,091 |

*Numbers in red are assumptions

**System-wide loans and deposits data

For other economies, it is based on our coverage universe

2. Outreach to Market Participants

2.1. Outreach approach

A survey was conducted with a number of organisations outside of the home countries (a home country would be what the US is for USD). A questionnaire was shared with participants to provide responses. The list of outreach participants can be found in Appendix A. The questionnaire asked participants' questions about the use of Benchmarks in their organisation and issues in transitioning to a replacement Benchmark. The full questionnaire can be found in Appendix B. However some respondents only provided high-level responses while others did not answer all questions. A major challenge is that the use of the surveyed currencies outside their home countries is rather limited except USD and EUR.

2.2. Benchmark usage by outreach contributors

Banks

- Commercial loans are usually linked to Libor.
- Commercial deposit fixings are linked to Libor (6 month). One bank commented that savings deposit rates are market-driven and Libid may be used.
- Interest rate swaps (IRS) and cross-currency swaps (CCS) are often linked to Libor (3 or 6 month). One bank said they used 1 or 3 month Libor for maturities less than 1 year and 3 month for maturities more than 1 year.
- Retail Mortgage-Backed Securities (RMBS) are linked to Libor (1 month).
- Euro instruments are more often linked to Euribor. One of the banks surveyed used both Euribor (2 month) and Eurolibor (2 month) for commercial loan fixings.
- For JPY, GBP and CHF, banks typically use Libor (3 or 6 month).
- Other USD benchmarks used by banks include the Treasury curve, overnight index swaps (OIS) and constant maturity swaps (CMS).
- Other euro benchmarks used by banks include mid-swap, German government bonds, euro overnight index average (EONIA) and CMS.
- Finally, Tibor is also used by banks as JPY benchmark.

Investors

- An insurance company said they invested in LIBOR-referenced securities in GBP, euro and USD through its Floating-Rate Note (FRN) portfolio.
- A pension plan said they used custom US treasury indices for their cash US treasury portfolio and 45 day Libor/45 day OIS for their alpha portfolio.
- An asset management firm said they used USD Libor (1 month to 12 month maturity) for their money market fund products.
- A securities firm said they used USD IRS rate (1 year to 10 year) for their derivative-linked security (DLS) and JPY Libor (6 month) for exotic swaps.

Other

- Singapore Stock Exchange, which provides USD IRS clearing, used O/N, 1W, 1M, 2M, 3M, 6M Libor fixings for its clearing.
- The Hong Kong Stock Exchange, which provides USD and euro IRS clearing, used USD Libor and Euribor/Eurolibor respectively.

2.3. Potential alternative reference rates

Banks

- Overall, banks said they do not favor a change or have not considered the issue. Client preference and a lack of consensus were cited as the reasons.
- One bank said in the case of some customers Libor and USD Interest Rate Fixing (TMUSD) could be a replacement for each other.
- Another bank suggested that since government bills/bonds are considered the most liquid, risk-free and the most commonly-traded in the market, a complete government bills/bonds curve pertaining to a currency (e.g. UST for USD) which shows the yield for all tenors could be a potential candidate.
- OIS was also suggested by one bank as it felt that there was certainly going to be a market for OIS (frequent re-sets) in crisis situations unlike the 3-month benchmark which does not necessarily trade during crisis times.
- In addition to existing benchmarks, Greek banks suggested deriving new Benchmarks as potential replacement Benchmarks:

For derivatives:

- Potential candidates can be brokers' pages with tradable prices that will set a fixing during the day.
- On deposits and loans, the potential candidate can be a new benchmark set:
 - As the mean price of a number of institutions, where their quotes are revealed only to the central bank, who not only will supervise but will be able to transact at these prices during the Fixing.
 - As the mid-price of a number of institutions and brokers, where a number of highs and lows will be excluded from the calculation of the Fixing. In order to avoid beautifying (rumors, reputational risk, etc.), quotes should be revealed only to the central bank.
- Using implied rates from OIS.

Investors

A pension plan said they have looked at bond baskets as an alternative without specifying the composition.

A securities firm suggested replacing with USD Libor with T-bill, USD IRS with T-note and JPY Libor by JGB.

Other

One of the exchanges we surveyed opined that data based on trading data is preferable to avoid 'gaming' adding that trading data could either be from trade reports (like an exchange—traded market) or akin to the credit fixings for CDS to stack bids and offers for a mid-market level. In addition, the exchange also suggested existing alternative benchmarks:

Table 1

| Benchmarks | Replacement benchmarks |
|------------|--|
| USD Libor | <ul style="list-style-type: none"> • Federal funds rate • USD OIS swaps referencing Fed Funds rate |
| Euribor | <ul style="list-style-type: none"> • EONIA |
| Eurolibor | <ul style="list-style-type: none"> • Euro OIS swaps referencing EONIA rate |

An industry trade group highlighted that most benchmarks would have a fallback mechanism should there be a disruption. There is potential to use FRA as replacement benchmarks for USD, euro, JPY, GBP and CHF. Apart from that, IR futures are would-be candidates but the apparent problem is that their settlement is defined to be Libor. Thus making Libor tradable would be a straightforward way by forcing reference banks to be market makers.

2.4. Transitions

Summary of feedback from banks, investors, others

- Banks reported that pricing, valuation and price volatility will be the major concerns. Market convention is to price off the Libor curves in the respective currencies. In the event of transitioning to a replacement benchmark, the pricing methodology would change thus creating mark-to-market swings on existing positions which would have a proportionally larger impact on longer-dated securities and derivatives positions. Depending on the composition of this replacement benchmark, the magnitude of change, and how it is implemented, it could create temporary disruptions as market participants adjust to the new pricing methodology.
- Banks were also concerned about operational issues that would arise transitioning from a legacy benchmark to a replacement benchmark.
- On cost, banks said that for new deals, given enough time and preparation, the cost should be minimal for new deals whereas the cost and time for longer tenor old deals would be a concern.
- In terms of transition time, one bank estimated that regulatory approval (In Korea, a change in benchmark needs regulatory approval) would take six months to one year while changes to internal systems are expected to take one to three months. The bank also highlighted the difficulty in maintaining two different benchmarks (e.g. one for short

tenor and another for long tenor) given the valuation difference between products. Hence a comfortable transition time would be advisable.

- Banks also raised issues as regards the legal framework – all legal documents will have to be restructured and existing contracts may have to be re-authorized. Also, if the applicable interest rate benchmarks are specified in an agreement, banks may not be able to change to a replacement benchmark without client consent. On this issue, an industry trade organization cited how the discontinuation of AUD Libor and the transition to Bank Bill Swap (BBSW) led to renegotiations of contracts that impacted client profitability / internal transfer pricing. Respondents generally suggested the transition to be mandatory to avoid legal issues.
- Finally, banks need to spend time to educate market participants and the public on the composition of the replacement benchmarks, the justification and their representativeness of market conditions.

