FSB FINANCIAL STABILITY BOARD

Global Shadow Banking Monitoring Report 2016

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The Report is accompanied by the publication of a dataset on a jurisdiction and aggregate level, which also includes the data underlying most of the exhibits shown in the report. These data are available at:

- *Shadow Banking Monitoring Dataset 2016*; and
- *Underlying data for exhibits*.

Executive summary

Non-bank financing provides a valuable alternative to bank funding and helps support real economic activity. It is also a welcome source of diversification of credit supply from the banking system, and provides healthy competition for banks. However, if non-bank financing is involved in bank-like activities, transforming maturity/liquidity and creating leverage like banks, it can become a source of systemic risk, both directly and through its interconnectedness with the banking system. To monitor these risks, the Financial Stability Board (FSB) has been conducting an annual monitoring exercise since 2011 to assess global trends and risks in the shadow banking system.[1]

This Report presents the results of the FSB's sixth annual monitoring exercise, covering data up to end-2015 from 28 jurisdictions, representing over 80% of global GDP and including Belgium and the Cayman Islands for the first time.[2] As in the 2015 monitoring exercise, this Report compares the size and trends of financial sectors across jurisdictions based on sector balance sheet data. Its focus then narrows to those parts of non-bank credit intermediation that may pose financial stability risks (hereafter the "narrow measure" or "narrow measure of shadow banking"). For a definition of key terms used throughout this Report, see Box 0-1.

While all participating jurisdictions are covered in the "macro-mapping" of jurisdictions' financial system, data from China were not received in time to complete an assessment of entities in China for the narrow measure of shadow banking. Improvements to Chinese data collection are currently underway in order to enable Chinese authorities to fully contribute to the 2017 monitoring exercise.

The main findings from the 2016 monitoring exercise are as follows:[3]

- *MUNFI* – **MUNFI and its components all continued to grow in 2015 for 21 jurisdictions and the euro area, although at a more moderate rate compared to previous years**. In contrast, while banks continued to grow in 2015, their share in the financial system declined for the fourth consecutive year, particularly in the euro area.
- *OFIs* – **OFI assets rose from $89 trillion in 2014 to $92 trillion in 2015 in 21 jurisdictions and the euro area.** Growth occurred in all but seven jurisdictions and was due, in part, to a combination of higher equity valuations and an increase in non-bank credit intermediation. The size of OFIs was equivalent to 150% of total GDP at end-2015, exceeding the previous high-point of 139% prior to the financial crisis. OFIs grew

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[1] The FSB defines shadow banking as "credit intermediation involving entities and activities (fully or partly) outside of the regular banking system". Some authorities and market participants prefer to use other terms such as "market-based finance" instead of "shadow banking". The use of the term "shadow banking" is not intended to cast a pejorative tone on this system of credit intermediation. However, the FSB uses the term "shadow banking" as this is the most commonly employed and, in particular, has been used in earlier G20 communications.

[2] Depending on the context, two samples are presented in this Report. The first sample is comprised of 28 reporting jurisdictions. The second is comprised of 21 individual non-euro area jurisdictions and the euro area aggregates. For details, see Section 1.1.

[3] Measures of growth throughout the report are adjusted for exchange rate effect by applying a constant end-2015 exchange rate across all years to convert data denominated in local currencies into US dollars. With two new jurisdictions joining the monitoring exercise in 2016, and China not included in the narrow measure of shadow banking, the results presented in this Report are not directly comparable to the 2015 monitoring exercise.

quicker than GDP in most jurisdictions, particularly in emerging market economies (EMEs), but declined relative to GDP in some large advanced economies outside of the euro area. Among the subsectors of OFIs, trust companies, money market funds (MMFs), and mixed/other investment funds (other than MMFs, hedge funds, equity funds, or fixed income funds) showed the strongest growth in 2015.

Key terms **Box 0-1**

The following monitoring aggregates are referred to throughout the report, with (ii) and (iii) as the main focus of analysis (see Exhibit 0-1):

(i) **MUNFI** (or Monitoring Universe of Non-bank Financial Intermediation, also referred to as non-bank financial intermediation), is a measure of all non-bank financial intermediation, which is comprised of OFIs, insurance corporations and pension funds. It provides the starting point for authorities' assessment of their non-bank financial entity types' involvement in shadow banking (see Section 2).

(ii) **OFIs** (or Other Financial Intermediaries) are comprised of all financial institutions that are not classified as banks, insurance corporations, pension funds, public financial institutions, central banks, or financial auxiliaries. It can be considered as a conservative proxy or broad measure of shadow banking (see Section 2.3).

(iii) **Narrow measure of shadow banking** (or the "narrow measure" or "shadow banking under the economic functions approach") includes non-bank financial entity types that are considered by authorities to be involved in credit intermediation where financial stability risks from shadow banking may occur, based on the FSB's methodology (see Section 4 and Section 5).

- *Lending activity* – **Loans extended by the OFI sector have been growing in 14 jurisdictions and the euro area since 2011.** In some jurisdictions the growth in OFI loans since 2011 has been substantial, increasing at an annual rate of 10% or more in Australia, China, Germany, Indonesia, Korea, and South Africa, with China reporting the highest increase of 35%.[4] In contrast, while bank loans rose in many jurisdictions, they decreased in some euro area jurisdictions and the Cayman Islands. However, loans extended by banks still represent the largest share of total lending in 2015 (77%) in 21 jurisdictions and the euro area.
- *Wholesale funding and repo* – **Based on the data on wholesale funding collected for the first time, OFIs' reliance on long-term wholesale funding sources declined, while banks' reliance on long-term wholesale funding sources declined at a slightly slower rate in recent years**. Repurchase agreements (repo) data, also collected for the first time, suggests that while the net repo positions (repo assets minus repo liabilities) of OFIs and banks have both increased in recent years, the net repo position of OFIs has seen a much more substantial increase and OFIs are now net providers of cash to the financial system through reverse repos.

[4] In some cases, this growth occurred from low levels and reflected greater financial inclusion.

- *Interconnectedness* – **While the interconnectedness between banks and OFIs,[5] has gradually declined since the crisis, it remains above pre-crisis levels.** Among financial sector entity types, banks and OFIs remain the most interconnected, with significant funding channels operating in both directions. Data on the interconnectedness of both insurance corporations and pension funds to OFIs and to banks suggested that this interconnectedness could be an important channel by which shocks could be transmitted.
- *Narrow measure* – **The narrow measure of shadow banking that may give rise to financial stability risks grew 3.2% to $34 trillion in 2015 for the 27 jurisdictions.**[6] This is equivalent to 69% of GDP of these 27 jurisdictions, and 13% of financial system assets. Nearly 80% of global shadow banking assets reported by these 27 jurisdictions reside in six jurisdictions.
- *Trends within the narrow measure* – **Credit intermediated by collective investment vehicles (CIVs) with features that make them susceptible to runs (e.g. open-ended fixed income funds, credit hedge funds, real estate funds, and MMFs), represents 65% of the narrow measure of shadow banking** (see Exhibit 0-1). On average, assets of these CIVs have grown annually by around 10% over the past four years, although the rate of this growth has declined over these years. Non-bank financial entities engaged in loan provision that are dependent on short-term funding or secured funding of client assets, such as finance companies, represent 8% of the narrow measure, growing by 2.5% in 2015. Market intermediaries that depend on short-term funding, such as broker-dealers, represent 11% of the narrow measure, and declined in 2015. Finally, the level of securitisation-based credit intermediation, which represents 9% of the narrow measure, has also fallen in recent years.

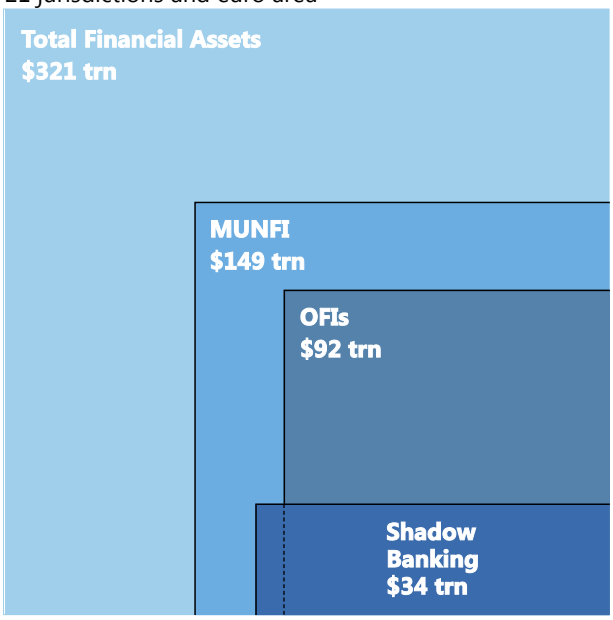
[5] Excluding those OFIs that are prudentially consolidated into banking groups.

[6] The narrow measure does not include China as the late submission of its data did not allow enough time to complete the assessment of entities as part of the shadow banking system. For context, China's OFI assets amounted to 8% of the total OFI assets reported by 21 jurisdictions and the euro area at end-2015.

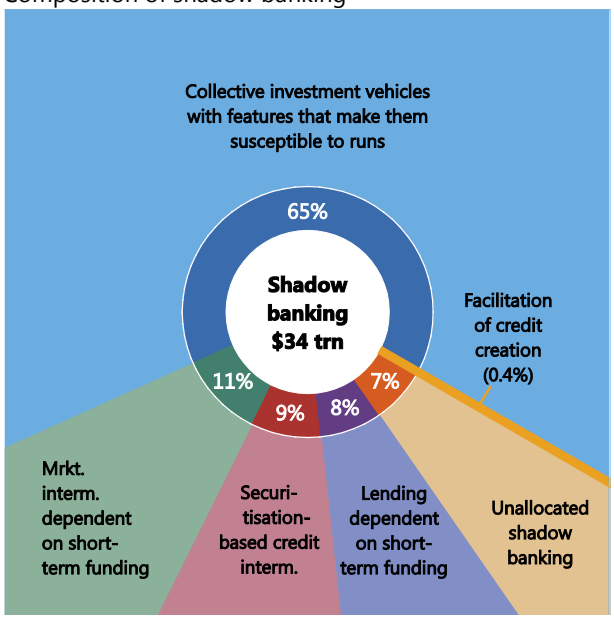
Monitoring aggregates

USD trillion at end-2015 Exhibit 0-1

21 jurisdictions and euro area[1]



Composition of shadow banking[2]



MUNFI = Monitoring Universe of Non-bank Financial Intermediation, includes OFIs, pension funds, and insurance corporations; OFIs also includes captive financial institutions and money lenders; Shadow banking = narrow measure of shadow banking, net of entities which are prudentially consolidated into banking groups.

[1] The narrow measure of shadow banking is based on data from the 27 jurisdictions, instead of 21 jurisdictions and the euro area, because data from seven participating euro area jurisdictions are more granular than the aggregate euro area data from the European Central Bank (ECB). For 27 jurisdictions, the corresponding aggregates are Total Financial Assets ($304 trillion), MUNFI ($127 trillion) and OFIs ($72 trillion).
[2] For additional details on these categories, please see Section 4.

Sources: National sector balance sheet and other data; FSB calculations.

- *Risks within the narrow measure* – The coverage and consistency of data provided by jurisdictions used to calculate risk metrics has improved compared to previous monitoring exercises, although data availability continues to be an issue.[7] While levels of risks vary across entity types, as would be expected due to the range of business models, preliminary findings suggest that:
  - The considerable growth of CIVs in recent years has been accompanied by a relatively high degree of credit risk, as well as liquidity and maturity transformation, and, in the case of jurisdictions that reported hedge funds, relatively high levels of leverage;[8]
  - In at least some jurisdictions, finance companies tend to have relatively high leverage and maturity transformation, which increases their susceptibility to roll-over risk during periods of market stress; and
  - Broker-dealers in some jurisdictions engage in significant leverage compared to other OFIs, probably reflecting differences in business models. These entities

[7] See also the discussion of risk metrics in Box 5-1.

[8] See Section 5.1.2.

may also be vulnerable to roll-over risk or runs, particularly if they are dependent on short-term wholesale funding.

The Report also includes a set of case studies from experts at national and regional authorities that assess some non-bank financial entity types or activities in greater detail, as well as a summary of the FSB Regional Consultative Group for the Americas' recent regional shadow banking monitoring exercise (Annexes 3 to 8).[9]

The data collected for the 2016 monitoring exercise benefited from a number of improvements made to the consistency and comprehensiveness of the data collected (in line with the recommendations in the peer review on shadow banking; see Box 4-1). Coverage, particularly of the global investment fund sector, was enhanced this year by the addition of the Cayman Islands to the monitoring exercise.[10] Going forward, the monitoring exercise will continue to benefit from further improvements to address identified data gaps and reporting inconsistencies. In this regard, improvements to the availability of more granular sectoral accounts data would help to reduce data gaps.[11] Jurisdictions that lack official sector balance sheet statistics (such as Flow of Funds) are encouraged to develop them.[12] Jurisdictions are also encouraged to devote additional resources to the development of more granular data on interconnectedness between different sectors of the financial system as well as across borders, and to the development of risk data to more adequately measure financial stability risks from shadow banking. To assess risks and to obtain a clearer view of risks within jurisdictions, data may be needed at a greater level of granularity than official sector balance sheet statistics, possibly supplemented by supervisory or commercially-available data. The FSB will further improve its risk analysis in the 2017 monitoring exercise.[13] These improvements are designed to help strengthen the effectiveness of the exercise to monitor shadow banking activities across jurisdictions, and to appropriately measure risks that may raise global financial stability concerns.

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[9] The views expressed in the case studies do not necessarily represent the assessment of the FSB or the relevant national/regional authorities.

[10] In relation to this, see FSB, *Peer Review on the Implementation of the FSB Policy Framework for Shadow Banking Entities*, May 2016. Recommendation 2C encourages additional non-FSB jurisdictions with significant non-bank financial sectors or cross-border shadow banking links to participate in future exercises. For example, about 90% of hedge funds reported by 28 jurisdictions are domiciled in the Cayman Islands.

[11] Recommendation II.5 on shadow banking of the G20 Data Gaps Initiative may help in the future to improve the availability of more granular sectoral accounts data. For details, see FSB and IMF, *Second Phase of the G-20 Data Gaps Initiative (DGI-2), First Progress Report*, September 2016.

[12] In relation to this, jurisdictions that have large residuals for the OFI or other financial sectors in their sector balance sheet statistics may wish to improve granularity.

[13] For instance, by making better use of publically available data to supplement Flow of Funds data. Also, monitoring and sharing of data on emerging activities and entities in a structured manner will help to foster a broader understanding of these entities and activities, and to maintain a forward-looking perspective.

1. Introduction

As the financial system becomes increasingly reliant on non-bank financing in many jurisdictions, it gives rise to both economic gains and new vulnerabilities. The comprehensive monitoring of the global trends, risks, innovations and adaptations of the non-bank financial system is therefore a key priority for the FSB and an important element of its efforts to transform shadow banking into resilient market-based finance. To this end, the FSB conducts an annual monitoring exercise to assess global trends and risks in the shadow banking system, and to identify financial entity types or activities for which size or rapid growth in combination with heightened risks may call for an assessment of existing regulation. This monitoring exercise also helps authorities to deepen their understanding of non-bank financing and identify areas for further improvements in data availability and analysis.

This Report sets out the results of the sixth annual monitoring exercise by the FSB. It covers 28 jurisdictions and the euro area as a whole (see Exhibit 1-1), representing slightly more than 80% of global GDP.[14] Jurisdictions submitted annual data up to end-2015 based on sector balance sheet data from national financial accounts statistics (i.e. "Flow of Funds"), complemented with supervisory and private sector data.[15] While the "macro-mapping" of jurisdictions' financial systems covers all participating jurisdictions and the euro area, the narrow measure of shadow banking does not include China.[16] The late submission of Chinese data delayed the publication of this Report, and did not allow enough time to complete the assessment of entities in China as part of the shadow banking system. Chinese authorities have committed to making improvements to their internal processes related to this exercise, and are expected to contribute fully to the 2017 monitoring exercise.

The monitoring exercise was conducted in 2016 by the FSB's Shadow Banking Experts Group (SBEG), which was established in 2016 under the Standing Committee on Assessment of Vulnerabilities (SCAV) to take forward the annual monitoring exercise. It includes experts from all participating jurisdictions (see Exhibit 1-1), as well as standard-setting bodies, and international financial organisations.[17]

The monitoring exercise adopts the practical two-step approach set out by the FSB in 2011:[18] (i) authorities "cast the net wide", looking at all non-bank credit intermediation to ensure that data gathering and surveillance cover all areas where risks to the financial system might potentially arise; and (ii) authorities then narrow the focus for policy purposes to the subset of non-bank credit intermediation where there are developments that increase the potential for

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[14] As some other jurisdictions with small GDP and large financial sector centres are currently not captured in this monitoring exercise, there may be scope for broadening participation. In relation to this, the FSB Regional Consultative Group for the Americas (RCGA) has been conducting its monitoring exercise since 2012, using the FSB's monitoring approach. The findings of its third exercise (using the data as of end-2015) are summarised in Annex 8.

[15] Some jurisdictions that currently lack sector balance sheet statistics may have used other data sources which may be less consistent across participating jurisdictions.

[16] Data submitted by China for previous shadow banking monitoring exercises have been excluded from the narrow measure of shadow banking in this Report to allow a like-with-like comparison.

[17] In addition to the jurisdictions listed in Exhibit 1-1, they include: the European Commission, Bank for International Settlements (BIS), European Securities and Markets Authority (ESMA), International Association of Insurance Supervisors (IAIS), International Monetary Fund (IMF), International Organization of Securities Commissions (IOSCO), Organisation for Economic Co-operation and Development (OECD), and the World Bank.