2.5. Other feedback

Market evolution or action that would need to occur

- Banks generally think the benchmark should have good liquidity and a large number of users hence large market acceptance.
- In terms of governance, banks suggested using a central exchange as well as having at least one regulatory body responsible for monitoring.
- Banks also expressed their opinions as regards the representativeness of a new benchmark. Emphasis was put on the benchmark being market-driven (e.g. average rates of actual deals done) rather than being survey-based. Ideally, trading data of interbank money market instruments (e.g. interbank lending, CD/CPs, repo, etc.) that fall within a specific set of criteria (e.g. deals by investment-grade cash-takers only) will be captured by a standardized electronic platform to generate a set of weighted average benchmark rates for all tenors of each currency.
- The usefulness of the rates generated by the new benchmark was also of interest to market participants. As the replacement will be a product containing credit risk, it will be difficult to agree which names to become the benchmark. Also, without introducing spreads over the or under other benchmarks, it would be difficult to be able to infer the transactional information produced by other traded instruments. The changed dynamic of the benchmark through the use of traded adjacencies could introduce other issues such as complicating the situation through spreads between different benchmarks being affected by supply and demand themselves. Strengthening the benchmark's description and guidelines to produce it will be more beneficial

Information that should be considered by the MPG

- In addition to having good liquidity and being market-driven, one bank emphasized global participation in that benchmark setting should include Asian banks rather than just European or US banks.
- In order to avoid manipulation and maintain market stability, the transition should address conflict(s) of interest, vulnerabilities of the fixing methodology, governance, quality and accountability.

Market Participants Group on Reforming Interest Rate Benchmarks

Emerging Markets Report Appendix

March 2014

Appendix A. Outreach Appendix

A.1. List of Outreach participants

| Segment | Outreach participant |
|------------------------------------|--|
| Banks | <ul style="list-style-type: none">• Colonial First Stat• Industrial & Commercial Bank of China• Bank of China (Hong Kong)• Agricultural Bank of China Head Office• Dah Sing Bank• Citic Bank International (Hong Kong)• Korea Exchange Bank• Shinhan Bank• Sumimoto Mitsui Banking Corporation, Hong Kong Branch• Standard Chartered Hong Kong• CIBC Treasury• Greek banks whose data was collected by HSBC Athens• Asia Securities Industry & Markets Association (Response from a Japanese member bank)• Citibank NA Hong Kong branch |
| Asset managers | <ul style="list-style-type: none">• Kapstream• Woori Investment & Securities• Ontario Teachers' Pension Plan• Brookfield Asset Management |
| Exchanges and post-trade providers | <ul style="list-style-type: none">• The Hong Kong Stock Exchange (HKEx)• Singapore Exchange (SGX) |
| Other | <ul style="list-style-type: none">• QBE• Asia Securities Industry & Markets Association (ASIFMA) |

A.2. Full questionnaire

QUESTIONS FOR MARKET PARTICIPANTS

Dear Market Participant:

The Financial Stability Board (FSB) has established a high-level Official Sector Steering Group (OSSG) of regulators and central banks, with responsibility for coordinating reviews of existing interest rate benchmarks. The OSSG has established a Market Participants Group (MPG) charged with examining the feasibility and viability of adopting additional reference rates and potential transition issues.

For more information about these efforts and the membership of the OSSG and MPG, please see: http://www.financialstabilityboard.org/publications/r_130829f.pdf

The MPG has concluded its recommendations to the OSSG would benefit from direct outreach to a diverse set of market participants, organized by region. We ask that you respond to the questions in this short questionnaire to help inform the MPG about the views of market users on additional reference rates and potential transition issues.

In completing this questionnaire, please refer to the IOSCO Principles for Benchmarks <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf> and in particular Principle 7 summarized in the footnote.

We appreciate your response to the questionnaire not later than 20 October 2013 as your answers will be used to inform the MPG activities in several other work streams. The MPG has committed to deliver its draft recommendations to the OSSG in December. The OSSG has asked that we retain a record of our outreach efforts so please be sure to indicate the name of your institution at the end of the form. Also, we ask for a contact person in the event follow-up is needed.

QUESTION 1: Please list the USD, EUR, JPY, GBP and CHF Benchmarks currently used by your organization and for what products and if relevant what tenor. This list should be as complete as possible and for complex institutions likely include multiple Benchmarks as used by different businesses (e.g., commercial loans, mortgage loans, student loans and other consumer loans originated by the bank, swap transactions by the dealer desk, margin loans by the broker/dealer, etc).

QUESTION 2: Using the list provided by your answer to Question 1, please identify potential candidates for replacement Benchmarks for each of the existing Benchmarks by product. If there are multiple potential replacement Benchmarks for a given product, please list each.

QUESTION 3: Are there other potential Benchmarks that could be replacement Benchmarks if further market evolution were to occur or if certain actions were taken to make this particular Benchmark more useful or viable (e.g., actions that increased liquidity in the underlying reference). Consider in this response whether imputed rates in traded adjacencies (investment grade bonds, CP, etc) may provide transaction information that could be utilized to create a Benchmark for certain tenors that meets IOSCO Principle 7. Please specify the potential Benchmark and data source, its product use and what market evolution or action would need to occur.

QUESTION 4: Using the lists provided in response to Questions 1 and 2, please indicate, with as much detail as possible, what issues will arise in transitioning from a legacy Benchmark to a replacement Benchmark. If there will be different issues (for example, the time need to transition may differ do to the use of a legacy Benchmark). Please consider in this response whether transition should be mandatory or voluntary, the economics of a transition (and how those costs would be apportioned) and how best to accommodate legacy Benchmarks contained in long tenor transactions. Responses may differ depending on the Benchmark and/or the product.

QUESTION 5: From a market participant perspective is there information that your firm believes should be considered by the MPG in making its recommendations to the OSSG as to replacement Benchmarks and necessary transition periods and actions?

Market Participants Group on Reforming Interest Rate Benchmarks

Alternative Reference Rate Approaches

March 2014

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Executive Summary

This appendix discusses the feasibility of several alternative approaches that we considered for obtaining reference rates. These are:

- A. Inferring reference rates in a given currency from reference rates in other currencies and foreign-exchange forward prices, using the covered-interest-parity formula.
- B. Obtaining a term unsecured rate of bank credit quality from a near-risk-free rate and an estimate of credit spreads obtained from credit default swap rates on a panel of referenced banks.
- C. Interpolating, from futures prices on overnight rates, the term rate implied by compounding the overnight rate (which is, in effect, the overnight index swap rate).
- D. Inferring a synthetic reference rate from put-call parity pricing relationships between option prices and bond prices.

After evaluating these approaches, the MPG chose not to recommend any of them as feasible and viable reference rates, although we do recommend the use of futures-implied USD OIS rates as a backup fixing method for USD OIS rates.

Appendix A. FX-Implied Reference Rates

Less developed financial markets can face liquidity constraints in deriving a market-based interest rate as a reference for domestic borrowing and lending. While FX-implied interest rates can partially solve liquidity issues, the MPG believes that credit, convertibility and domestic US\$ liquidity issues make such rates highly problematic for use as reference rates. We do not recommend that FX-implied rates be used as reference rates except in the rare cases of offshore financial centres

An accurate measure for the price of domestic liquidity is critical for any economy, forming the basis for lending from corporate loans to household mortgages. As the IBOR issues have illustrated, however, an accurate measure can be problematic to determine, with reforms shifting towards using transaction-based approaches in preference to polled contributions.

A.1. Issues With Domestic Interest Rate Determination

In deep, liquid money markets such as the US or Europe, the volume of daily transactions in benchmark tenors means that such an approach is relatively straightforward. However, in many emerging and less developed economies, the volume of activity is significantly lower and hence a transaction-based domestic interest rate might not be available.

For developing economies, domestic credit creation and a reliable interest rate channel are often weak. However, such developing economies will typically have a higher ratio of total trade to overall economic activity (as services are more typically non-tradeable but become more important at a later stage of economic development). Further, the importers and exporter usually are active in converting their trade activity from a foreign currency to a local one. In this situation, the foreign exchange market is often more liquid than the interest rate market and hence raises the potential of using FX-implied interest rates instead of a domestic interest rate.

A.2. Defining Fx-Implied Interest Rates

Interest rates for domestic markets can be derived using a no-arbitrage approach called interest rate parity. The principle behind this calculation is that a dollar invested in the US dollar interest rate market should have the same return as converting that dollar into another currency, investing at the prevailing interest rate in that foreign currency and converting back through the forward exchange rate using a rate determined at inception. Formally, this can be expressed as:

$$1 + r_{\$} \cdot t = \frac{e(1 + r_f \cdot t)}{e^*}$$

Where $r_{\$}$ is the US\$ interest rate for period t , r_f is the foreign interest rate for period t , e is the spot exchange rate between US\$ and the foreign currency, and e^* is the forward outright exchange period at time t . The FX-implied interest rate is then determined by solving for r_f .

A.3. Why FX-Implied Rates Fail The No Arbitrage Condition

The expression used above is a commonly used formulation in foreign exchange markets. However, in very important ways, this does not satisfy the no arbitrage condition. The three most important ways in which problems arise are in credit risk, convertibility risk, and liquidity risk.

A.4. Credit Risk

The credit risk issue arises as the equation above assumes that the credit exposure in all four legs of the transaction (US interest rates, domestic interest rates, spot foreign exchange and forward foreign exchange) are identical. However, this is rarely the case. For example, taking the US interest rate, market convention is to use US\$ LIBOR. That interest rate, however, represents the cost of credit for LIBOR banks. By contrast, participants in the market for which the calculation is being made might have a different cost of credit, possibly lower or possibly higher.

One such extreme example is for Iceland in 2008. In April that year, the domestic interest rate (Reykjavik Interbank Offer Rate, REIBOR) for the 3-month tenor was at around 15.5%; the FX-implied interest rate was near zero. The explanation was that Icelandic banks were unable to fund directly in US dollars and so were borrowing synthetically through the FX market, with an implied US dollar cost of funds at around US LIBOR +15.5%. In this environment, not only is the FX-implied rate inaccurate but it will actually fall even as funding conditions deteriorate. We will return later to the issue of why a domestic US dollar interest rate is also not feasible.

A.5. Convertibility Risk

The FX-implied rate above assumes an absence of convertibility risk. In many instances this is a material risk and again is exacerbated during periods of heightened stress on the balance of payments. The clearest observation of this can be seen for non-deliverable forward (NDF) markets, although the application is broader if expectations of convertibility risk rise.

This phenomenon was seen clearly in Brazil in 2002, in the run-up to the presidential elections. At that time, FX-implied rates from the non-deliverable forward market were negative in the front end of the curve. This was caused by a significant preference to convert Brazilian Real (BRL) into US dollars immediately, rather than to risk being unable to move BRL offshore at the expiry of the NDF contract (an additional concern for NDF currencies is that this is a contract for difference, so although the payment at expiry is in USD, the full amount is not hedged).

A.6. Liquidity Risk

To avoid the credit risk issue highlighted above, the fx-implied rate can be based on paired spot and forward fx transactions (the reference spot rate for transacted FX forwards), along with the US\$ cost of funds for the same time period for the counterparties involved in that trade. While FX liquidity might be deeper than domestic interest rate liquidity either across the term structure or in longer tenors, this fx-implied approach requires not only liquidity in

the spot and forward fx markets, but also in domestic US\$ liquidity. As noted in the Icelandic example above, during periods of financial distress, domestic banks might not be able to access US\$ liquidity, hence the problem of determining an accurate, traded interest rate remains unsolved.

A.7. Appropriateness for Offshore Financial Centres

In a very limited set of countries, fx-implied interest rates can be a relevant interest rate. We believe this is in the instance of offshore financial centres, where significant banking activity is conducted by a large proportion of international banks who fund primarily by bringing funding onshore through the foreign exchange market. Singapore is the clearest such example, and in this instance the Swap Offer Rate (SOR) is calculated as above. As we have noted though, the issue of determining the appropriate US\$ interest rate has been a key concern, with a switch from 1 January 2014 from using US\$ SIBOR (Singapore Interbank Offer Rate) to US\$ LIBOR, to address issues regarding liquidity of locally-determined US\$ funding.

A.8. Recommendation

Broadly then, we believe that FX-implied interest rates are not an appropriate reference rate as there are too many variables that can bias the result (credit, convertibility and liquidity) and in periods of distress, they fail to represent pricing of domestic liquidity.

Appendix B. CDS-Implied Synthetic Reference Rates

B.1. Introduction

The purpose of this note is to discuss the feasibility of a synthetic substitute for LIBOR based on the sum of a risk-free rate and a new short tenor CDS index rate.

Arguably, one of the reasons LIBOR is widely used as a benchmark is that it reflects the short term unsecured funding cost of financial institutions. To the extent that this is important then a synthetic alternative should have a similar credit quality. Of course, if most swap transactions are motivated by hedging interest rate risk, and only a subset of the participants care about the bank funding cost aspect of LIBOR rates, then it might be desirable to separate the two aspects and offer a floating rate benchmark indexed on widely accepted liquid transaction rates, such as OIS or TBill rates. Investors who want to be benchmarked against bank credit risk could then go out and purchase this component separately in the CDS market.

For this note we suppose that the synthetic LIBOR rate would be constructed as the sum of a reference risk-free rate and a credit adjustment to reflect the same level of (unsecured interbank) credit risk as LIBOR.