[18] FSB, *Strengthening Oversight and Regulation of Shadow Banking*, October 2011.

systemic risk, and/or indications of regulatory arbitrage. In line with this approach, the monitoring process starts from an aggregate measure of all non-bank financial intermediation, referred to as the "MUNFI" and composed of OFIs, insurance corporations and pension funds. It then focuses on a narrow measure of shadow banking that may pose financial stability risks (hereafter the "narrow measure" or the "narrow measure of shadow banking") classified into different economic functions. The narrowing down methodology is based on an approach that was introduced in the FSB's high-level *Policy Framework for Strengthening Oversight and Regulation of Shadow Banking Entities* (hereafter the FSB Policy Framework), published in 2013.[19] Since nearly all of the non-bank financial entities that are included in the narrow measure are OFIs, the OFI measure can be used to obtain an initial conservative proxy or broad measure of the size of the shadow banking system and its evolution over time.

The inclusion of non-bank financial entities or activities in the narrow measure does not constitute a judgement that policy measures applied to address the financial stability risks from shadow banking of these entities and activities are inadequate or ineffective.[20] It is based on a conservative assessment of the potential risks they may pose during stressed events on a pre-mitigant basis (i.e. assuming policy measures and/or risk management tools are not exercised). This pre-mitigant assessment allows authorities to then assess existing policy tools to address financial stability risks that may arise from shadow banking and identify any residual risks that may warrant policy responses. This approach also helps improve the consistency in the assessment across jurisdictions and capture potential changes in risks from the shadow banking system. As a result, the narrow measure may overestimate the degree to which non-bank credit intermediation currently gives rise to post-mitigant financial stability risks.[21]

The FSB has continuously improved the monitoring exercise by broadening the geographic scope, deepening the analysis and learning from the experiences of previous exercises. In the 2016 monitoring exercise, the scope of participating jurisdictions was broadened to also include Belgium and the Cayman Islands.[22] The reporting templates were enhanced to collect a more granular breakdown of non-bank financial sectors, as well as information on short-term wholesale funding, including repurchase agreements (repos). In addition, new data were collected to measure interconnectedness among non-bank financial sectors. Finally, the process of arriving at a narrow measure, which is based on jurisdictions' assessment of their non-bank financial entities' involvement in shadow banking, was improved through additional classification guidance and discussions between jurisdictions. Going forward, the monitoring exercise will continue to benefit from further improvements in data availability and reductions in reporting inconsistencies.

Section 2 presents a comparative macro-mapping perspective of all sectors in the financial system, including central banks, banks, public financial institutions, insurance corporations,

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19 FSB, *Policy Framework for Strengthening Oversight and Regulation of Shadow Banking Entities*, August 2013.

20 In other words, the inclusion of entities in the narrow measure does not necessarily mean that these entities pose financial stability risks after considering the impact of the use of policy measures and risk management tools to contain risks.

21 For example, although MMFs and fixed income funds are included in the narrow measure, their existing policy measures or risk management tools may have addressed or significantly reduced financial stability risks, including maturity/liquidity mismatches, imperfect credit risk transfer and leverage, so that no additional policy responses are currently warranted.

22 The monitoring exercise may be expanded to include additional jurisdictions in the future. In particular, the scope may be expanded to include additional (offshore) financial centres where large shares of assets of specific OFI subsectors can potentially be hosted due to regulatory and tax incentives.

pension funds, OFIs and financial auxiliaries. Section 3 then provides an assessment of the interconnectedness between non-bank financial entities and banks, and also among non-bank financial entities based on additional data collected for this monitoring exercise. Section 4 discusses the narrow measure based on the activities they undertake, and the classification into the five "economic functions" developed by the FSB. Section 5 provides an assessment of the potential risks in the activities of shadow banking entities.

1.1 Data aggregation

Sample composition — Exhibit 1-1

28-group	*21+EA-group*
Argentina	Argentina
Australia	Australia
Brazil	Brazil
Canada	Canada
Cayman Islands	Cayman Islands
Chile	Chile
China	China
Hong Kong	Hong Kong
Indonesia	Indonesia
India	India
Japan	Japan
Korea	Korea
Mexico	Mexico
Russia	Russia
Saudi Arabia	Saudi Arabia
Singapore	Singapore
Switzerland	Switzerland
Turkey	Turkey
United Kingdom	United Kingdom
United States	United States
South Africa	South Africa
Belgium	Euro Area
Germany	
France	
Italy	
Ireland	
Netherlands	
Spain	

This Report presents results using time series data ranging from end-2002 to end-2015 and cross-sectional data as of end-2015. Due to the addition of two new jurisdictions, improvements in national statistics and more granular reporting, the results are not strictly comparable to those presented in previous reports, in particular because a number of jurisdictions have revised their data historically. The data and information collected from jurisdictions are mostly based on sector balance sheet statistics (flow of funds), complemented with supervisory and private sector data where sector balance sheet statistics are not available in the required granularity. Sector balance sheet statistics are a useful source of information for mapping the global size and trends of non-bank credit intermediation, as they are available in a large number of jurisdictions and provide generally consistent data on assets and liabilities of bank and non-bank financial sectors.[23]

In an attempt to maximise both the scope and granularity of available data, the monitoring results are presented for two different samples of jurisdictions, which differ in terms of the treatment of euro area jurisdictions (see Exhibit 1-1).

The first sample, denoted *28-group*, comprises 28 individual jurisdictions and has better granularity of non-bank financial sectors. The second sample, denoted as *21+EA-group*, is more comprehensive in terms of jurisdiction coverage and comprises 21 individual non-euro area jurisdictions plus the euro area as a whole. This sample excludes the seven euro area

[23] Jurisdictions that are already using sector balance sheet statistics are encouraged to further improve its granularity while those that have not yet implemented official sector balance sheet statistics are encouraged to develop them.

jurisdictions (Belgium, Germany, France, Italy, Ireland, the Netherlands, and Spain) individually participating in the exercise and uses instead data from the European Central Bank (ECB) for the euro area as a whole. Most of the macro-mapping results presented in Section 2 are based on the *21+EA-group* sample to benefit from the better coverage. However, as the national submissions from the seven euro area jurisdictions provide some additional granularity on non-bank financial sectors, the discussion on non-bank financial sectors as well as Section 4 on the narrow measure focuses on the *28-group* sample.

Measures of growth throughout the report are based on historical data submitted in 2016 for data through to end-2015. The focus is mainly on trends from 2011 forward, as data gaps were relatively few between 2011 and 2014, with no such gaps in 2015.[24] Given the large movement of some currencies against the US dollar, exchange rate effects have been netted out when presenting growth rates by applying a constant end-2015 exchange rate across all years to convert the local currency data into US dollars. It is worth noting that growth rates of financial assets presented in this Report are not adjusted for valuation effects, which in 2015 tended to exert an upwards influence on growth rates, and therefore only approximately reflect the evolution of financial transactions from one year to another.[25]

[24] As a result, increases of aggregated time series may to some extent also reflect improvements in the availability of data over time at the jurisdiction level.

[25] An increase in the nominal value of assets can be driven (a) by an increase in the quantity of assets valued at a given price, and (b) by an increase in the price of a fixed quantity of assets. Exchange rate adjustments only filter out the price effect related to exchange rate movements. As such, other valuation effects are still included in the growth rates presented in this report.

2. Macro-mapping of all non-bank financial intermediation

This Section on macro-mapping provides an overview of key trends in financial intermediation, with an emphasis on elements of non-bank financial intermediation. The macro-mapping categories presented in this Report are largely aligned with jurisdictions' sector balance sheet statistics. The main sectors of financial corporations are shown in Exhibit 2-1.

2.1 Overview of trends

Total global financial assets of all financial corporations (or total global financial system assets) in the *21+EA-group* have consistently increased since 2003,[26] reaching $321 trillion in 2015 (Exhibit 2-1). Total global financial system assets as a share of total GDP stayed relatively constant in 2015 compared to 2014, indicating that the size of the financial system on aggregate did not grow faster than the economy.

Macro-mapping of the financial system

21 jurisdictions and the euro area — Exhibit 2-1

	Total global financial assets (FAs)	Central banks	Banks[1]	Public financial institu-tions	Insurance corpora-tions	Pension funds	OFIs[2]	Financial auxiliaries[3]
Size in 2015 ($ trillion)	321	24	133	13	28	29	92	1
Share of total global FAs (%)	100	7.4	41.6	4.2	8.6	9.1	28.8	0.3
Growth in 2015 (year-over-year, %)	3.7	8.3	2.4	6.9	3.5	3.0	4.3	6.7
Growth 2011-14 (compounded, %)	6.0	8.0	3.1	4.1	6.9	7.0	10.0	11.1

Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [1] All deposit-taking corporations. [2] OFIs also includes captive financial institutions and money lenders. The 2011-14 compounded growth rate of OFI assets may also reflect improvements in the availability of data for some OFI subsectors over time on a jurisdiction level. [3] Financial auxiliaries consist of financial corporations that are principally engaged in activities associated with transactions or with providing the regulatory context for these transactions but in circumstances that do not involve the auxiliary taking ownership of the financial assets and liabilities being transacted (SNA 2008).

Sources: National sector balance sheet and other data; FSB calculations.

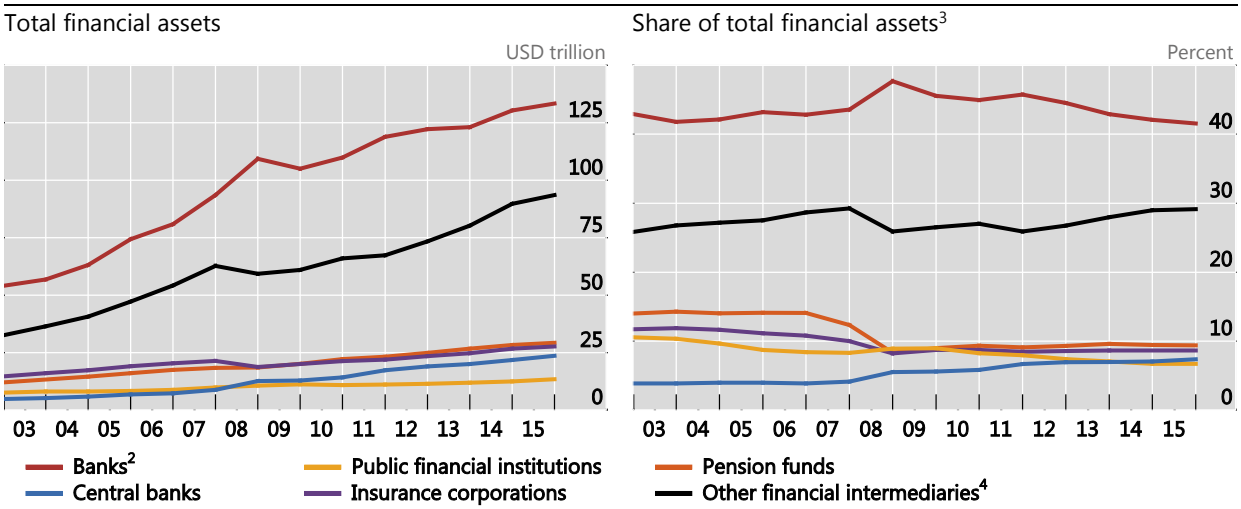
Central banks' assets increased substantially in 2015, mostly reflecting the continuation of central bank asset purchase programmes. Their share in total financial assets also increased from 7.0% in 2014 to 7.4% in 2015 (Exhibit 2-2). The assets of banks, defined as "deposit-taking corporations (DTCs)", increased in 2015 to reach about $133 trillion.[27] However, banks' share in the financial system continued to decline for the fourth consecutive year. The decline was more pronounced in the euro area where, traditionally, the role of banks in the financial system has been larger than in the US.

[26] Net of exchange rate effects (based on constant 2015 exchange rate).

[27] In some jurisdictions, DTCs also include credit unions, for example.

Assets of financial intermediaries[1]

21 jurisdictions and the euro area — Exhibit 2-2

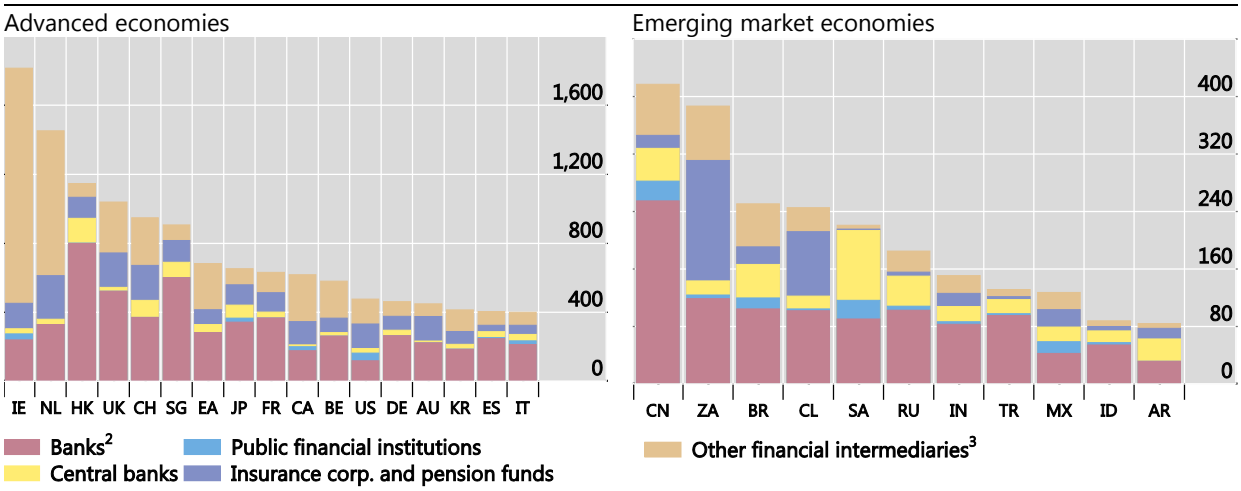


[1] Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [2] All deposit-taking corporations. [3] Weighted average based on total national financial assets. [4] Also includes captive financial institutions and money lenders, and, for presentation purposes, financial auxiliaries. Increases in the value of OFI assets may also reflect improvements in the availability of data for some OFI subsector over time at the jurisdiction level.

Sources: National sector balance sheet and other data; FSB calculations.

Composition of financial systems[1]

Percent of GDP at end-2015 — Exhibit 2-3



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; EA = Euro area as a whole; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

[1] Assets invested in foreign jurisdictions may distort these ratios. Data for the Cayman Islands are not represented in this graph – the size of the financial system was around 200,000% of GDP at end-2015. [2] All deposit-taking corporations. [3] Also includes captive financial institutions and money lenders, and, for presentation purposes, financial auxiliaries.

Sources: National sector balance sheet and other data; IMF *World Economic Outlook*; FSB calculations.

The composition of the financial system varied across jurisdictions (Exhibit 2-3 and Annex 1). The Cayman Islands, Ireland and the Netherlands reported the largest financial systems relative

to GDP (see Box 2-1). The relatively large size of these financial sectors is a result of OFIs in their jurisdiction – principally composed of investment funds – which are large both in terms of their size as a share of GDP and relative to other sectors of the national financial system.

In most jurisdictions, banks made up the single largest share of the financial system, while South Africa and Chile reported large insurance corporations and pension funds sectors relative to their national financial system. Compared to advanced economies, banks generally tend to play a bigger role relative to OFIs in most emerging market economies (EMEs). The central bank in Saudi Arabia, which is also managing the country's oil reserves, accounted for almost half of the national financial system in 2015.

Expanding the scope of jurisdiction coverage **Box 2-1**

In 2016, two jurisdictions joined the FSB's monitoring exercise for the first time: Belgium and the Cayman Islands. As a result, the number of participating jurisdictions increased to 28, of which 4 are non-FSB members.

The addition of Belgium, which is a member of the euro area, helps to reduce the discrepancy between the *21+EA-group* and the *28-group* samples (see Exhibit 1-1). Banks dominate the Belgian financial system, although their share has been on a declining trajectory since 2002 (Exhibit 2-4). In contrast, the size of OFIs in Belgium has increased in recent years, but remains small compared to most other jurisdictions. The size of captive financial institutions and money lenders is relatively large compared to other non-bank financial entities in Belgium. Captive financial institutions mainly engage in intra-group transactions with very little engagement in any investment or borrowing with entities external to the group. Their expansion was mainly linked to the attractiveness of the fiscal regime applied to them and has diminished from 2013 onwards because of the low interest rate environment, which lowered fiscal advantages.

The Cayman Islands is an international financial centre where a large part of the world's investment funds are domiciled.[28] Bringing the Cayman Islands into the scope of the monitoring exercise helps fill an important data gap and is another step towards arriving at more meaningful estimates of the size and trends of the global investment fund sector. Since the data collected for the monitoring exercise are based on the legal residence of the relevant entities, double-counting of investment funds that are managed and/or marketed in multiple jurisdictions is avoided. However, the aggregated figure for investment funds, and in particular hedge funds, still tends to be underestimated as a number of investment funds are domiciled in international financial centres that do not yet participate in the FSB exercise.[29]

The largest financial sectors in the Cayman Islands are investment funds, included in OFIs, and banks. While domiciled domestically, a majority of the assets of both sectors are managed and/or marketed outside of the islands, particularly in the US. In this regard it is worth noting that the risks carried by the activities of offshore banks and funds within the jurisdiction appear to be mostly reputational to the jurisdiction, irrespective of the large size. The share of OFIs in

[28] Almost half of the global sample's NAV of hedge funds was domiciled in the Cayman Islands. See IOSCO, *Report on the Third IOSCO Hedge Funds Survey*, December 2015.