B.2. Reference Risk-Free Rate

The risk-free benchmark should be based on widely available transaction data preferably obtained from liquid markets so as to not be subject to potential manipulations. Natural candidates are the overnight interbank deposit rates, or the longer term OIS rates, or Treasury Bills. Given the at times idiosyncratic behavior of T-Bills yields and the lack of constant maturity yields, which would have to be interpolated from available data, it would seem preferable to use an OIS based reference risk-free rate.

B.3. Bank-CDX

Note that LIBOR reflects refreshed prime bank credit risk in that the constituents of the LIBOR panel may change over time so that the panel always reflects prime banks' credit worthiness. To construct a credit derivative on similar credit risk, one could design a basket CDS index (similar to CDX or Itraxx) that would reference a portfolio of banks with high credit quality. This index would be refreshed at a constant frequency (say every three months), so as to always reflect the best available credit quality banks. The new contract would operate on a full running basis (as opposed to the upfront plus running convention used in the CDX market) so that the quoted rate could be readily interpreted as a pure credit spread. Protection buyers would pay a premium every quarter, equal to the quoted rate times the outstanding notional of the contract. In exchange, protection sellers would cover any shortfall due to credit losses that would occur in the underlying basket (and that would result in a reduction of the notional of the underlying basket). The quoted rate on this Bank-CDX would then reflect the market's assessment of the 'average' credit spread on the underlying portfolio.

For each of a set of maturities of such Bank-CDX (for example, 3, 6, and 12 months), one could directly add the quoted CDX rate to the risk-free benchmark to obtain a reasonable synthetic substitute for LIBOR.

B.4. Discussion

While the above construction seems fairly simple it depends crucially on the successful launch of a bank-CDX contract. We discuss some of the features that may hamper a successful launch of such contract.

Liquidity

Liquidity in CDS is typically at much longer maturities. Five year CDS are typically considered the most liquid points for single name CDS as well as index products (CDX and ITraxx). It is rare to find high liquidity in maturities less than 1 year (especially for high grade securities), which is what would be required to construct a 3-month or 6-month Bank-CDX. An alternative is a series of 12-month CDX contracts, introduced at 3-month intervals, allowing interpolation of the 3-month and 6-month credit spreads from the stubs of the “off the run” 12-month CDX contracts.

If the liquidity of the market is not sufficient, there is potential scope for manipulation.

Marking to market, netting and novation

Secondary market trading and ease with which positions can be marked to market and/or netted and novated would be crucial for the new Bank-CDX market to take-off. This suggests that operating on an upfront with fixed running quoting convention would be preferred by market participants. Indeed, this has become the standard in the single-name CDS and the CDX markets for technical reasons (pertaining to the ease of netting and marking to market of positions) which would also apply here. Unfortunately, while trading on an upfront plus running would be desirable from a market design perspective, it would introduce another (somewhat model dependent) calculation to transform the upfront to the proper credit spread required as an add-on to the risk-free benchmark.

Complexity

The complexity attached with the synthetic LIBOR replacement, which would require sourcing information from two separate markets, one of which would be a new synthetic basket CDS market, seems unattractive in the current post-crisis context where the trend is rather towards simplification of financial contracts and away from complex synthetic derivatives.

Uncertainty in launching new market

The mere fact that the success of the new synthetic LIBOR substitute would be conditional on the successful launch of a new derivative market (the bank-CDX) makes it a difficult choice, operationally.

Difficulty to switch existing contracts

It is not clear how existing contracts that reference LIBOR could be transitioned into referencing a new synthetic LIBOR benchmark. The legal basis for such a transition would need to be investigated.

B.5. Conclusion

We have discussed the feasibility of a new CDS-based synthetic LIBOR substitute. While it is possible to create a relatively simple synthetic alternative to LIBOR that would have similar credit-risk characteristics, its success would depend crucially on the successful launch of a new synthetic CDS contract reflecting prime bank credit risk. Absent some indication of likely depth and volume for this hypothetical new CDS index market, a CDS-based synthetic substitute for LIBOR appears unlikely to be a consensus choice to replace LIBOR.

Appendix C. Futures Implied OIS Rates

Overnight Index Swap (OIS) fixings can be derived by using fed fund futures¹, which are monthly contracts based on the arithmetic average of the daily effective fed funds rate. The key drivers for the variations in the fed effective rate include change in, and in some cases anticipation of a change in, the target fed funds rate as result of policy decision at the Federal Open Market Committee (FOMC) meetings, and periodic spikes in inter-bank lending activity as a result of any temporary drain or oversupply of liquidity. Although we lack granularity to back out daily fluctuation of the effective fed fund rate from a futures contract that is based on monthly averaging, it is possible to derive a reasonable estimate for the rate levels of medium to long term OIS contracts.

In this appendix, we illustrate a simple procedure that calibrates a set of implied fed fund futures rates, by solving a Quadratic Program (QP) over the input space of expected change in target fed fund rates on scheduled FOMC meeting dates. Results indicate that, even without sophisticated modeling of daily liquidity events, the model is able to calibrate a 3-month term OIS to within 10 bps and is robust over a period that spans multiple rate cycles.

C.1. OIS Fixing Model

The proposed OIS fixing calibration method relies on a set of assumptions deemed appropriate for the purpose.

- Target fed fund rate
 - On the day of the settlement, and before the first scheduled FOMC meeting, the model uses the target fed fund rate over this period. The model uses the realized effective fed fund rates over the period from the beginning of the month, to the settlement date.
- Convergence of effective fed fund rate to target rate
 - The model assumes that after each FOMC meeting, the effective fed fund rate immediately converges to the target rate. This assumption is strong, as there could be special market events that can lead to foreseeable deviation of the effective rate away from target. Figure 1 shows the difference between the two rates, over the period between 2013-02-01 and 2013-05-31. We see that, during this period when the FOMC is in a rate hike mode, the effective rate seems to increase days before the announcement, in anticipation of the expected hikes to come. Figure 2 shows the distribution of the difference between the two rates over the sample period. While careful modeling of the daily effective rate is crucial to ensure arbitrage free pricing, for reference rate fixing purposes, we could justify ignoring the impact of the effective-target rate basis.

The calibration process requires defining a set of implied fed fund futures rates, \hat{F}_k , for $k=1,2,\dots,n$, where $k=1$ indicates the month of the front contract, $k=2$ the month of the

¹ See link for fed fund futures contract specifications: http://www.cmegroup.com/trading/interest-rates/stir/30-day-federal-fund_contract_specifications.html

second contract, etc., and finally, $k=n$ is the month of the n -th contract and the month in which the OIS terminates.