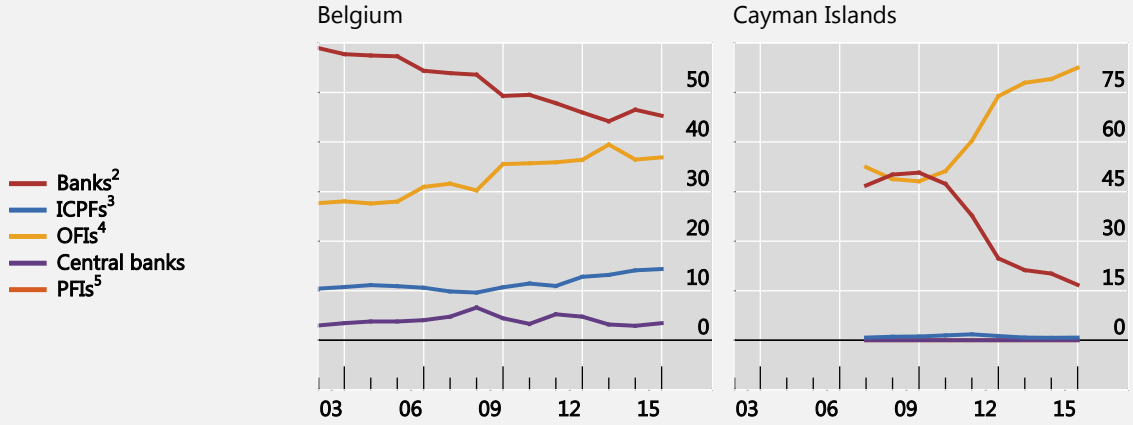
[29] The size of the global hedge fund sector may also be underestimated (a) due to the absence of a universally accepted definition of hedge funds; and (b) because certain types of hedge funds are sometimes exempted from regulation and reporting in some jurisdictions.

the national financial system has increased significantly since 2011, reflecting mainly the introduction of a new "master funds" licencing category.[30] The assets of banks in the Cayman Islands, on the other hand, decreased in recent years as banks continued to restructure their operations in search of improved profitability.[31]

Given the jurisdiction's small economy relative to the size of the national financial system, statistics showing the size of financial assets as a share of GDP are extremely large and had to be treated as outliers in some of the exhibits presented in this Report.

Financial system composition

Percent of total national financial system[1] Exhibit 2-4



[1] Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [2] Deposit-taking corporations. [3] Insurance corporations and pension funds. [4] Also includes captive financial institutions and money lenders, and, for presentation purposes, financial auxiliaries. [5] Public financial institutions.

Sources: National sector balance sheet and other data; FSB calculations.

2.2 Insurance corporations and pension funds

Insurance corporations and pension funds play an important role in jurisdictions' financial sectors, and an overview of their size and trends helps to provide the broader context for their interconnectedness with banks and OFIs through credit intermediation.

In many jurisdictions, insurance corporations and pension funds play an increasingly active role in credit intermediation through the purchase of credit assets and, occasionally, engaging in direct lending activities. Some of these entities may also facilitate credit creation by providing credit enhancements or writing puts on credit assets.

After having grown annually in excess of 6% on average since the financial crisis, insurance corporations increased by a more moderate 3.5% in 2015 for the *21+EA-group* (Exhibit 2-5).[32]

[30] A master fund is defined in the Cayman Islands' law as a mutual fund that is incorporated or established in the islands, holds investments and conducts trading activities, and has one or more regulated feeder funds. Such a fund is used to pool capital raised by different feeder funds into a centralised vehicle.

[31] At end-2015, a significant contraction in the balance sheets of these banks occurred as a result of up-streaming of deposits to European parent group banks to facilitate liquidity requirements for stress testing conducted by the ECB.

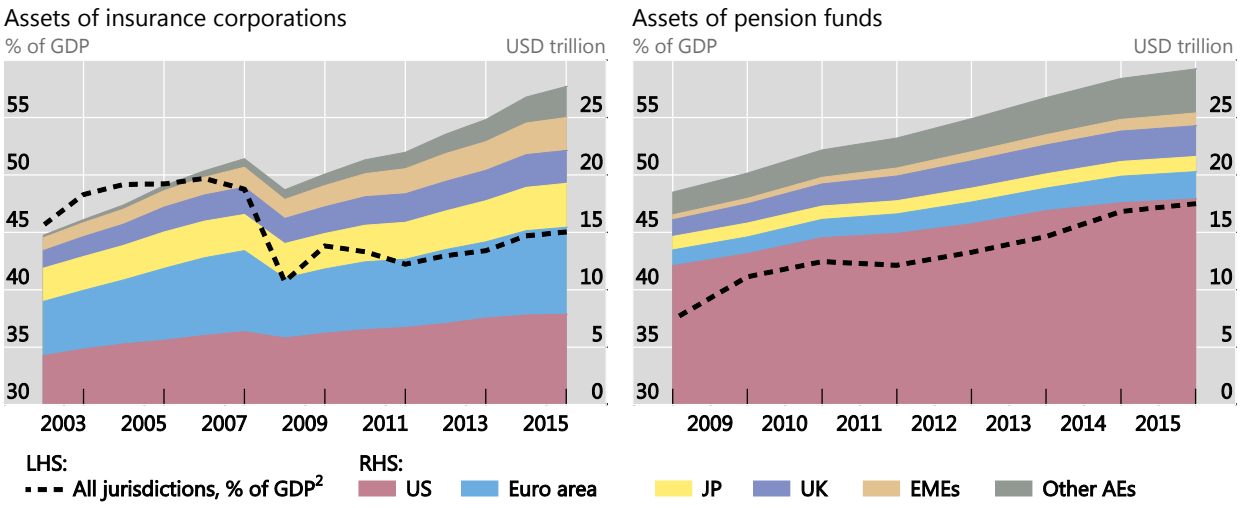
[32] The (re)insurance corporations sector operates in an increasingly difficult macroeconomic and financial environment, which is challenging long-established business models of various insurance corporations as demonstrated by the recent official stress test results and scenario analysis. See IAIS, *Global Insurance Market Report 2016*, January 2016.

The financial assets of insurance corporations in these jurisdictions reached $28 trillion at end-2015, representing 9% of total global financial system assets or 45% of total GDP. The US and the euro area each accounted for more than a quarter of global insurance corporations' assets (28% and 27%, respectively), followed by Japan (14%) and the UK (10%), while growth in these jurisdictions was mostly below the average growth rate.

At end-2015, pension fund assets stood at $29 trillion, constituting 9% of total global financial system assets or 48% of total GDP. Pension funds' annual average growth since 2011 reached 7%. With increasingly ageing populations in most developed jurisdictions, pay-as-you-go pension systems are putting increasing strains on government finances and may eventually become unsustainable. For this reason, some governments are increasingly complementing pay-as-you-go systems with fully funded and often private systems, which in turn are contributing to the growth of pension fund assets in recent years.[33]

Insurance corporations and pension funds

21 jurisdictions and the euro area[1] Exhibit 2-5



EA = Euro area; JP = Japan; UK = United Kingdom; US = United States; EMEs = emerging market economies; AEs = advanced economies.

[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Based on historical data included in jurisdictions' 2016 submissions. Increases in the value of insurance corporations' and pension funds' assets may also reflect improvements in the availability of data over time at the jurisdiction level. [2] As a weighted average based on rolling GDP weights.

Sources: National sector balance sheet and other data; IMF *World Economic Outlook*; FSB calculations.

The growth of pension funds and, to a lesser extent, insurance corporations in recent years resulted from their relatively high growth in EMEs. As these jurisdictions' financial systems mature, insurance corporation and pension fund sectors tend to evolve as well. Also, in some of these EMEs, the growth of insurance corporations and pension funds is occurring from a low base and contributing to financial deepening, in particular where the financial system is relatively less developed.

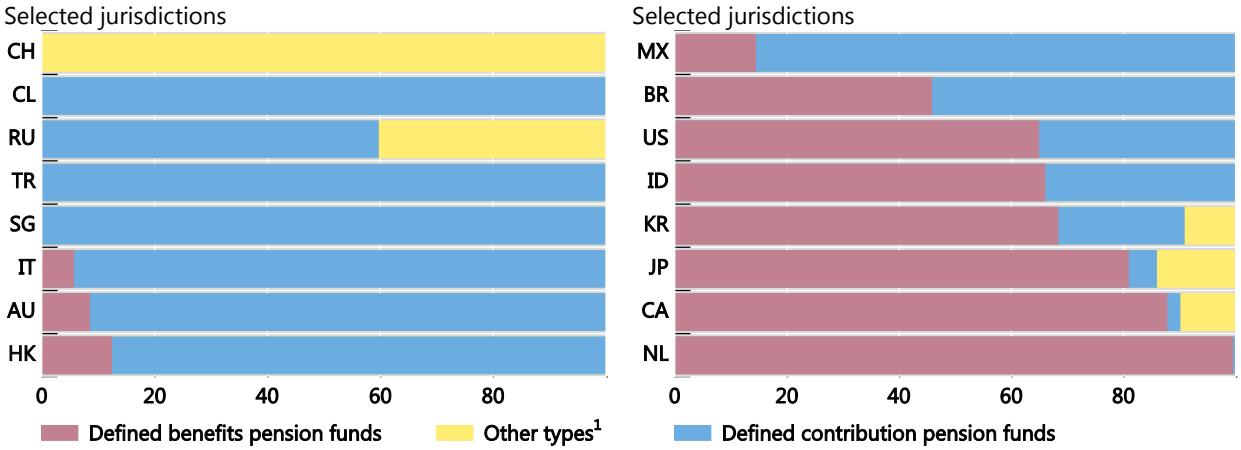
Pension funds provide their members with retirement benefits under two basic structures: defined benefit or defined contribution. In a defined benefit arrangement, the plan sponsor is responsible for paying a stream of defined benefits to a retired plan member, with the sponsor

[33] OECD, *Pensions at a Glance 2013*.

bearing the risk that plan assets will not sufficiently fund the benefits. In a defined contribution arrangement, the plan member's benefit is equal to the accumulated value of contributions and the investment return on these contributions, with the plan member bearing the risk that accumulated assets will not provide sufficient funds for retirement.

Defined benefit versus defined contribution split by jurisdiction

In percent, at end-2015 Exhibit 2-6



AU = Australia; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; HK = Hong Kong; ID = Indonesia; IT = Italy; JP = Japan; KR = Korea; MX = Mexico; NL = Netherlands; RU = Russia; SG = Singapore; TR = Turkey; US = United States.

[1] Other types includes hybrid schemes. For example in Switzerland pension funds are defined contribution with a guaranteed minimum rate of return and capital protection.

Sources: National sector balance sheet and other data; IMF *World Economic Outlook*; FSB calculations.

Pension funds generally have long-term investment horizons and can therefore be expected to make a positive contribution to financial stability. They also generally have relatively low levels of liquidity transformation and financial leverage. Nonetheless, pension funds can engage in activities that give rise to vulnerabilities, in the event that asset sales due to portfolio rebalancing put pressure on market liquidity. This applies in particular to defined contribution structures.[34] For the first time, the 2016 monitoring exercise collected a breakdown of pension funds into defined benefit and defined contribution plans. For those jurisdictions that reported this split,[35] the size of defined benefit plans significantly exceeded defined contribution plans at end-2015, with a respective size of $15 trillion and $9 trillion. However, assets of defined contribution plans grew at a higher rate than assets of defined benefit plans on average over the last few years. Defined contribution plans are dominant in Australia, Chile, Hong Kong, Italy, Mexico, Russia, Singapore, and Turkey. Defined benefit plans are more prevalent in Canada, Indonesia, Japan, Korea, the Netherlands, and the US (Exhibit 2-6).[36]

[34] For example where plan rules allow members to withdraw from or switch funds on very short notice, there could potentially be a liquidity risk similar to that of open-ended funds. For details of potential vulnerabilities, see FSB, *Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities*, January 2017.

[35] These are: Australia, Brazil, Canada, Chile, Hong Kong, Indonesia, Italy, Japan, Korea, Mexico, the Netherlands, Russia, Singapore, Switzerland, Turkey, and the US.

[36] In the US, defined benefit plans are bigger when both private and public funds are taken together. However, the majority of private pension funds have a defined contribution structure.

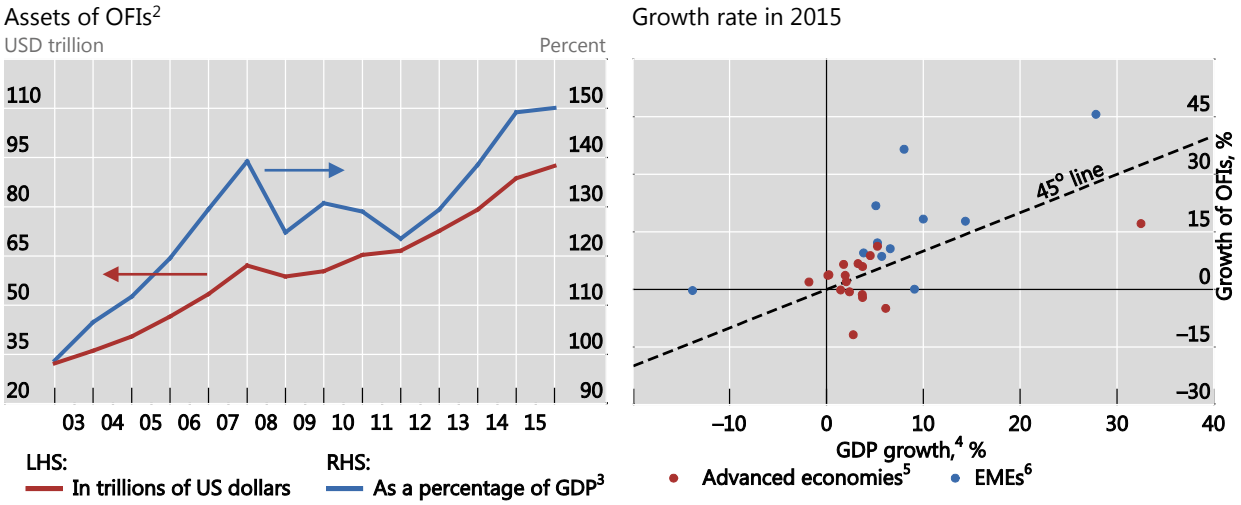
2.3 Other financial intermediaries

2.3.1 Global perspective

The size of OFIs is measured by the sum of assets of all financial corporations that are not classified as central banks, banks, insurance corporations, pension funds, public financial institutions, or financial auxiliaries. There are ten core OFI subsectors which are broadly consistent with the way jurisdictions' sector balance sheet statistics are typically structured.[37] Additional sectors are reported by jurisdictions where applicable. Since many of the non-bank financial entities that authorities include in the five economic functions as part of the narrow measure of shadow banking are included in OFIs (see Section 4), the size of OFI subsectors can be used to obtain an initial conservative proxy or broad measure for the size of the shadow banking system and its evolution over time.

Other financial intermediaries (OFIs) compared to GDP[1]

21 jurisdictions and the euro area Exhibit 2-7



[1] Also includes captive financial institutions and money lenders. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Based on historical data included in jurisdictions' 2016 submissions. [2] Increases in the value of OFI assets may also reflect improvements in the availability of data for some OFI subsectors over time at the jurisdiction level. [3] As a weighted average based on GDP weights. [4] Calculated from GDP figures in local currency based on current prices. Growth rates in two outlier jurisdictions are reflecting high inflation and one-off relocations of big economic agents. [5] Australia, Belgium, Canada, the Cayman Islands, France, Germany, Hong Kong, Ireland, Italy, Japan, South Korea, the Netherlands, Singapore, Spain, Switzerland, the UK and the US. [6] Argentina, Brazil, Chile, China, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa and Turkey.

Sources: National sector balance sheet and other data; IMF *World Economic Outlook*; FSB calculations.

OFIs in the *21+EA-group* continued on an upward trend, increasing for the seventh consecutive year by $3.8 trillion in 2015 to reach $92 trillion (Exhibit 2-7). However, the 4.3% exchange rate-adjusted growth rate in 2015 was lower than the average growth rate of 10% in previous years. The size of OFIs was equivalent to 150% of total GDP at end-2015.

[37] For the 2016 monitoring exercise, core OFI subsectors are MMFs, hedge funds, other investment funds, real estate investment trusts (REITs) and real estate (RE) funds, trust companies, finance companies, broker-dealers, structured finance vehicles, central counterparties, and captive financial institutions and money lenders. See the *reporting templates* at for more details.

Across the sample, growth of GDP tended to be associated with growth of OFIs – for every 1 percentage point increase in the level of GDP, OFIs increased by 0.9 percentage points.[38] The dots above the 45°-line in Exhibit 2-7 indicate that assets of OFIs grew faster than GDP in most jurisdictions in 2015, which was particularly the case in EMEs. However, aggregated across the *21+EA-group*, OFIs as a share of GDP increased only marginally in 2015, reflecting OFI sectors stagnating or falling relative to GDP in some advanced economies. The compounded growth of OFIs tended to be associated with GDP growth over a longer time period (2011–2014), albeit less strongly.

2.3.2 Cross-jurisdictions analysis

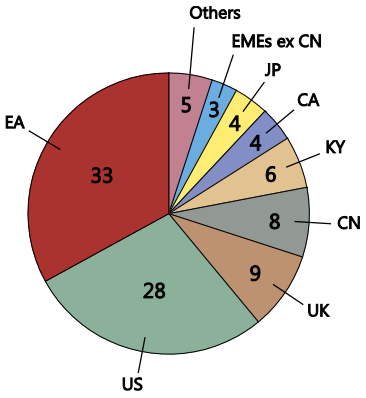
The aggregated numbers mask considerable heterogeneity between jurisdictions in terms of the importance and growth of OFIs in the respective domestic financial and economic systems.

The euro area as a whole had the largest OFI sector at end-2015 with assets totalling $30 trillion, followed by the US ($26 trillion), the UK ($8 trillion), China ($8 trillion), the Cayman Islands ($6 trillion), Canada and Japan (each $4 trillion). Compared to 2011, the euro area's share of total OFIs increased marginally from 32% to 33%, whereas the US' share decreased from 33% to 28% and the UK's share from 14% to 9% (Exhibit 2-8).

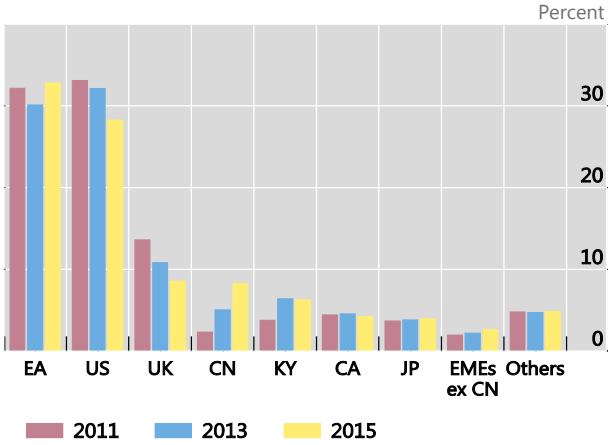
Share of global OFI assets[1]

21 jurisdictions and the euro area — Exhibit 2-8

At end-2015, in percent



Historical evolution of the shares by jurisdiction[2]



CA = Canada; CN = China; EA = euro area; EMEs = emerging market economies; JP = Japan; KY = Cayman Islands; UK = United Kingdom; US = United States. Others include Australia, Hong Kong, Korea, Singapore and Switzerland. EMEs include Argentina, Brazil, Chile, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa and Turkey.

[1] Also includes captive financial institutions and money lenders. [2] Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Based on historical data included in jurisdictions' 2016 submissions. The evolution of OFI shares may also reflect improvements in the availability of data for some OFI subsectors over time at the jurisdiction level.

Sources: National sector balance sheet and other data; FSB calculations.

In 2015, six jurisdictions – Canada, the Cayman Islands, Ireland, the Netherlands, Switzerland, and the UK – featured OFI sectors that were more than twice as large as their respective GDP.[39]

[38] The R^2 is 38%, t-stat is 4.0, p-value is <0.001.

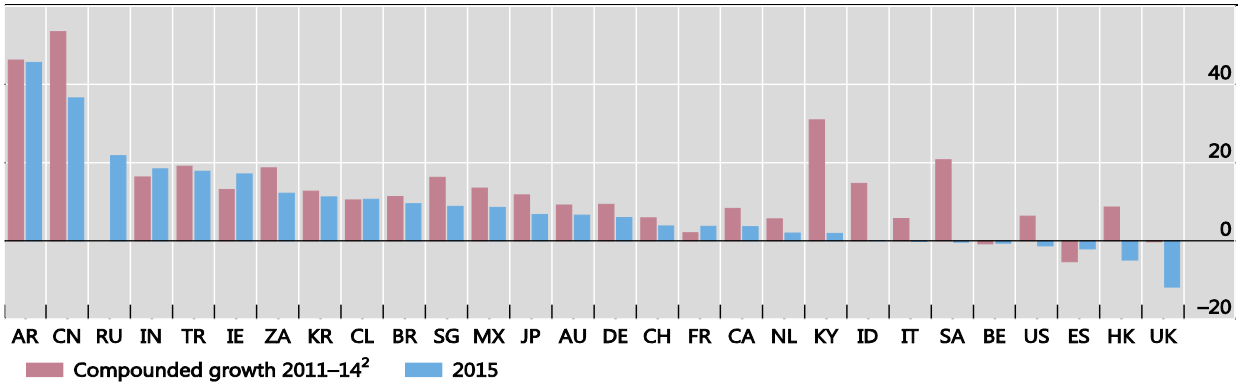
[39] OFI assets also exceeded 200% of GDP in the euro area as a whole.

This concentration was to a large extent attributable to most of these jurisdictions' role as international financial centres or hosts to financial activities carried out by foreign-owned entities.[40] In the case of the Cayman Islands, where OFI assets exceeded 170,000% of GDP, this is due to the international nature of the OFI sector in this jurisdiction, which had limited linkages to the domestic economy. The Cayman Islands continues to be the domicile of choice and is home to a significant share of global investment funds, most of which are managed and marketed abroad. Other jurisdictions where the measure of OFIs as a percentage of GDP was substantial include Ireland[41] at around 1,400% of GDP and the Netherlands at approximately 840% of GDP. No other jurisdictions exceeded 500% of GDP for this measure.

Annual growth of other financial intermediaries (OFIs)[1]

By jurisdiction, in percent

Exhibit 2-9



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; EA = Euro area; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [1] Also, includes captive financial institutions and money lenders. [2] For Russia, the compounded growth rate could not be calculated because OFIs data prior to 2014 are incomplete. For Hong Kong, the compound growth rate is based on 2012–15 due to incomplete OFIs data in 2011.

Sources: National sector balance sheet and other data; FSB calculations.

OFIs grew in most jurisdictions in 2015. This growth was widespread and, after adjusting for exchange rate effects, only 7 out of 28 jurisdictions – UK, Hong Kong, Spain, the US, Belgium, Saudi Arabia, and Italy – reported a decline in OFI assets during 2015 (Exhibit 2-9). The largest drop in OFIs in 2015 occurred in the UK, where it was largely driven by a fall in broker-dealer assets following a sharp rise in their assets in the previous year. Of the jurisdictions whose OFIs grew in 2015, the biggest increases were reported mainly in EMEs, especially in Argentina and China with 46% and 37%, respectively. However, in many cases, these strong growth rates can

[40] For Canada, a large part of the OFI sector is composed of holding companies and head offices, which are primarily engaged in managing and/or holding the securities of companies and enterprises.

[41] For a more detailed analysis of the Irish shadow banking system, see Annex 2 in FSB, *Global Shadow Banking Monitoring Report 2015*, November 2015.

largely be attributed to the low base effect given the relatively small size of OFIs in these jurisdictions.[42]

2.3.3 OFI subsectors

This Section offers some detail on the different subsectors comprising the OFIs category. In contrast to the preceding sections, the analysis is mostly based on data from the *28-group*, instead of the *21+EA-group*, because data from the seven participating euro area jurisdictions are more granular than the aggregate euro area data from the ECB.[43]

Major OFI subsectors

28 jurisdictions — Exhibit 2-10

	Inv. funds	BDs	CFI MLs	MMFs	SFVs	Fin. co.	HFs	Trusts	REITs	CCPs
Size in 2015 ($ trillion)	30.7	9.5	5.4	4.6	4.4	4.6	3.2	2.9	1.8	0.4
Share of OFI total (% of OFIs)	38.5	11.9	6.8	5.8	5.5	5.7	4.0	3.7	2.2	0.5
Growth in 2015 (year-over-year, %)	3.2	−5.5	2.8	9.2	−4.3	6.6	1.0	15.3	1.8	-4.1
Growth 2011-14 (compounded, %)	15.3	4.9	3.8	3.6	−7.5	3.0	32.8	38.3	14.1	−5.9

Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). MMFs = Money market funds; HFs = Hedge funds; Inv. funds = Investment funds (equity funds, fixed income funds, mixed/other funds); REITs = Real estate investment trusts and real estate funds (RE funds); Trusts = Trust companies; Fin. co. = Finance companies; BDs = Broker-dealers; SFVs = Structured finance vehicles; CCPs = Central counterparties; CFIMLs = Captive financial institutions and money lenders.

Sources: National sector balance sheet and other data; FSB calculations.

The OFI sector can be split into 10 major subsectors of varying significance (Exhibits 2-10 and 2-11).[44] In the order of size:

- **Investment funds** (other than MMFs and hedge funds) was by far the largest OFI subsector in 2015 with about $30.7 trillion in assets, representing almost 40% of total OFI assets of the *28-group*. Aggregated across jurisdictions, investment funds grew by 3.2% in 2015, following 15% annual average growth between 2011 and 2014. About half of the sector was concentrated in the US.

  Investment funds are comprised of equity funds, fixed income funds, and mixed/other funds (other than MMFs or hedge funds). About 54% ($16.5 trillion) of the investment funds sector consisted of equity funds, which grew by 2% in 2015. Fixed income funds made up 26% ($7.9 trillion) of the investment funds sector, growing at 2% in 2015. Finally, the remaining 21% ($6.5 trillion) are mixed/other funds that grew by about 9%

[42] In the UK, the rise and fall in broker-dealer assets is primarily attributable to changes in the fair value of financial instruments, such as derivative instruments, due to market movements. In the case of Argentina, the strong growth rates are partially explained by high inflation levels.

[43] Participating euro area jurisdictions are: Belgium, France, Germany, Italy, Ireland, the Netherlands, and Spain. See also Exhibit 1-1 for the composition of the samples.

[44] Entities prudentially consolidated into banking groups are included as in this section we describe the structure of the financial system. Consolidated entities are excluded in the narrowing down process (Section 4.2) as they are not considered shadow banking.

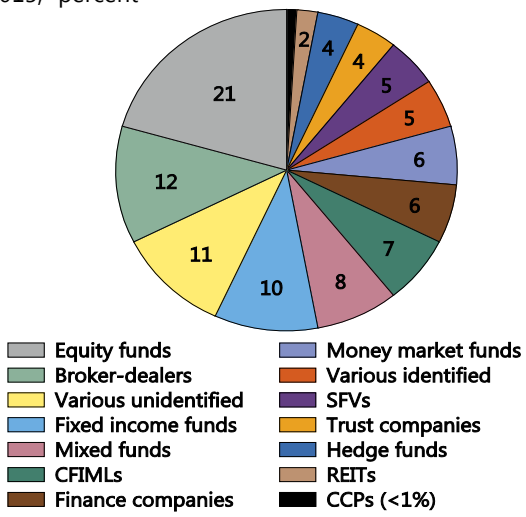
in 2015 (Exhibit 2-12). The calculated growth rates mentioned here are net of exchange rate effects, but do not account, for example, for valuation effects, which would likely dampen the growth figures given the overall appreciation of asset prices in 2015.

Major OFI subsectors

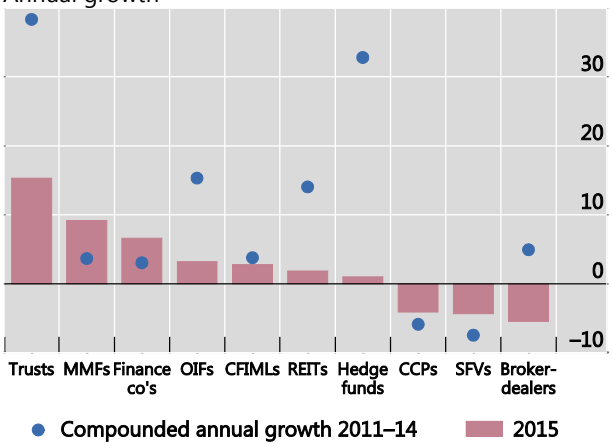
28 jurisdictions

Exhibit 2-11

2015,[1] percent



Annual growth[2]



CCPs = Central counterparties; CFIMLs = Captive financial institutions and money lenders; MMFs = Money market funds; OIFs = Other investment funds; REITs = Real estate investment trusts and RE funds; SFVs = Structured finance vehicles; Trusts = Trust companies;

[1] Various unidentified also includes central counterparties. [2] Based on jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015).

Sources: National sector balance sheet and other data; FSB calculations.

- **Broker-dealers** were the second largest identified sector with $9.5 trillion of assets corresponding to 12% of total OFIs. At end-2015, the sector was concentrated in the US (32%), the UK (31%), and Japan (15%). The assets of broker-dealers contracted in 2015 by 5%, driven by negative growth in most jurisdictions. The decline was particularly pronounced in the UK, where assets of broker-dealers fell by 17%.[45] The US also saw a decline in broker-dealer assets of 6% in 2015.
- **Captive financial institutions and money lenders** provide financial services where most of their assets or liabilities are not transacted on open financial markets (see Box 2-2). For example, they may be holding companies that own assets of subsidiaries and possibly raise funding on open financial markets, or certain types of special purpose entities that qualify as institutional units and raise funds in open markets to be used by their parent corporation. Six jurisdictions reported different types of captive financial institutions and money lenders from their national financial accounts statistics,[46] which aggregated to $5.4 trillion at end-2015, corresponding to 7% of total OFIs. Some 81% ($4.4 trillion) of this sector came from the Netherlands and consisted mainly of "Special Financial Institutions", which include financial and non-financial holding companies of

[45] See Footnote 42.

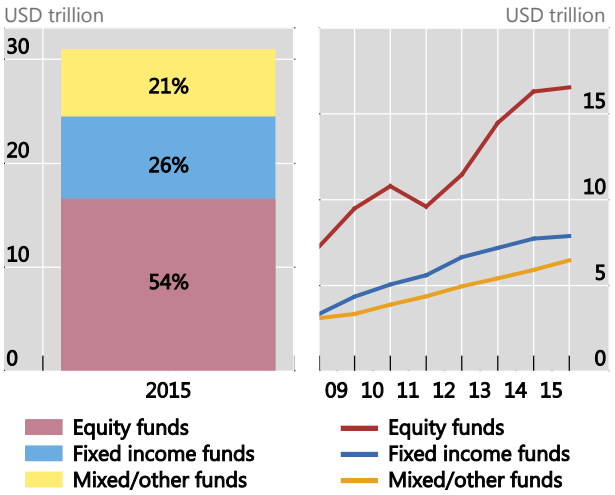
[46] These are: Belgium, France, Germany, Korea, the Netherlands, and Spain.

international corporations. These are typically owned by foreign multinationals who use these entities to attract external funding and facilitate intragroup transactions. The sector grew by 3% in 2015.

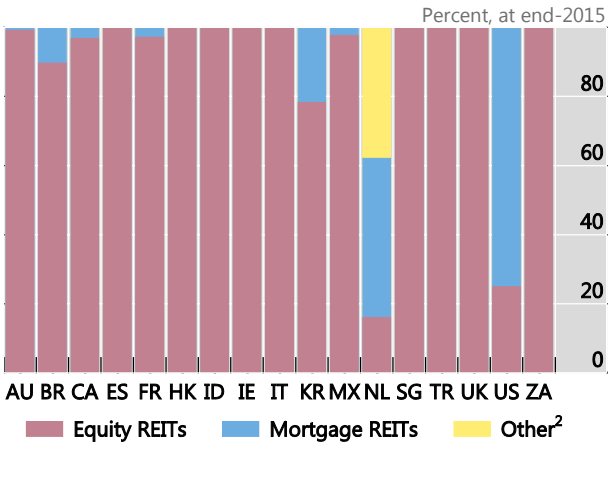
Investment funds and REITs[1]

28 jurisdictions Exhibit 2-12

Investment funds breakdown



Equity REITs versus mortgage REITs split by jurisdiction



AU = Australia; BR = Brazil; CA = Canada; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IT = Italy; KR = Korea; MX = Mexico; NL = Netherlands; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

[1] REITs = real estate investment trusts and RE funds. [2] Includes funds of real estate funds.

Sources: National sector balance sheet and other data; FSB calculations.

- **Finance companies** stood at $4.6 trillion in 2015, equivalent to 6% of total OFIs. They were growing at an aggregate growth rate in 2015 of 7%. The US reported the largest sector making up about 32% in the *28-group* while China had the second largest sector (20%). The growth of finance companies in 2015 ranged from -18% in Italy to 30% in China.
- **MMFs** stood at $4.6 trillion in 2015, equivalent to 6% of total OFIs. They were growing in most jurisdictions, with an aggregate growth rate of 9% in 2015. The MMF sector is dominated by four jurisdictions (the US, China, Ireland, and France), which together accounted for about 90% of total MMF assets under management in the *28-group* (Exhibit 2-13). MMFs in the US represent more than 50% of global MMFs. In the US, the sector grew by about 1% in 2015. Jurisdictions with the highest 2015 growth rate of MMFs include Belgium (1,434%),[47] China (67%), Mexico (46%), Argentina (46%), the UK (25%), Turkey (22%), India (22%), and Ireland (20%), albeit from very different initial shares of national financial assets.[48] It is worth noting that new rules aimed at

[47] MMFs in Belgium jumped in 2015 from a very low starting level, due to a temporary switch in investments by certain equity funds that use a floor-monitoring mechanism. After equity markets underwent a correction in 2015, these funds rebalanced their investments towards safer assets, consisting of bank deposits (investments in which are limited by UCITS directive) and MMFs. This was of a temporary nature, since by end-2016, MMFs NAV fell back to "normal" levels.

[48] In some cases, the growth is occurring from low initial amounts, leading to large percentage changes even if the absolute change is small (low base effect).

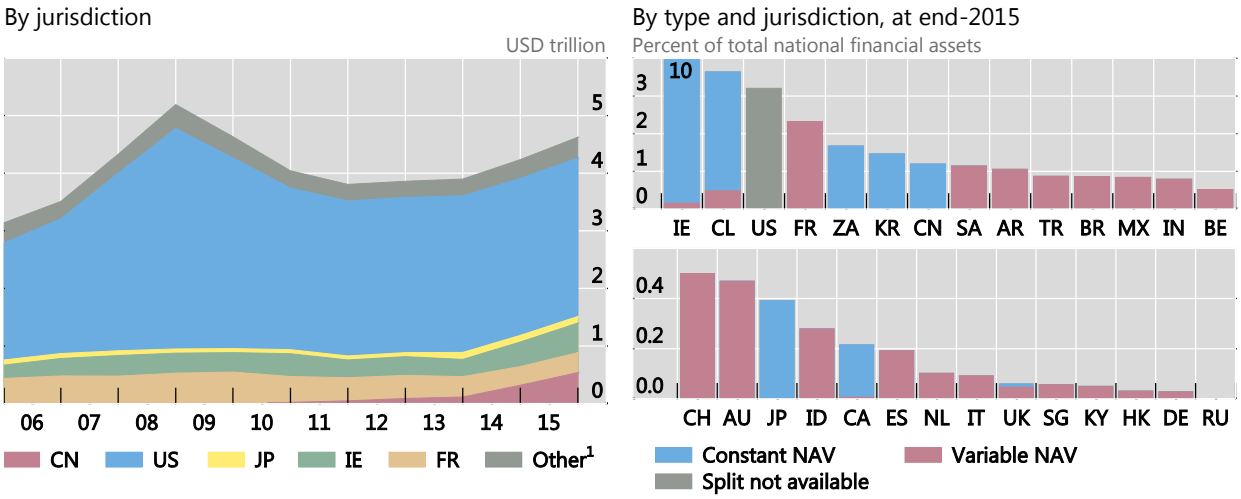
addressing risks of investor runs have been adopted in the US and are about to be adopted in the EU.[49]

All but one jurisdiction reported the split between MMFs offering variable (or floating) net asset value (NAV) and constant (or stable/fixed) NAV.[50] For those that provided the breakdown, constant NAV (CNAV) structures were relatively more prevalent in Canada, Chile, China, Ireland, Japan, Korea, and South Africa. In contrast, variable NAV (VNAV) MMFs were dominant in Argentina, Australia, Belgium, Brazil, the Cayman Islands, France, Germany, Hong Kong, India, Indonesia, Italy, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, Spain, Switzerland, Turkey, and the UK, with some jurisdictions not allowing MMFs to offer CNAV structures (Exhibit 2-13).