Let $d_{k,1}, d_{k,2}, \dots, d_{k,f}, \dots, d_{k,e}$, be dates in month k , where $d_{k,f}$ is the FOMC announcement date scheduled for that month, and $d_{k,e}$ is the last day of the month. For the front month implied future we have,

$$\hat{F}_1 = \frac{1}{d_{2,1} - d_{1,1}} \left[R_{d_s}^{(b)}(d_{2,1} - d_s) + \sum_{i=1}^{d_s} R_{d_{1,t}}^{(e)} + \Delta_1(d_{2,1} - d_{1,f}) \right],$$

where d_s is the settlement date of the OIS contract, $R_{d_{1,t}}^{(e)}$ is the realized effective fed fund rate for day i of the front month, $R_{d_{1,t}}^{(b)}$ is the target fed fund rate for day i , and Δ_1 is the expected change in the target fed fund rate for the scheduled FOMC meeting that falls in the front month. For back months up to and include the last month, n , where the OIS contract terminate, we have,

$$\hat{F}_k = R_{d_s}^{(b)} + \sum_{i=1}^{k-1} \Delta_i + \Delta_k \frac{d_{k+1,1} - d_{k,f}}{d_{k+1,1} - d_{k,1}}, \quad k = 2, \dots, n,$$

where Δ_i is the expected FOMC rate change for month i . If there is no scheduled meeting for that month, we set $\Delta_i = 0$.

In the optimization step, we calibrate the implied futures prices to market by solving the following constrained QP,

$$\min_{\Delta_1, \dots, \Delta_n} \|F - \hat{F}\|^2 + \lambda \sum_{i=2}^n \left(\frac{\Delta_k / \delta_k - \Delta_{k-1} / \delta_{k-1}}{(\delta_k - \delta_{k-1}) / 2} \right)^2 \quad (1)$$

s. t. $-1.0 \leq \Delta_k \leq 1.0, \quad k = 1, \dots, n,$

where δ_i is the number of days between the i -th and $(i-1)$ -th FOMC meetings. The second term in (1) is a discrete penalty function that penalizes excessive curvature.

Figure 3 shows an example that illustrates the various components of the calibration process, together with the intermediate calibration result, for a 3-month OIS term contract, with settlement date on 2013-02-15 and termination date on 2013-05-15. Table 1 shows the calibrated implied target rate change on scheduled FOMC meeting dates. At the end of the calibration process, we obtain the expected target fed fund rates, from which, with an application of geometric compounding over the period between the settlement and the terminate dates, we obtain the implied OIS fixings.

C.2. Result

In order to assess the robustness of the proposed procedure, we estimate the implied OIS fixings and compare those to the actual OIS fixings based on trade data, for the sample period between 2002-01-02 and 2013-05-29. This period covers two complete rate cycles, together with a wide range of target rates that peaked at 5.41% in 2006 and troughed at

0.04% in 2011. For each day in the sample period, the data set contains closing prices for the front six serial fed fund futures contracts, together with the daily effective fed fund rate and the daily fixing of the 3-month term OIS rate based on actual trades. External data include target fed fund rate change decision of the FOMC meetings, and FOMC historical and future meeting schedules².

For each business day in the sample period, we solve the QP, which calibrates the implied fed fund rate to the market, by minimizing (1), using the FOMC rate decision variables, Δ_k , for $k=1, \dots, n$, as inputs. At the end of the calibration process, we obtain a set of implied daily effective fed funds rates, from which we can derive the implied 3-month OIS fixing rates by compounding over the settlement and termination dates of the 3 month terms.

In Figure 4, the top panel shows the goodness of fit, as measured by the difference between the implied 3-month OIS versus the actual market traded rate. We see that the implied OIS follows closely the actual market. The majority of deviation occurs during the period where there had been extraordinary measures taken by the Federal Reserve during and right after the financial crisis of 2008. Figure 5 shows that the discrepancy between the implied and actual OIS fixing stays mostly within 10bps over the two rate cycles over a period that spans more than ten years. If we consider the period between 2007-06-01 and 2009-01-01, during which the Federal Reserve added liquidity aggressively to counteract the fallout from the finance crisis, as an outlier, then the goodness of fit increases to within 5bps, as shown in Figure 5.

² Meeting calendars, statements, and minutes (2008-2014), published by the Board of Governors of the Federal Reserve System, available here <http://www.federalreserve.gov/monetarypolicy/fomccalendars.htm>.

C.3. Figures

Figure 1: Effective versus target fed fund rate for the period between 2013-02-01 and 2013-05-31

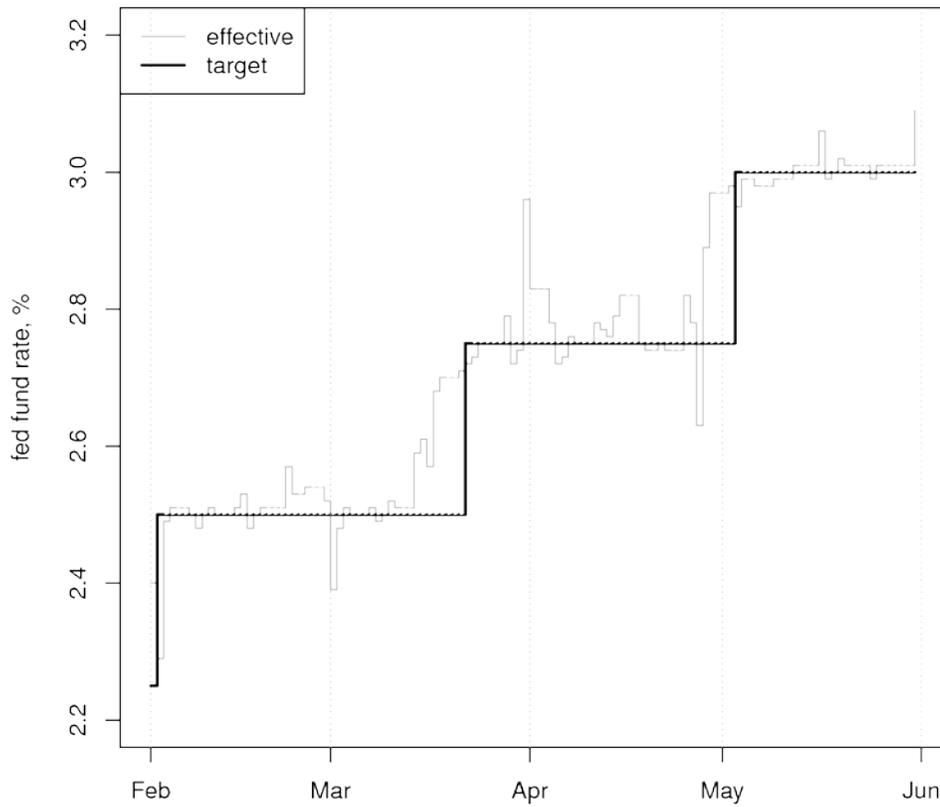


Figure 2: Histogram of the difference between effective and target fed fund rate for the period between 2013-02-01 and 2013-05-31.

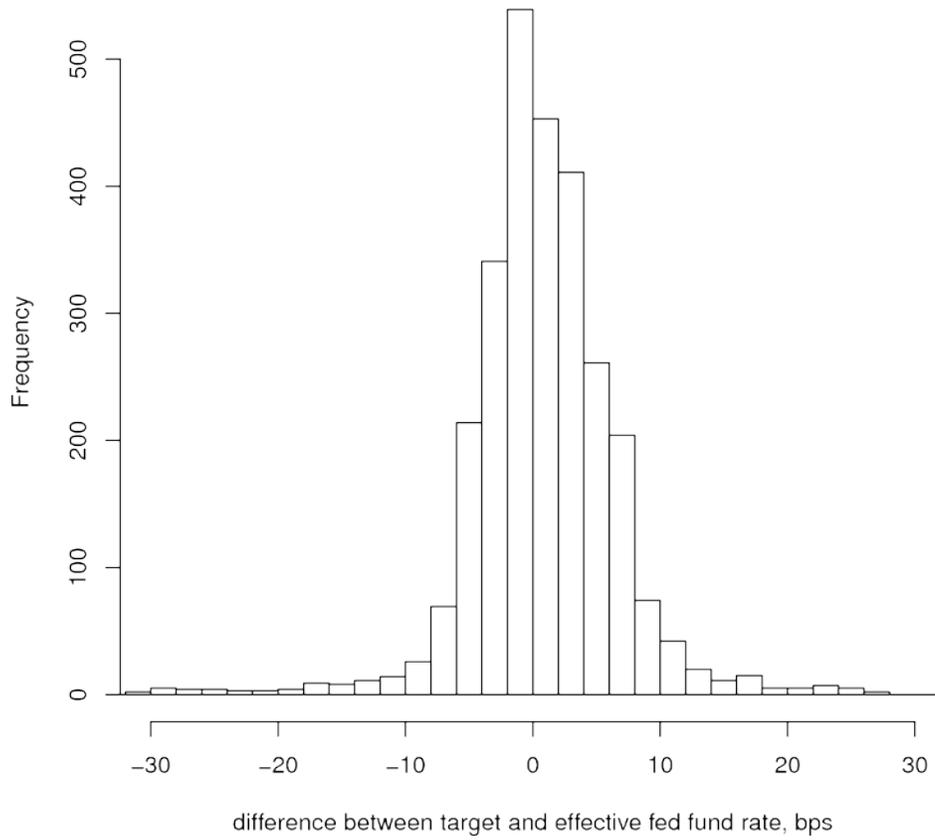


Figure 3: An example that illustrates the various components of the calibration process, together with the result, for a 3-month OIS term contract, with settlement date on 2005-02-15 and termination date on 2005-05-15, $\lambda = 0.0$. The labels FF1 to FF4 indicate the span of the front, second, third and fourth fed fund futures contract. The label 3M OIS indicates the span of the 3-month OIS term contract. Top panel: solid black line is the realized effective fed fund rate between 2005-02-01 and 2005-02-15; dash-line is the expected target fed fund rate; gray solid line is the historical effective fed fund rate. Bottom panel: solid black line is the actual market fed fund rate based on the closing price on 2005-02-11; dash-line is the implied rate based on the calibration procedure outlined in this section.

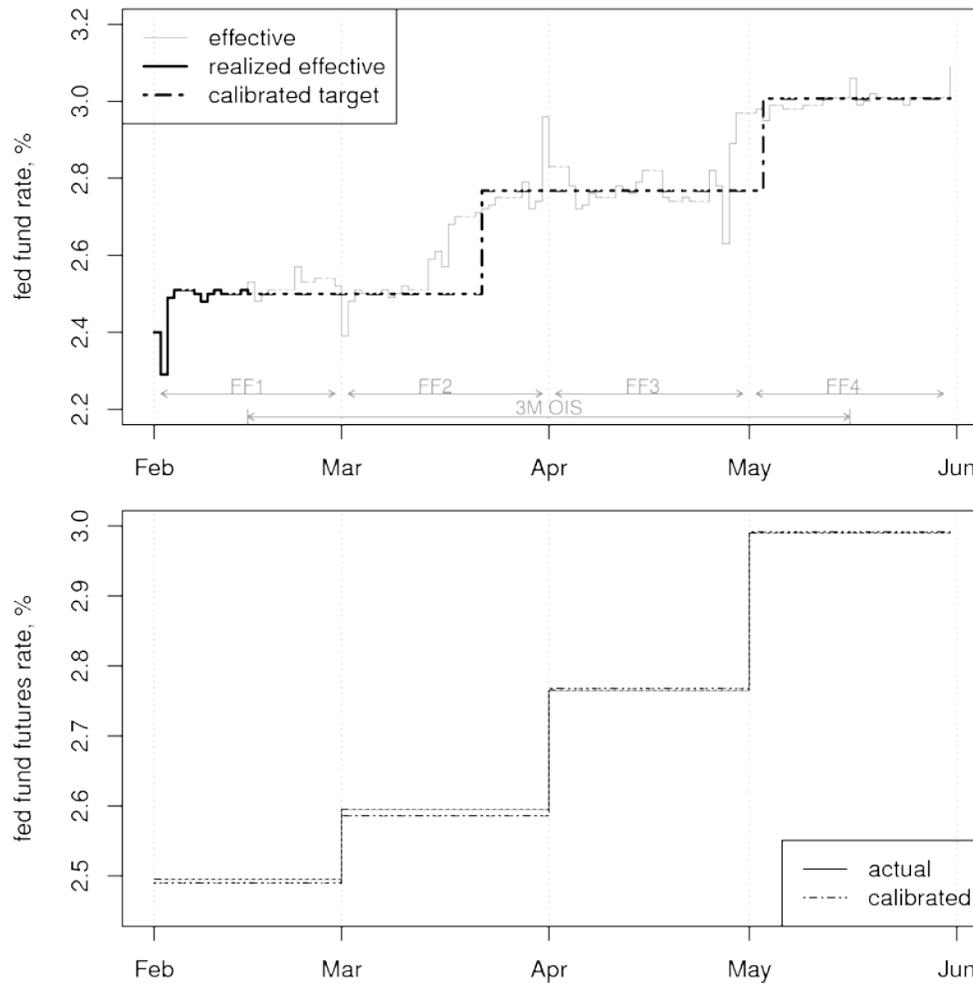


Figure 4: Calibration result, for period between 2002-01-02 and 2013-05-29, $\lambda = 0.0$. Top panel: difference between the actual and the implied 3-month OIS fixings, in basis points. Bottom panel: time series of the effective fed fund rate over the sample period.