Assets of MMFs

28 jurisdictions

Exhibit 2-13



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; DE = Germany; EA = euro area; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

[1] Other = AR, AU, BE, BR, CA, CH, CL, DE, ES, HK, IN, ID, IT, KR, KY, MX, NL, RU, SA, SG, ZA, TR, UK.

Sources: National sector balance sheet and other data; FSB calculations.

- **Structured finance vehicles** stood at $4.4 trillion at end-2015, corresponding to 5% of total OFIs. The sector shrank by 4% in 2015 in the *28-group*. About 30% of the sector was concentrated in the US, followed by Ireland (11%) and the UK (8%).
- **Hedge funds**' assets amounted to about $3.2 trillion, 4% of total OFIs, based on data reported by 14 jurisdictions.[51] This aggregate amount is not inconsistent with the

[49] See SEC, *Money Market Fund Reform; Amendments to Form PF*, July 2014. The EU is about to adopt new rules; see European Parliament, *European Parliament Legislative Resolution of 5 April 2017 on the Proposal for a Regulation of the European Parliament and of the Council on Money Market Funds*, April 2017.

[50] The US did not provide the split of MMFs into CNAV and VNAV.

[51] Hedge funds typically have more flexible investment strategies than mutual funds. They are usually marketed in way of "private placement" to (semi-) professional investors. Hence, they are often not subject to some of the regulations that are designed to protect retail investors. Hedge funds were reported by Canada, the Cayman Islands, France, Germany, Ireland, India, Italy, the Netherlands, Russia, Singapore, South Africa, Spain, Turkey, and the UK.

amount calculated by IOSCO's third hedge fund survey which estimated the global hedge fund industry as $2.6 trillion in assets under management (AUM), although the methodology for calculating the amount differed from this monitoring exercise.[52] The global size of this OFI sector in previous FSB monitoring exercises was significantly underestimated, which was primarily due to the fact that offshore financial centres, where most hedge funds tend to be domiciled, were not included in the scope of the exercise.[53] In the 2016 monitoring exercise, part of this gap was closed through the addition of the Cayman Islands to the exercise, which added about $2.9 trillion of hedge fund assets into the scope. Given the Cayman Islands' share in the total sector, the aggregate growth rate of this sector was driven by developments in the Cayman Islands where the reported size of hedge funds contracted by 0.4% in 2015.[54] The Cayman Islands seem to continue to be a preferred domicile for hedge funds.

- **Trust companies**' assets stood at $2.9 trillion at end-2015, equivalent to 4% of total OFIs in the *28 group*, with almost 90% reported in China. Trust companies in China have experienced rapid growth in recent years, growing at an average annual exchange rate-adjusted growth rate of almost 40% since 2011, with an increase of 17% in 2015. Chinese trust companies conduct asset management businesses on customers' behalf and are supervised and regulated by the China Banking Regulatory Commission (CBRC). They manage different types of trusts by investing in financial assets such as bonds and equity, and by extending loans.[55]
- Assets of **real estate investment trusts and real estate funds**, hereafter "REITs", amounted to $1.8 trillion in 2015, corresponding to 2% of total OFIs. Most jurisdictions separately identified equity REITs and mortgage REITs,[56] with equity REITs exceeding mortgage REITs by a factor of two. The sector grew by 2% in 2015, significantly below the double digit average growth in previous years. However, this growth rate conceals significant differences between the two components, with equity REITs growing by almost 8% and mortgage REITs contracting by about 10% in 2015. Of the jurisdictions that reported this split,[57] the UK reported the largest equity REITs sector with $309

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[52] IOSCO, *Report on the Third IOSCO Hedge Fund Survey*, December 2015. Results included in the IOSCO survey are not directly comparable with this Report's results for a number of reasons: (a) reporting in the FSB's monitoring exercise is based on the legal residence of the relevant entities to avoid double-counting of investment funds that are managed and/or marketed in multiple jurisdictions; (b) in the FSB exercise, where possible, the size of investment funds, and in particular hedge funds, are reported based on total financial AUM without netting of any liabilities; and (c) the sample of jurisdictions included may differ between the FSB exercise and the IOSCO survey.

[53] Another reason is that national financial account statistics are often not granular enough to allow a separation between hedge funds and other sectors (e.g. in the financial accounts of the US, hedge funds are included in the household sector).

[54] There is no separate licencing category for hedge funds incorporated in the Cayman Islands. As such, the Cayman Islands authorities estimated their size based on certain characteristics that would designate them as hedge funds (e.g. leverage).

[55] See Annex 3 in FSB, *Peer Review of China*, August 2015.

[56] Equity REITs only invest in and own physical property and their revenues therefore come principally from their properties' rent. Mortgage REITs, on the other hand, do not invest in physical real-estate but derive most of their income from investment and ownership of debt instruments. See Box 4-1 in FSB, *Global Shadow Banking Monitoring Report 2014*, October 2014.

[57] These are: Australia, Brazil, Canada, France, Hong Kong, Indonesia, Ireland, Italy, Korea, Mexico, the Netherlands, Singapore, South Africa, Spain, Turkey, the UK, and the US.

billion (30% of the *28-group* total), followed by the US with $164 billion (16%).[58] Reported 2015 growth rates across jurisdictions varied widely depending on the size of the initial base and the evolution of these businesses in each jurisdiction. For mortgage REITs, the US reported 92% of the *28-group* aggregate ($493 billion), with a growth rate of −13%. The Netherlands, where mortgage REITs stood at $21 billion, recorded the highest growth rate of 74% in 2015. The right panel of Exhibit 2-12 shows that equity REITs exceeded mortgage REITs in most jurisdictions at end-2015, with the exception of the Netherlands and the US.

- **Central counterparties** (CCPs) were the smallest OFI subsector, making up only $0.4 trillion, or less than 1% of total OFIs. CCPs decreased by 4%, which was largely driven by their decline in the UK.[59]

Captive financial institutions and money lenders **Box 2-2**

Captive financial institutions and money lenders (CFIMLs) were newly introduced as a category in the System of National Accounts (SNA) 2008, separate from OFIs and financial auxiliaries.[60] They are defined as *institutional units providing financial services, where most of either their assets or liabilities are not transacted on open financial markets*. According to the European System of Accounts (ESA) 2010,[61] which builds on SNA 2008, this sector includes for example:

- Trusts, estates, or "brass plate" companies;[62]
- Certain holding companies;
- Special purpose entities that qualify as institutional units and raise funds in open markets to be used by their parent corporation; and
- Units providing financial services exclusively with own funds, or funds provided by a sponsor, to a range of clients and incur the financial risk of the debtor defaulting.

This category has also been added as a separate item in the macro-mapping templates used for the FSB's 2016 monitoring exercise. When jurisdictions update their national financial accounts to SNA 2008, CFIMLs are often introduced as a new subsector of financial corporations. Having a specific column for CFIMLs in the FSB's templates therefore improves the consistency of

[58] In relation to this, some UK property funds faced stress in the period following the EU referendum (on 23 June 2016) and suspended redemptions. For details, see Annex 3.

[59] The decline in UK CCP assets reflected a decline in repo balances, which is the value of the second cash leg of a repo transaction after netting. These balances can fall even as volumes of cleared repo increase provided that netting efficiency has increased. Given the regulations that have been implemented over the last few years (e.g. the leverage ratio), banks have been incentivised to increase their netting efficiency to help reduce regulatory capital requirements.

[60] UN et al, *System of National Accounts 2008*, December 2009.

[61] Eurostat, *European System of Accounts 2010*, 2013.

[62] The definition of trust companies varies across jurisdictions. In general, they were reported whenever their activities involved financial intermediation (i.e. went beyond basic accounting or administrative/legal services, such as where they are involved in asset management activities on behalf of their clients).

reporting of this category across jurisdictions and also helps to broadly align aggregated figures in the template with published financial accounts figures.[63]

Examples of entities reported as CFIMLs include holding companies (Belgium, France, Germany, Korea, and Spain), money lenders (Korea), issuers of preference shares and other negotiable securities (Spain), and special financial institutions, which are subsidiaries of foreign multinationals used almost exclusively for the pass-through of capital (the Netherlands).

2.4 Credit and lending activities

Data were collected on "credit assets" and "lending" (subset of total financial assets) of the following types of entities: banks, insurance corporations, pension funds, public financial institutions, and the aggregate OFI sector and its subsectors – finance companies, hedge funds, fixed income funds, other funds, and broker-dealers.[64] The intention is to identify which non-bank financial entities are involved in credit intermediation, to analyse how their credit activities evolved and to identify potential shifts between sectors.

2.4.1 Credit assets

Bank credit intermediation, as measured by bank holding of credit assets, has increased in recent years, driven largely by non-euro area jurisdictions. On average, bank credit in the *21+EA group* has increased at an exchange rate-adjusted annual rate of about 2% since 2011, reaching $74 trillion at end-2015. Growth was particularly strong in the US and EMEs, while a contraction in bank credit was seen in some advanced economies especially in the euro area. Together with the deleveraging needs of the non-financial private sector, balance sheet adjustments by euro area banks have been a significant factor in this decline as banks have adjusted to the new regulatory environment and still have to deal with the high outstanding amount of non-performing loans adversely affecting banks' profitability. Credit demand in the euro area remains relatively moderate. According to a recent ECB survey only 1% of SMEs signalled an increase in their need for bank loans.[65]

Credit intermediation by OFIs has been increasing steadily since 2010, in constant exchange rate terms, and reached $34 trillion in 2015. For 17 jurisdictions and the euro area,[66] credit assets represented about 37% of total financial assets of OFIs in 2015. The steady increase in OFI credit assets was largely accounted for by fixed income funds (right panel of Exhibit 2-14). In the last five years, credit assets of fixed income funds rose from just below $6 trillion in 2011 to above $8 trillion in 2015. After experiencing moderate growth prior to the financial crisis,

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[63] The reporting template also included an unlabelled column that jurisdictions can use to submit data in addition to the specified entity type columns.

[64] "Credit assets" is defined as the amount of loans and receivables, investments in debt securities, and other credit-related assets (e.g. government debt and other debt instruments). "Loans" (or "lending") is defined as the amount of loans and receivables. The corresponding SNA 2008 codes for transactions in financial assets and liabilities are F3 plus F4, and F4, respectively. Note that credit and lending to financial entities and the government are also included. OFIs in Section 2.4, 2.5 and 3 do not include captive financial institutions and money lenders.

[65] ECB, *Survey on the Access to Finance of Enterprises in the Euro Area*, November 2016.

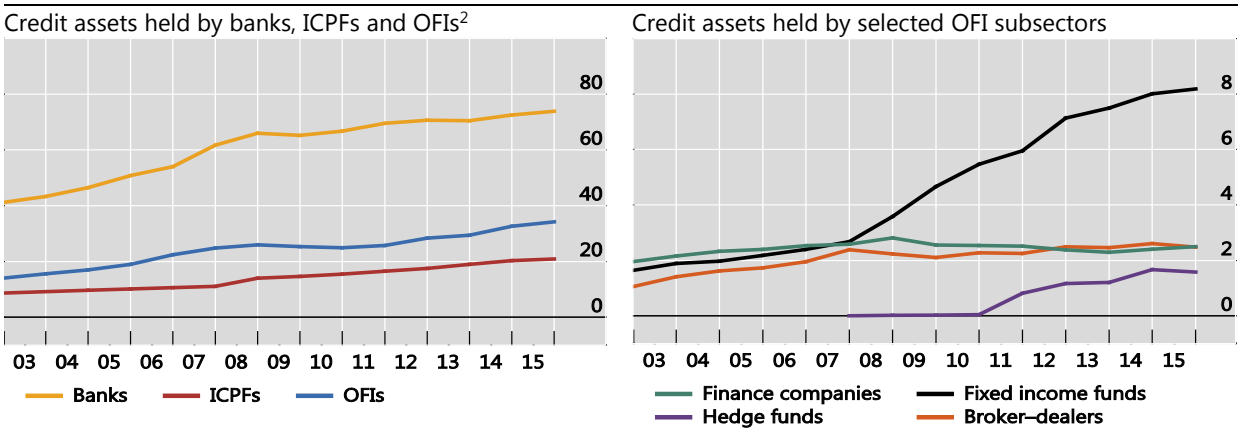
[66] Argentina, Australia, Brazil, Canada, the Cayman Islands, Chile, China, India, Indonesia, Japan, Korea, Mexico, Singapore, South Africa, Switzerland, the UK, and the US.

credit intermediation by finance companies and broker-dealers has remained largely constant since 2008.

Meanwhile, credit assets of insurance corporations and pension funds have both increased in recent years, reaching a combined $21 trillion in 2015 in 18 jurisdictions and the euro area.[67] The increase in reported credit assets in these sectors is consistent with anecdotal evidence of pension funds and insurance corporations taking on more higher-yielding fixed income exposure in response to the prolonged period of low rates.[68]

Credit assets

In trillion of US dollars, 21 jurisdictions and the euro area[1] Exhibit 2-14



[1] Based on historical data included in jurisdictions' 2016 submissions. Increases in credit assets held may also reflect improvements in the availability of data over time at the jurisdiction level. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [2] ICPFs = Insurance corporations and pension funds; OFIs = Other financial intermediaries.

Sources: National sector balance sheet and other data; FSB calculations.

2.4.2 Lending

Lending assets (or loans) were collected as a subset of credit assets (Exhibit 2-15). At 77%, bank loans represented the biggest portion of total lending in 2015. They have been increasing in constant US dollar terms from $52 trillion in 2011 to $57 trillion in the *21+EA group* sample. While bank loans have decreased in some euro area countries and the Cayman Islands, they have risen in many other jurisdictions. Insurance corporations and pension funds are also involved in the business of direct lending, taking advantage of the funding gap existing in the market where banks have retreated primarily as a result of Basel III regulation. Loans extended or held by insurance corporations and pension funds have been relatively steady in constant US dollar terms for the last seven years in the *21+EA group*.[69] At the jurisdiction level, the decline in insurance corporations' loans in Japan from $700 billion in 2002 to $401 billion in 2015 has been offset by a corresponding increase in the US and the euro area. For pension funds, there

[67] Argentina, Australia, Brazil, Canada, Chile, Hong Kong, India, Indonesia, Japan, Korea, Mexico, Russia, Singapore, South Africa, Switzerland, Turkey, the UK, and the US.

[68] Insurance corporations and pension funds, as well as other OFIs, seem to be recently increasing their involvement in leverage finance, which consists of leveraged loans and high-yield bonds. For details on leveraged finance including on the role of institutional investors, see Annex 7.

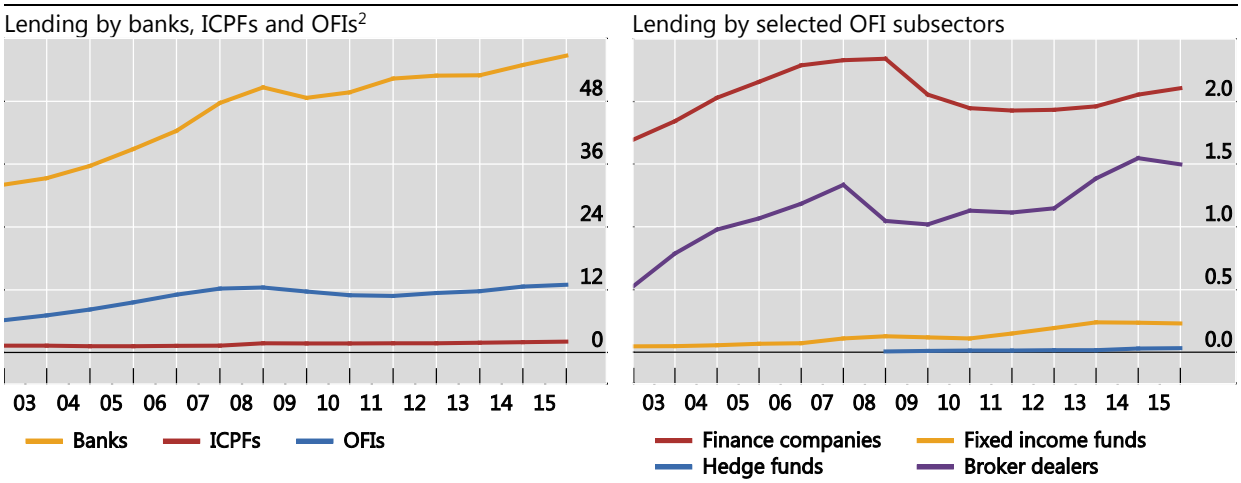
[69] However, insurance corporations' loan assets rose from $1.6 trillion in 2011 to $1.9 trillion in 2015, increasing 4% on average annually in constant US dollar terms.

was a noticeable long-term increase in lending over the last decade in Canada, with an average annual exchange rate-adjusted growth rate since 2007 of almost 20%.