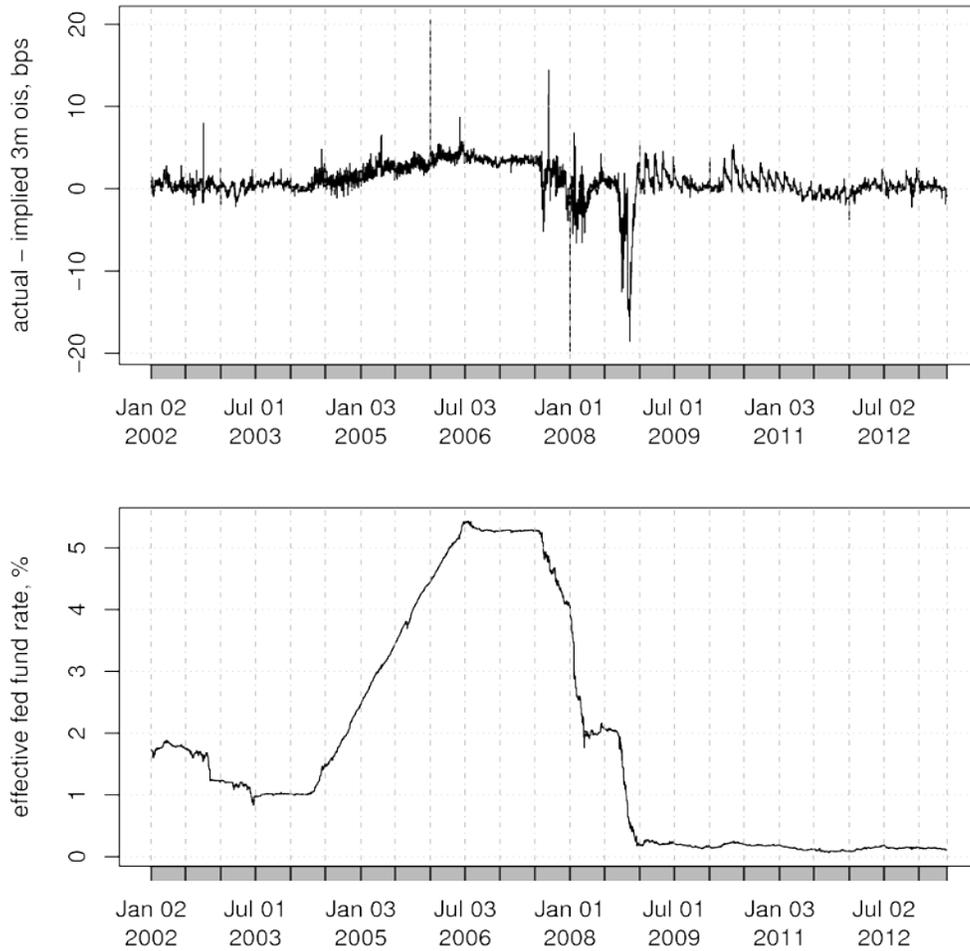


Figure 5: Histogram for the difference between the actual and the implied 3-month OIS fixings, in basis points, for the period between 2002-01-02 and 2013-05-29, $\lambda = 0.0$.

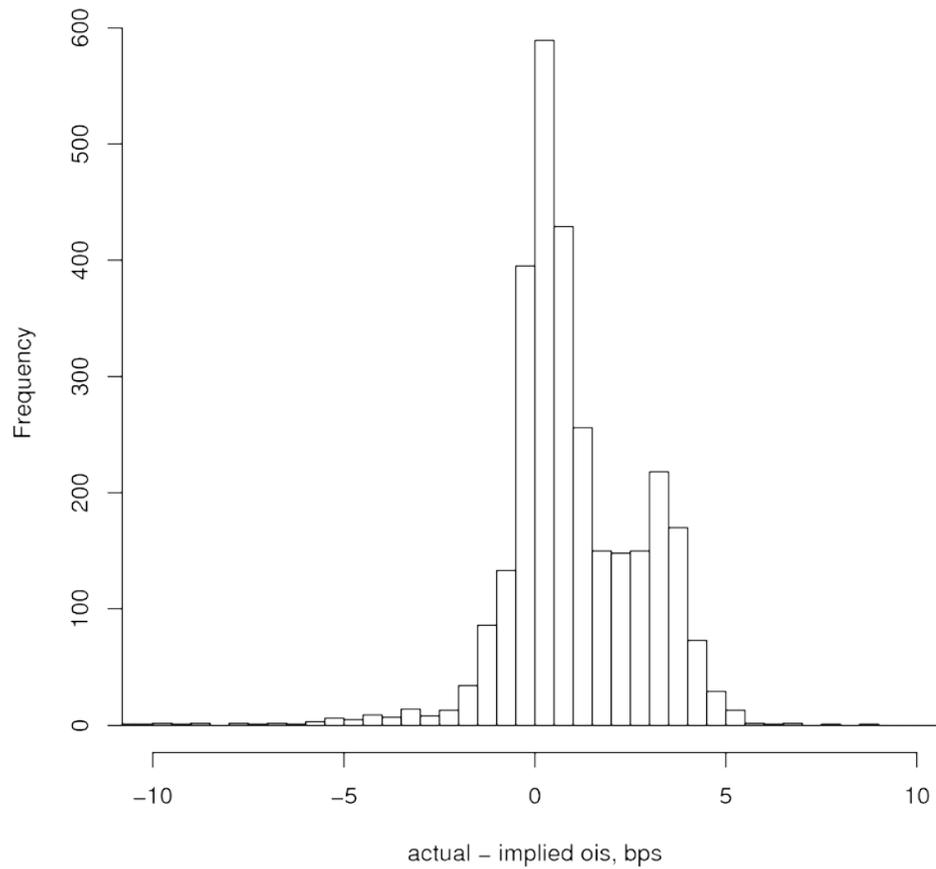
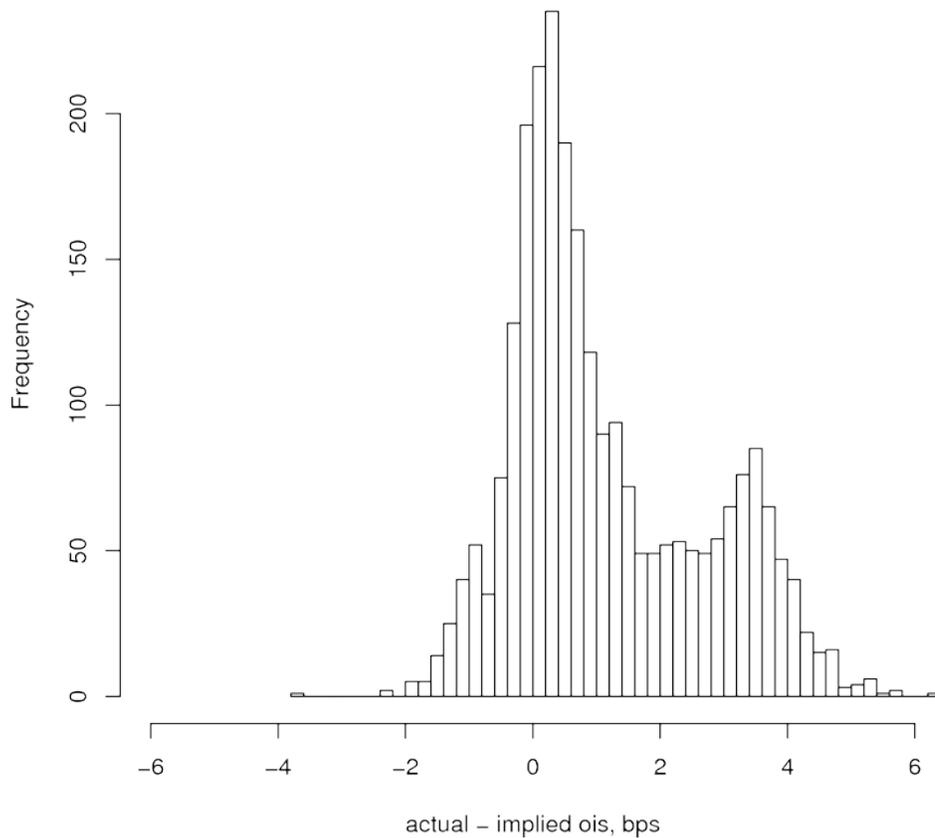


Chart 1 Histogram for the difference between the actual and the implied 3-month OIS fixings, in basis points, for the period between 2002-01-02 and 2013-05-29, $\lambda = 0.0$, excluding the period between Jun 2007 and Jan 2009.



C.4. Tables

Table 1: Calibrated fed fund target change that minimizes the objective function in (1), for the period between 2013-02-01 and 2013-05-31, $\lambda = 0.0$. The implied OIS fixing is 2.71%, compared to actual OIS fixing of 2.68% on 2013-05-15.

| | 2003-03-22 | 2005-05-03 | 2005-05-03 |
|----------------|------------|------------|------------|
| Δ , bps | 26.77 | 23.96 | 17.78 |

Appendix D. Option-Implied Reference Rates

D.1. Introduction

This appendix discusses the feasibility of using put-call parity arbitrage relationships to infer reference rates from the prices of exchange-traded options. This approach was suggested to the MPG as a possible direction by market participants who participate in exchange-traded derivatives markets. After some evaluation, the MPG chose not to recommend this approach, for reasons to be explained below.

D.2. Put-Call Parity Implied Reference Rates

For a given underlying asset with actively traded European options, and for a given strike price K and option exercise date T , let $P(K,T)$ be the market price of the corresponding put option, let $C(K,T)$ be the price of the call option, let X be the price of the underlying asset, and let $B(T)$ be the price of a risk-free discount note with maturity T . In the absence of arbitrage, and ignoring transactions costs and default, by payoff equivalence we have

$$C(K,T) - P(K,T) + K B(T) = X.$$

One can solve for the implied bond price $B(T)$, given the other prices. One would take the mid-point of the bid and ask prices for the options and the underlying asset. Further, one can average the implied bond prices associated with various different strike prices, to reduce sampling noise and to improve robustness to manipulation. One can further average across different underlying assets and different option markets, provided the prices are executable quotes (or transactions prices) in the same currency as the strike price, and provided that the options are for the same exercise date T . One may also use options on futures.

One can then convert the implied bond price $B(T)$ to a money-market interest rate, as a candidate reference rate for maturity T .

One could in principle also infer reference rates from the prices of box spreads. Applying the same formula above at a different strike price K' , one can eliminate X and obtain

$$B(T) = [C(K',T) - C(K,T) + P(K,T) - P(K',T)]/(K-K').$$

The original put-call parity relationship is effectively a special case with $K'=0$, because $C(0,T) = X$ and $P(0,T) = 0$.

D.3. The Implied Borrower's Credit Quality

The box-spread pricing formula above shows that a bond can be constructed from a package of four option positions. The implied borrower is the agent that guarantees the performance of the four option contracts. For the case of options traded on a particular exchange, the implied borrower is therefore the clearinghouse of this exchange. The clearinghouse performs on based on the credit-quality of option writers, as well as initial margins, the

default guarantee fund contributions of clearing members, and the capital of the clearinghouse. For effectively managed and regulated clearinghouses, this significant “waterfall” of resources implies that the implied synthetic bond has very high credit quality, and thus that the implied reference rate would be close to the risk-free rate.

D.4. Key Advantages and Disadvantages

The reference rates implied by put-call parity are reasonably accurate, provided that the underlying options are European (no early exercise) and are traded in a reasonably efficient market, and provided that care is taken when using the data (for sampling synchronicity, fees, and bid-ask effects). For example, when care is taken, put-call parity holds reasonably well for European options on major stock indices.³ One market participant reported to us that reasonable accuracy has been obtained with Eurodollar futures options. (Of course, the Eurodollar futures option may be affected by reference rate reform.)

A major concern with applying this approach to obtain a global benchmark is that exchange-traded options have fixed periodic calendar-based exercise dates, typically once a quarter. In order to obtain accurate constant-maturity reference rates at tenors such as one month, three months, and six months, one would need corresponding (or nearly corresponding) exercise dates. Interpolation of constant-maturity risk-free rates from calendar quarter implied rates is unlikely to be accurate. A special series of option exercise dates could be introduced for the purpose of inferring reference rates, but these options would be thinly traded. The implied reference rates would be noisy and not robust to manipulation.

There is also a potential concern that if important global reference rates were to be based on the prices of packages of options, then these option packages might eventually become, in effect, actively traded synthetic bonds that are backed by the resources of exchange clearing houses. This might have unintended consequences, given that the primary role of the exchange clearing house is not that of a credit guarantor. We have not, however, considered this potential concern in depth, given the severe impediment already posed by calendar-based as opposed to constant-maturity exercise dates.

Because the implied reference rates are implicitly of very high credit quality, they are not a close substitute for Libor, and thus do not alleviate any transition disruption concerns.

D.5. Conclusion

Barring further market developments, we do not recommend that option-implied reference rates be considered as feasible and viable reference rates.

³ See Avraham Kamara and Thomas Miller Jr. “Daily and Intraday Tests of European Put-Call Parity,” *Journal of Financial and Quantitative Analysis*, Volume 30 (1995), and Lucy Ackert and Lisong Tian, “Efficiency in Index Options Markets and Trading in Stock Baskets,” *Journal of Banking and Finance*, Volume 25 (2001), and Paul Draper and Joseph Fung “A Study of Arbitrage Efficiency Between the FTSE-100 Index Futures and Options Contracts,” *Journal of Futures Markets*, Volume 22 (2001).