Loans extended by the OFI sector have been growing on average at around 5% annually in 14 jurisdictions and the euro area since 2011.[70] Over the same period, OFI loans increased at an exchange rate-adjusted annual rate of 10% or more in Australia, China, Germany, Indonesia, Korea, and South Africa, with China reporting the highest increase of 35%. In contrast, OFI loan assets decreased by around 17% and 13% in the UK and Italy, respectively. To some extent, variations in growth rates were driven by differences across jurisdictions in the initial base. The right panel of Exhibit 2-15 suggests that reported finance company loans and broker-dealer loans (commonly referred to as "margin loans") accounted for large portions of the OFI loan book.

Lending

In trillion of US dollars, 21 jurisdictions and the euro area[1] Exhibit 2-15



[1] Based on historical data included in jurisdictions' 2016 submissions. The evolution of lending may also reflect improvements in the availability of data over time on a jurisdiction level. Exchange rate effects have been netted out by using a constant exchange rate (from 2015).
[2] ICPFs = Insurance corporations and pension funds; OFIs = Other financial intermediaries.

Sources: National sector balance sheet and other data; FSB calculations.

2.5 Wholesale funding and repos

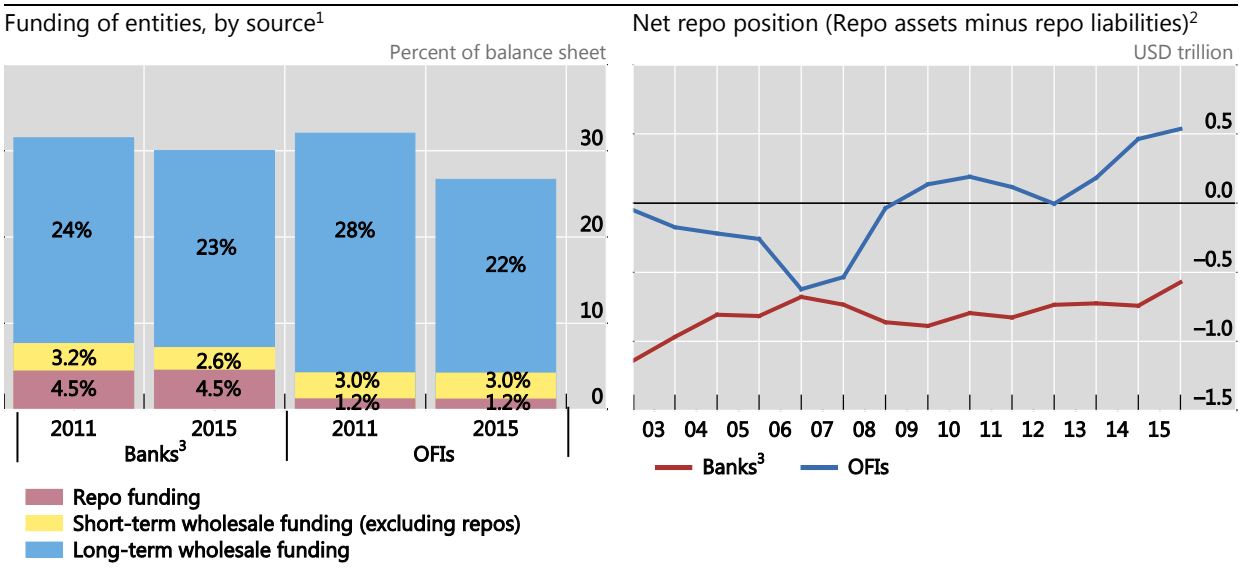
Wholesale funding techniques, which include repurchase agreements (repos), are core funding techniques for banks as well as non-bank financial entities such as broker-dealers and hedge funds. While some wholesale funding techniques such as repos also support price discovery and secondary market liquidity for a wide variety of securities, they can also be used by non-bank financial entities to create short-term, money-like liabilities, facilitating credit growth and maturity/liquidity transformation outside the banking system. This can pose financial stability risks by aiding the build-up of leverage and maturity transformation. Wholesale funding techniques also enhance interconnections among financial institutions and contribute to pro-cyclicality.

[70] Although still small in size, the market for technology-enabled lending has been expanding rapidly in recent years through, for example, crowdfunding platforms. Depending on the business model, crowdfunding platforms may or may not display risks typically associated with shadow banking. See Annex 6 for details.

Wholesale funding and repos

27 jurisdictions

Exhibit 2-16



[1] Bank funding data from Argentina, Australia, Brazil, Canada, the Cayman Islands, France, Italy, Korea, Mexico, the Netherlands, South Africa, Spain, Switzerland, and the UK. OFIs funding data from Australia, Brazil, France, Mexico, the Netherlands, and Spain. Short-term funding is defined as funding whose residual maturity is less than 12 months. [2] Data for banks' net repo positions from Argentina, Australia, Canada, Brazil, France, Indonesia, Japan, Korea, Mexico, Saudi Arabia, and the US. Data for OFIs' net repo positions from Australia, Brazil, France, Japan, Mexico, Spain, and the US. Assets related to repo transactions on the buyer's (collateral-taker, cash-provider) balance sheet. Liabilities related to repo transactions on the seller's (collateral-provider, cash-taker) balance sheet. [3] All deposit-taking corporations.

Sources: National sector balance sheet and other data; FSB calculations.

In light of the FSB's regulatory framework for haircuts on non-centrally cleared securities financing transactions published in November 2015,[71] the data collection template was expanded to include items from the liability side of the balance sheet, so as to capture time series data on wholesale funding and repos of the main financial sectors: deposit-taking corporations, insurance corporations, pension funds, and OFIs.[72]

According to the data collected, the percentage of bank assets funded through long-term wholesale funding sources fell slightly from 24% in 2011 to 23% in 2015, on average in 16 jurisdictions.[73] In parallel, OFIs' reliance on long-term wholesale funding sources declined from 28% of total assets to 22%, according to data reported by six jurisdictions (Exhibit 2-16).

While the net repo positions (repo assets minus repo liabilities) of banks and OFIs have both increased in recent years, the net repo position of OFIs has seen a much more substantial increase and now exceeds zero, indicating that OFIs are net providers of cash to the financial system through repos (Exhibit 2-16 right panel). There was, however, considerable variation across jurisdictions with, for instance, banks acting as net providers of cash through repos in some jurisdictions and net recipients in others. Among the 15 reporting jurisdictions, about 59% of non-bank repos are concentrated in the US at end-2015, followed by Japan (24%).

[71] FSB, *Regulatory Framework for Haircuts on Non-centrally Cleared Securities Financing Transactions*, November 2015.

[72] Wholesale funding includes all non-deposit on- and off-balance sheet funding sources, particularly market funding, but excluding non-redeemable equity. Deposits provided by retail customers and funding provided by small business customers are excluded.

[73] Long-term is defined as a residual maturity of more than one year.

3. Interconnectedness with banks and among financial sectors

An assessment of financial interconnectedness between banks, OFIs and other areas of non-bank credit intermediation is important to understand potential contagion channels resulting from direct and indirect linkages. This can have consequences for financial stability, particularly when risks associated with exuberant growth of credit intermediation are underestimated and mispriced in the financial sector, as well as not sufficiently addressed by commensurate policy tools. This Section assesses how direct linkages and associated risks may result in the transmission of stress from one sector to the other, and how it can be amplified through feedback loops.[74]

The interlinkages between banks and non-bank financial entities can take a variety of forms. For example, direct linkages are created when non-bank financial entities form part of the bank credit intermediation chain, are directly owned by banks, or benefit directly from explicit or implicit bank support. This kind of bank support of non-bank financial entities may mask the build-up of excessive leverage or maturity/liquidity mismatches in the financial system, by providing "enhancements" to the underlying assets or credit of non-bank financial entities which may make them more acceptable to funding providers. Funding interdependence is another form of direct linkage, as is the holding of each other's assets, such as debt securities. The risks associated with such interconnectedness can vary depending on the size of the exposure, the credit quality of the counterparty and the funding duration of the credit intermediation. As in previous monitoring exercises, the FSB analysed the interconnectedness between banks and OFIs in jurisdictions and the potential financial stability risks associated with these linkages. To measure direct interconnectedness, the FSB focused on the aggregate balance sheet bilateral exposure between financial sectors (e.g. assets and liabilities of banks to OFIs and OFIs to banks) and made adjustments for assets and liabilities of OFIs that are prudentially consolidated into banking groups whenever jurisdictions provided the required granularity in their data submissions.[75] These exposure data were used to compile high-level measures of interconnectedness between banks and OFIs, specifically measures of credit exposure and funding dependence, using the methodology shown in Exhibit 3-1. Interconnectedness results, however, are not always comparable across jurisdictions as not all jurisdictions reported interconnectedness measures net of prudential consolidation. In addition, some authorities only reported a subset of banks' assets and liabilities to OFIs.[76]

While continued data limitations prevent an in-depth assessment of financial stability risks associated with particular forms of interconnectedness, some progress has been made this

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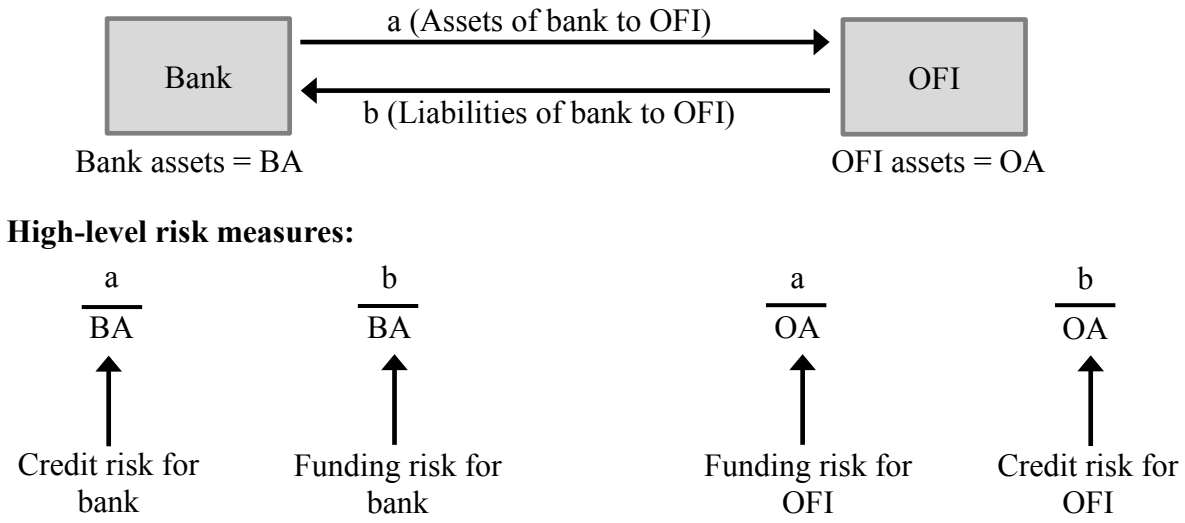
[74] In addition, indirect linkages also exist through a market channel, as the two sectors may invest in similar assets. Assessing risks from indirect contagion channels however is beyond the scope of this Report.

[75] Significant challenges remain with regard to the treatment of banks' partial ownership of an OFI entity. Most jurisdictions have followed their respective accounting rules and brought the full amount of an entity's assets back onto the bank's balance sheet, even in the case of partial ownership.

[76] For example, due to limitations in data availability, some jurisdictions only reported a subset of bank assets/liabilities (e.g. loans/deposits) to (some) OFI sectors, instead of all bank assets/liabilities to all OFIs.

year.[77] First, where available, additional breakdowns of bank interconnectedness to OFIs are now being collected for specific OFI entity types (e.g. MMFs). This allowed a more granular understanding of potential spill-over of risks to (or from) banks from (or to) certain non-bank financial entity types. Second, additional data on the interconnectedness of other non-bank financial intermediaries, namely pension funds and insurance corporations, are now being collected. Although these data need to be improved, a more comprehensive view of how financial sectors are linked with each other has started to emerge (see Box 3-1). Third, data are now being collected for claims on and liabilities to the financial sector in the rest of the world, providing insight into cross-border exposures.

A risk analysis framework of interconnectedness between banks and OFIs Exhibit 3-1



Interconnectedness among financial sectors **Box 3-1**

For the first time, the 2016 monitoring exercise collected data on the interconnectedness of pension funds and insurance corporations to other financial sectors including banks and OFIs. Exhibit 3-2 shows the preliminary findings from the analysis of interconnectedness between banks, OFIs, pension funds and insurance corporations. The thickness of the arrows reflects the size of the exposures from a certain financial sector to the other.

Although these data could be improved, preliminary findings suggest that:

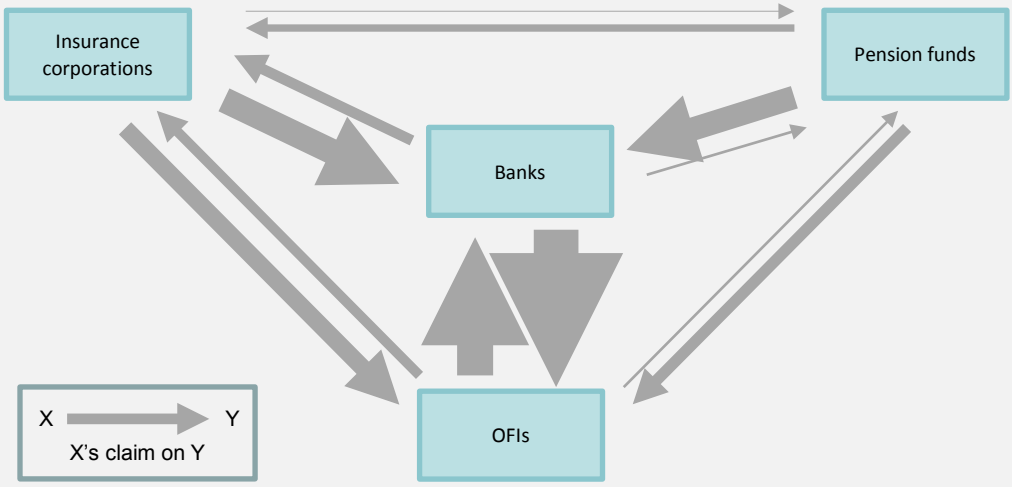
- in aggregate, banks and OFIs remain the most interconnected, with significant funding channels operating in both directions;
- the interconnectedness of both pension funds and insurance corporations to OFIs and to banks was also material;

[77] Although improvements have been made, the direct interconnectedness measures currently do not capture derivatives (except in the case of the UK) and contingent exposures, such as bank lines of credit to OFIs, which proved to be key channels of contagion during the financial crisis. Limited data also prevents a comprehensive assessment of the interconnectedness between banks and OFIs across borders. The FSB is considering improvements to the measures and the analysis going forward.

- as a result, disruptions in the funding provided by insurance corporations and/or pension funds to OFIs can lead to some pressure on OFIs and subsequent disruptions of the funding provided by OFIs to banks; and
- the variance across jurisdictions is large; for instance, in some jurisdictions OFI's interconnectedness with other parts of the financial system is greater than that of banks.

Several key questions have yet to be addressed. First, the degree to which the actual funding and credit risk associated with these exposures have the potential to affect financial stability, through for example the build-up of leverage, maturity/liquidity mismatches and contagion channels for risk propagation across financial subsectors, may need to be considered. Second, an analysis of how concentrated these exposures are, for example, in some large, complex and less substitutable intermediaries may be needed. Third, the extent to which these interconnections have a cross-border element that can result in international spillovers may need to be further assessed.

Exhibit 3-2



Sources: National sector balance sheet and other data; FSB calculations.

3.1 General trends in interconnectedness with banks and among financial sectors

Some high-level observations of interconnectedness based on the data as of end-2015 are as follows:[78]

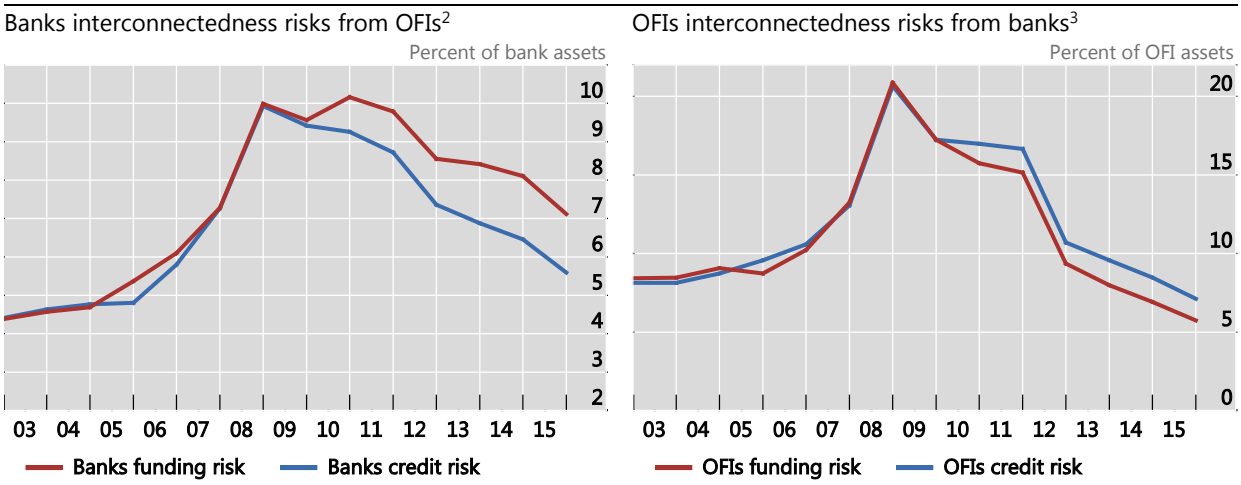
- **Funding and credit interconnectedness between banks and OFIs have continued to decline, on average, since the financial crisis, but bank funding and credit risks to OFIs remain above pre-crisis levels** (Exhibit 3-3). Aggregated across jurisdictions, banks' credit exposures to OFIs declined by $1.2 trillion to result in 5.6% credit risk for

[78] The sample of jurisdictions reporting data on the interconnectedness between banks and OFIs increased in the 2016 monitoring exercise. The results presented here are based on historical data included in jurisdictions' 2016 submissions and are therefore not directly comparable to the 2015 exercise.

banks to OFIs at end-2015, while banks' liabilities to OFIs declined by $1.4 trillion, resulting in a 7.1% bank funding risk from OFIs.[79]

Interconnectedness between banks and OFIs

18 jurisdictions and the euro area[1] Exhibit 3-3



[1] Based on historical data included in jurisdictions' 2016 submissions. Changes in interconnectedness measures in 2011 and 2012 may also reflect improvements in the availability of data over time on a jurisdiction level. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [2] Banks funding risk = Banks' liabilities to OFIs as a share of bank assets. Banks credit risk = Banks' claims on OFIs as a share of bank assets. [3] OFIs funding risk = OFIs' liabilities to banks as a share of OFI assets. OFIs credit risk = OFIs' claims on banks as a share of OFI assets.

Sources: National sector balance sheet and other data; FSB calculations.

- However, **the level of interconnectedness varies widely across jurisdictions, and remains relatively high in some jurisdictions**. Some jurisdictions' OFI exposures to banks remain considerably high; in particular MMFs, other investment funds and broker-dealers are highly interconnected in some jurisdictions.
- The size of OFIs relative to total financial system assets tends to be associated with OFIs accounting for higher shares of banking sector liabilities. The implication is that where OFIs are relatively large, banks' short-term wholesale funding is more dependent on the non-bank financial sector.
- **Also, data on pension funds and insurance corporations' exposures suggest in some cases quite significant credit risk exposures to OFIs**. As pension and insurance entities are a material portion of the financial system in many jurisdictions, OFIs may be vulnerable to portfolio rebalancing by insurance corporations and pension funds that reduce funding to OFIs.

3.2 Bank risks from interconnectedness

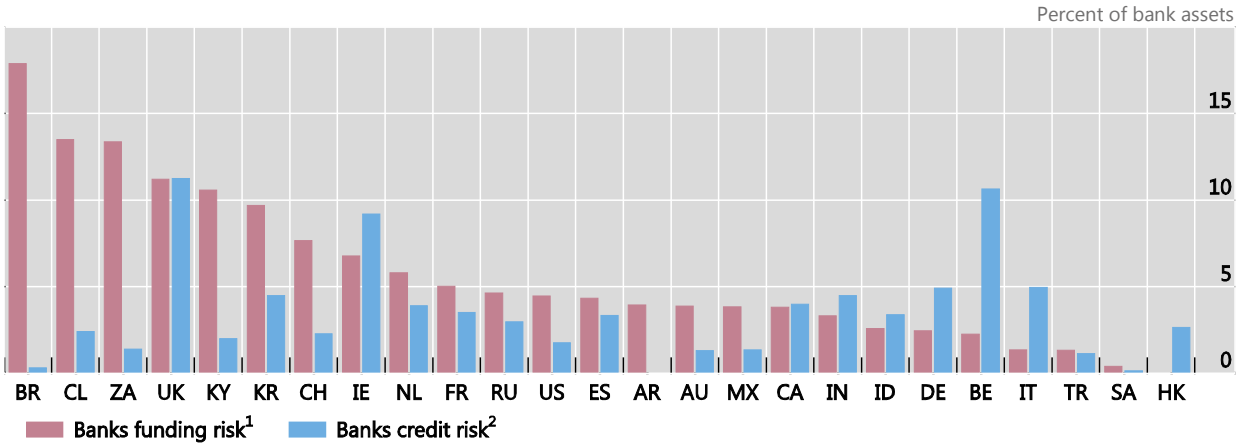
Banks are leveraged entities that, to varying degrees, may be reliant on short-term wholesale funding from OFIs and may therefore face going-concern challenges if a reduction of funding occurs. Similarly, if banks lend to or heavily invest in OFIs, a material deterioration of OFI credit may undermine their soundness. Therefore, in addition to assessing the size and trends

[79] See Exhibit 3-1 for the definition and interpretation of these interconnectedness measures.

of banks' exposures to and from OFIs, the FSB assessed their associated risks (or dependence on OFIs) by looking at their ratios relative to banks' total financial assets.[80] It is, however, difficult to set a clear threshold for concern for such indicative risk measures, as the risks associated with interconnectedness measured by assets do not take into account the credit quality of the counterparty and maturity profiles. However, the following assessment seeks to provide a relative basis of comparison that may serve as a guidepost for further analysis by the authorities.

Banks' interconnectedness to OFIs

End-2015 Exhibit 3-4



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IT = Italy; KR = Korea; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

[1] Banks' liabilities to OFIs as a share of bank assets. [2] Banks' claims on OFIs as a share of bank assets.

Sources: National sector balance sheet and other data; FSB calculations.

3.2.1 Bank credit risk to OFIs

Banks' credit exposures to OFIs, which could give rise to credit risks, were below 5% of total bank assets in most jurisdictions in 2015. However, some jurisdictions' banking sectors were relatively more exposed to OFIs, and over 10% of total bank assets in Belgium and the UK were exposures to OFIs.[81] Credit exposures to OFIs entity types, such as MMFs, REITs, other investment funds, broker-dealers, and securitisation vehicles, varied across jurisdictions. In some jurisdictions, banks' OFI exposures are primarily to investment funds, which may hold some assets that are less liquid or contain high-risk credit.[82] To the extent that OFIs in certain jurisdictions invest in high-risk loans or credit instruments, unexpected losses could result in material capital erosion of banks. However, it is difficult to determine the extent to which banks are exposed to certain risks, in particular concentration risk, through these funds.

[80] Based on the data submitted for the 2016 monitoring exercise, there is little statistical relationship between the extent of interconnectedness between banks and OFIs as a share of OFIs' assets, the growth of OFI assets, and the size of OFIs relative to the financial system.

[81] UK data on banks assets/liabilities to OFIs include derivative assets and liabilities.

[82] See Footnote 118 for a definition of liquid assets.

Also, in some jurisdictions, banks are relatively more exposed to broker-dealers through the provision of funding. A better understanding of the extent to which these exposures are longer-term and uncollateralised could aid in the assessment of risks.

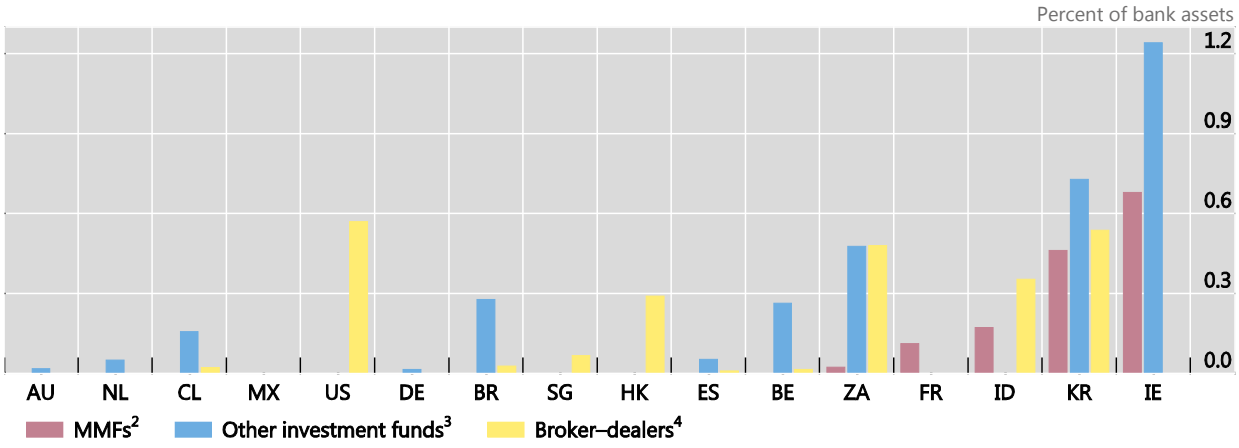
3.2.2 Bank funding risk from OFIs

Banks' liabilities to OFIs were over 15% of total bank assets in Brazil,[83] and above 10% in the Cayman Islands, Chile, South Africa, and the UK in 2015. In Brazil, this bank funding was primarily from MMFs and other investment funds. In South Africa, bank funding is primarily from MMFs and other investment funds, but finance companies are also a source of funding.

While, in aggregate, it appears that banks' funding risk from OFIs is moderate, such levels of funding could pose risks if liabilities are short-term in nature and funding less liquid, longer-maturity assets. Also, funding exposures may vary significantly across banks, as larger entities may be afforded more access to wholesale markets through non-bank financial intermediaries, which in turn may contribute to short-term funding dependence for banks from non-bank financial entities. A better understanding of the maturity and the nature (unsecured or secured) of OFI funding to banks and any concentrations of short-term OFI funding to particular entities would help determine the extent of vulnerabilities.[84]

Banks' credit exposure to MMFs, other investment funds, and broker-dealers

End-2015[1] Exhibit 3-5



AU = Australia; BE = Belgium; BR = Brazil; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; KR = Korea; MX = Mexico; NL = Netherlands; SG = Singapore; US = United States; ZA = South Africa.

[1] South Africa's data are from a survey of its five largest banks. [2] Banks' claims on MMFs as a share of banks assets. [3] Banks' claims on other investment funds (equity funds, fixed income funds, mixed funds) as a share of bank assets. [4] Banks' claims on broker-dealers as a share of banks assets.

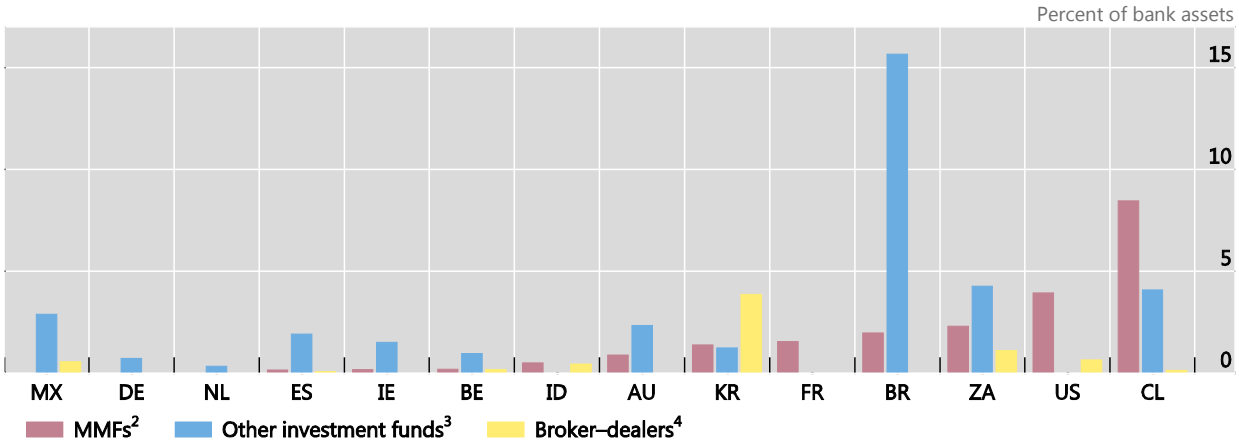
Sources: National sector balance sheet and other data; FSB calculations.

[83] In Brazil, only around a third of banks' liabilities to OFIs represents funding risk, as the remaining liabilities are repos backed by sovereign bonds which banks pass along to the central bank.

[84] For example, OFI repo and money market funding of bank short-term liabilities might result in greater funding risk than OFI (e.g. investment funds) holdings of bank term debt, due to the shorter maturity profile of the former source of funding. Jurisdictions with relatively high bank funding risks to OFIs may seek to better understand the extent to which roll-over risk, maturity walls and credit concentrations exist, particularly if non-OFI funding risks are also present.

Banks' funding from MMFs, other investment funds, and broker-dealers

End-2015[1] Exhibit 3-6



AU = Australia; BE = Belgium; BR = Brazil; CL = Chile; DE = Germany; ES = Spain; FR = France; ID = Indonesia; IE = Ireland; KR = Korea; MX = Mexico; NL = Netherlands; US = United States; ZA = South Africa.

[1] South Africa's data are from a survey of its five largest banks. [2] Banks' liabilities to MMFs as a share of banks assets. [3] Banks' liabilities to other investment funds (equity funds, fixed income funds, mixed funds) as a share of bank assets. [4] Banks' liabilities to broker-dealers as a share of banks assets.

Sources: National sector balance sheet and other data; FSB calculations.

3.3 OFI risks from interconnectedness

OFI interconnectedness risks include both funding from and credit exposure to banks.[85] The key difference in assessing OFI interconnectedness risks from assessing banks' interconnectedness risks is that the exposure is measured as a percent of OFI assets rather than bank assets. As total assets of OFIs tend to be much smaller than bank assets in most jurisdictions, the measure of OFIs' interconnectedness to banks can therefore be large in some jurisdictions. While it is difficult to assign a threshold for such concerns, relatively high OFI exposures to banks in a few jurisdictions may indicate potential vulnerabilities from credit, liquidity and funding risks, as well as concentration to particular banking institutions that serve OFIs as market-based or credit intermediaries.

3.3.1 OFI credit risks to banks

Credit provided to banks made up over 30% of total OFI assets in Chile and Brazil, and over 15% in seven other jurisdictions (Exhibit 3-7). By comparison, OFI credit risks to banks are much higher on average than banks' exposures to OFIs which were generally much less than 20% of bank assets.

The credit exposures of OFIs to banks, calculated as OFIs' claims on banks as a share of OFI assets, vary by type of OFI subsector, and are generally largest for those OFI subsectors that can engage in liquidity transformation, such as for broker-dealers, MMFs and other investment funds. In jurisdictions where these intermediaries were relatively large, such as in Ireland,

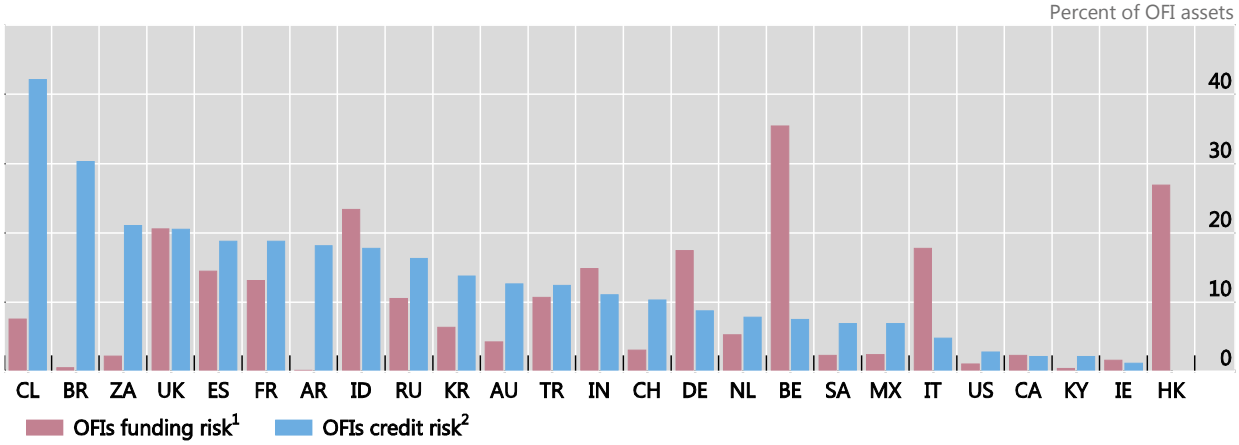
[85] As the nominal value of a bank's exposure to an OFI is the same as the OFI's funding exposure to the bank (representing the numerator in interconnectedness ratios), the jurisdictions' OFI size relative to that of banks causes the differences in OFI-related measures of interconnectedness (through the denominator of interconnectedness ratios).

Korea, South Africa and the US, OFI credit exposures to banks tended to be higher. Moreover, as seen in Exhibit 3-8, the growth in OFI assets over the past four years is positively correlated with the growth in the amount of banks' funding from OFIs.

If one or more large banks – particularly those with high leverage or liquidity transformation – are significant borrowers from OFIs, material credit deterioration of such banks could precipitate broader contagion across multiple OFIs possibly in different types of entities, especially in situations of general market stress.

OFIs' interconnectedness to banks

End-2015 Exhibit 3-7



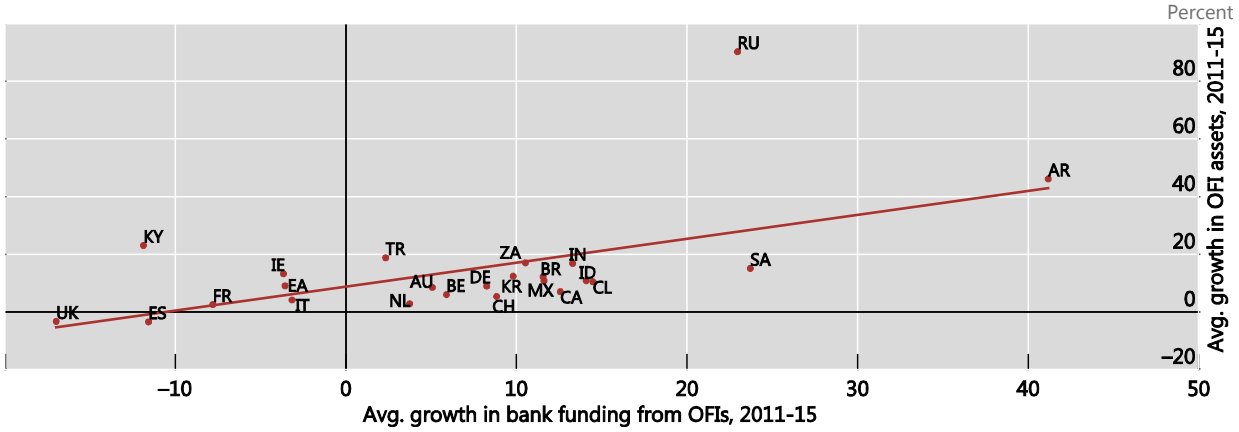
AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IT = Italy; KR = Korea; KY = Cayman Islands; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

[1] OFIs' liabilities to banks as a share of OFI assets. [2] OFIs claims on banks as a share of OFI assets.

Sources: National sector balance sheet and other data; FSB calculations.

Trend in bank funding from OFIs and OFI growth

24 jurisdictions Exhibit 3-8



Note: R-squared is 31.4%.

Sources: National sector balance sheet and other data; FSB calculations.

3.3.2 OFI funding risks from banks

OFI funding from banks remains large in a number of jurisdictions and was over 20% of total OFI assets in Belgium, Hong Kong, Indonesia, and the UK. Overall, OFIs in eleven jurisdictions were reliant on banks for at least 10% of their funding (relative to total OFI assets).

While these exposures may not necessarily result in elevated funding risks, a better understanding of the maturity and diversification of funding is warranted. To the extent that banks are supplying short-term funding to investment funds or leveraged non-bank credit institutions, the abrupt withdrawal of such funding could under some circumstances precipitate funds' asset sales and contagion, and raise going-concern challenges at more leveraged institutions with acute maturity mismatches.

3.4 Other forms of interconnectedness among financial sectors

3.4.1 Interconnectedness of insurance corporations and pension funds to OFIs

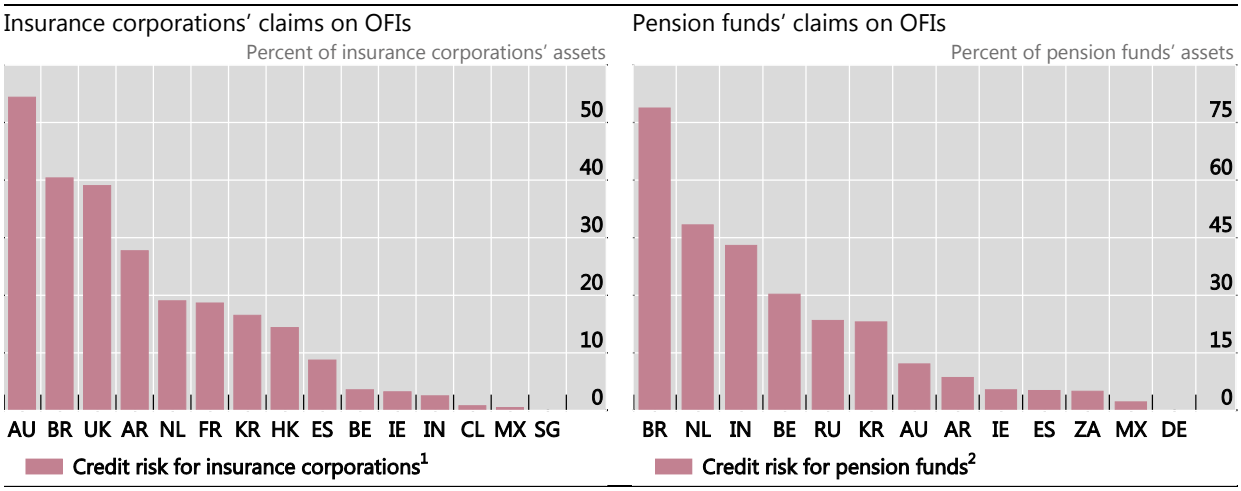
The interconnectedness of insurance corporations and pension funds to OFIs, where reported, reflects the heterogeneity in financial system structures across jurisdictions, with implications for potential vulnerabilities. Traditionally, the interconnectedness between banks or OFIs and these entity types have been afforded less focus than OFIs due to their generally low levels of liquidity mismatches and short-term funding dependence. However, in light of the extended reach for yield, incentives exist for insurance corporations and pension funds to move into credit positions that they can easily exit when the rate and credit environments abruptly change. Amid deteriorating market liquidity, this may have implications for bank funding.

Key observations from reported insurance corporations and pension funds' interconnectedness are as follows:

- While insurance corporations and pension funds do not tend to rely on funding from OFIs, OFIs are reliant on funding from insurance corporations and pension funds in some jurisdictions (Exhibit 3-9), especially in cases where the latter have delegated the management of their assets.
- Insurance corporations' and pension funds' credit exposure to a range of OFIs is quite elevated in some jurisdictions. In this regard, in two jurisdictions the amount of these entity types' credit exposures to OFIs was above 40% of the total assets of insurance corporations and pension funds. This shows that in at least some jurisdictions, insurance corporations and pension funds chose to invest significantly in OFIs rather than directly in the real economy, in some cases due to regulatory constraints. Given the prominence of investment funds in OFIs in these jurisdictions, insurance corporations and pension funds may have sought the benefits of diversification through investing via the investment fund sector. The extent to which they also sought to reach for yield through liquidity and maturity transformation, and to leverage, is difficult to determine with the existing dataset, but is an issue which authorities could consider exploring in more depth.

Insurance corporations and pension funds: Credit risk from interconnectedness

End-2015 Exhibit 3-9



AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; IE = Ireland; IN = India; KR = Korea; MX = Mexico; NL = Netherlands; RU = Russia; SG = Singapore; UK = United Kingdom; ZA = South Africa.

[1] Insurance corporations' claims on OFIs as a share of insurance corporations assets. [2] Pension funds' claims on OFIs as a share of pension fund assets.

Sources: National sector balance sheet and other data; FSB calculations.

Examples of large pension fund and, to some extent, insurance corporation exposures to OFIs can be found in Belgium, Brazil, India, and the Netherlands (Exhibit 3-9). These examples illustrate the ways in which multiple exposures with the non-bank financial sector might occur.

- Belgian pension funds' credit exposures to OFIs are relatively large. As they invest a large share of assets in investment funds, compliance with diversification rules is ensured. Similarly, Belgian banks' exposures to OFIs are relatively large.[86] While the risks from multiple intermediation chains are low, there is a question as to the extent to which they are used for a reach for yield strategy, and rely on liquidity transformation to rebalance when conditions change.
- Brazil's insurance corporations' and pension funds' exposures to OFIs exceed 40% of insurance corporation assets and 75% of pension fund assets, respectively. Insurance corporations and pension funds usually use exclusive investment funds with predetermined mandates of asset allocation. The final and indirect exposure of insurance corporations and pension funds to banks is limited, as the exclusive funds[87] mostly invest in long-term sovereign bonds. Given that Brazil also exhibits a high bank-OFI interconnectedness, this illustrates an overall intermediation chain interconnectedness from pension funds and insurance corporations to OFIs, and then to banks.[88]

[86] Belgium's bank-to-OFIs interconnectedness figures may include interconnectedness between banks and OFI entities prudentially consolidated into banking groups, such as when securitisation vehicles take mortgage bonds from a bank and turn these into debt securities which are then given back to the same bank to be used as collateral for access central bank funding (see Footnote 105).

[87] Exclusive funds have only one investor.

[88] If repos backed by government securities are excluded, the exposures of pension funds and insurance corporations to banks are 9% and 0%, respectively.

- While India's pension funds' credit exposures to OFIs were relatively large, its insurance corporations had much lower exposures to OFIs. Further, banks' credit and funding risk exposures to OFIs were also moderate or low in India.
- In the Netherlands, insurance corporations and pension funds have relatively large exposures to OFIs. This appears to be primarily due to their use of investment funds as a means for specialisation and diversification in investing, including with respect to foreign investments. However, the link with the banking system is relatively modest, as the interconnectedness between banks and OFIs is relatively low. This suggests that direct spillovers from non-bank financial entities to the banking system are low.

3.4.2 Cross-border interconnectedness

High-level interconnectedness data were collected on liabilities and claims from a jurisdiction's banks and OFIs to and from all non-domestic financial sector counterparties.[89] While this dataset has gaps and thus does not provide a consistent comparison across jurisdictions at the moment, it does allow for some preliminary observations that show banks and OFIs potentially display material interconnectedness with non-domestic financial intermediaries.

Among the reporting jurisdictions, banking systems that utilise cross-border funding tend to be associated with international financial centres. OFI sectors associated with cross-border interconnectedness are more varied.

The limited data available (liabilities on and claims to the Rest of the World's financial sector) make it possible to calculate some preliminary measures of foreign funding levels for domestic banks (for example as a percentage of bank assets) as well as for domestic banks' credit exposures to foreign entities. In the case of OFIs, available data show, for example, that investment funds account for a considerable portion of cross-border financial sector interconnectedness for Belgium, Ireland, and Spain.[90] India's credit exposures result from interconnectedness of finance companies. Also, Ireland and the Netherlands appear to have considerable interconnectedness between domestic hedge funds and non-domestic investors.

Although the lack of granular data does not allow further analysis or the identification of specific risks, the data available suggest a wide range of financial interconnectedness between similar types of domestic financial intermediaries and foreign intermediaries or investors. While a diversity of exposures and internationally-integrated financial markets provide benefits that support economic growth, authorities should be mindful of the extent to which these exposures may lead to spillovers across jurisdictions during periods of heightened stress. To better understand cross-border interconnectedness risks and potential contagion channels, it will be important for jurisdictions to seek further granularity on cross-border interconnectedness data.

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[89] 16 jurisdictions (Australia, Belgium, Brazil. Canada, Chile, Germany, Ireland, Italy, Korea, Mexico, the Netherlands, Russia, South Africa, Spain, Switzerland, and the US) and the euro area provided data on banks' interconnectedness with foreign financial intermediaries. 12 jurisdictions (Australia, Belgium, Brazil, Chile, Germany, Ireland, India, Italy, Korea, Mexico, Spain, and Switzerland) and the euro area reported data on OFIs' interconnectedness with foreign financial intermediaries. Some jurisdictions only provided some data items.

[90] The size of the investment funds' sector varies widely across jurisdictions. However, this data on interconnectedness shows the relevance of cross-border transactions and the need to address the associated data gaps.

3.4.3 Analytical tools to capture interconnectedness

The FSB is engaged in efforts to further assess the degree of interconnectedness within and across jurisdictions' financial systems, although some of them are still at an exploratory stage. One such effort is through modelled systemic stress simulations, which is used by some jurisdictions to understand the spillovers between various financial sectors within the jurisdiction, particularly in periods of reduced market liquidity. Another effort is through empirical research on how non-bank financial intermediaries' portfolio rebalancing behaviour can lead to spillovers to other financial sectors. A third effort is through specific tools to quantify multiple layers of interconnectedness, as explained in Box 3-2.

Alternative risk measures for interconnectedness[91] **Box 3-2**

In order to improve the evaluation of risks arising from the interconnectedness among financial sectors, FSB members have explored some additional risk measures suggested by network theory. The methodology quantifies the risks from direct exposures using the information from the "whom-to-whom" matrix, which reports the claims and liabilities of selected entities among each other. The degree of aggregation can differ. For example, banks, OFIs, insurance corporations and pension funds can be taken as separate entities in the "whom-to-whom" matrix for each jurisdiction. Alternatively, one could follow a more granular approach treating economic functions as separate entities. Ultimately, the availability of data should guide the level of aggregation.

Consider the hypothetical, but realistic, "whom-to-whom" matrix in Exhibit 3-10 reporting the liabilities of traditional banks, OFIs, insurance corporations and pension funds among each other. Moving across the columns, the table reports the liabilities of one entity to other entities. Moving down the rows, the table reports the claims of one entity to other entities.

Exhibit 3-10: "Whom-to-whom" interconnectedness matrix (USD million)

Liabilities / *Claims*	**Banks**	**Insurance corporations**	**Pension funds**	**OFIs**
Banks	3,108,000	888,000	296,000	562,400
Insurance corporations	14,800	349,280	14,800	0
Pension funds	888	11,840	2,960	0
OFIs	1,154,400	0	592	13,320

Two measures of risk from interconnectedness can be computed:[92]

1. A measure of *borrowing centrality,* given by the right *eigenvector*[93] of the "whom-to-whom" matrix, which provides information about potential default cascades. A shock to a specific entity type, for example to OFIs, pushing them close to insolvency would result in direct losses to other entities reported in the "OFIs" row in Exhibit 3-10. But, the propagation of these defaults through the system could induce additional losses if,

[91] This Box was contributed by Alexandros Vardoulakis from the US Board of Governors of the Federal Reserve System.

[92] See Glasserman P. and H. P. Young, *Contagion in Financial Networks*, October 2015.

[93] Eigenvectors are a special set of vectors associated with a linear system of equations.

for example, some banks also start defaulting on their own creditors. The proposed measure captures the relative contribution of an entity type to both direct and indirect potential losses.

2. A measure of *funding centrality,* given by the left *eigenvector* of the "whom-to-whom" matrix, which captures the importance of an entity to provide funding. Suppose, for example, that an adverse shock to OFIs forces them to reduce their funding to other financial entities. The importance of OFIs as funding providers does not only depend on their direct exposures, but also on the funding exposures of their counterparties, which are mainly banks. Given that banks are the main source of funding for most financial entities, OFIs could be considered to be relatively more important for overall funding conditions than the size of their claims may suggest.

These measures are attractive because they quantify how interconnected an entity is relative to other entities and take into consideration how central the connecting entities are. Exhibit 3-11 below compares the measures of borrowing and funding centrality to simple ratios of each entity's total liabilities and claims over the total exposures of all entities.

Exhibit 3-11: Risk measures

	Borrowing centrality	Total liabilities over total exposures	Funding centrality	Total claims over total exposures
Banks	0.74	0.76	0.64	0.67
OFIs	0.26	0.18	0.11	0.09
Insurance corporations	0.00	0.06	0.19	0.19
Pension funds	0.00	0.00	0.06	0.05

Although the centrality measures described in this Box yield qualitatively similar evaluations about interconnectedness risks as the simple ratios of aggregate claims and liabilities described elsewhere in this section, the quantitative differences between the two different types of measures may be economically meaningful. For instance, the importance of OFIs as sources of credit and funding risk is under-reported by the simple ratios. The borrowing and funding centrality measures are therefore useful to accurately evaluate the risk stemming from interconnectedness.

Moreover, these measures of centrality have been found to be superior in mapping systemic risk and, importantly, they are immune to the gross size of the financial system, which can arguably be considered as a separate source of risk.[94] Nevertheless, data gaps can bias the interconnectedness measures and ideally more granular data would be needed to evaluate the risks within the shadow banking sector for each of the economic functions identified in this report. Finally, the computed measures do not capture risks from indirect interconnectedness and do not take into account important qualitative aspects, such as the difference between secured and unsecured liabilities.

[94] Alter A., B.R. Craig, and P. Raupach, *Centrality-Based Capital Allocations*, June 2015.

4. The narrow measure of shadow banking

The broad examination of all non-bank credit intermediation presented in Section 2 is a useful first step in monitoring trends in all financial sectors, including those outside the banking system, and to ensure that data gathering and surveillance cover all the activities within which financial stability risks from shadow banking (e.g. maturity/liquidity transformation and/or leverage) might arise. To narrow down its focus on non-bank financial entities that may be involved in financial stability risks from shadow banking, the FSB developed a second step to its monitoring approach, which results in the FSB's estimate of the "narrow measure of shadow banking".[95]

As in the 2015 monitoring exercise, the FSB estimated the narrow measure of shadow banking in the 2016 monitoring exercise (as of end-2015) based on economic functions (or activities) that are set out in the FSB Policy Framework.[96] To arrive at this narrow measure, non-bank financial entities are classified with reference to five economic functions (EFs), each of which involves non-bank credit intermediation that may pose risks to financial stability. The entity types classified into the economic functions include certain entities that are involved in: the management of collective investment schemes that are susceptible to runs (EF1); lending dependent on short-term funding (EF2); market intermediation dependent on short-term funding or secured funding of client assets (EF3); facilitating credit creation (EF4); and securitisation-based credit intermediation (EF5). Exhibit 4-1 sets out the definition of the five economic functions, along with a list of entities that were typically classified into the different economic functions. Some entity types may be classified in more than one economic function.[97]

The economic function (activity)-based approach to monitoring shadow banking allows for a more accurate refinement of the narrow measure of shadow banking through the exclusion of non-bank financial entities that do not fall into any of the five economic functions and are therefore not involved in significant maturity/liquidity transformation and/or leverage, or that are not typically part of a credit intermediation chain. The approach also incorporates authorities' supervisory judgement (or qualitative information) to supplement data that are sometimes not available.[98]

The consistency of economic function classification was improved in the 2016 monitoring exercise through the development of guidance and mutual review of jurisdictions' submissions. However, additional refinement to the non-bank financial entity types' classification guidance will help further improve consistency in assessments going forward. The consistency of economic function classification is an ambitious endeavour which will take time to fully realise,

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95 FSB, *Strengthening Oversight and Regulation of Shadow Banking*, October 2011.

96 FSB, *Policy Framework for Strengthening Oversight and Regulation of Shadow Banking Entities*, August 2013.

97 In those limited cases, where an entity type was classified into more than one economic function, its value: (i) was only counted once towards the jurisdiction's narrow measure of shadow banking; and (ii) was proportionately allocated between the economic functions into which it was classified.

98 As stated in the introduction, the inclusion of non-bank financial entities or activities in the economic functions and the narrow measure is based on a conservative assessment of potential risks on a pre-mitigant basis and does not constitute a judgement that policy measures applied to address the financial stability risks from shadow banking of these entities and activities are inadequate or ineffective.

with improvements in data availability and consistency also being achieved as authorities learn from collective information-sharing in successive exercises.

Classification by Economic Functions Exhibit 4-1

Economic Function	Definition	Typical entity types[99]
EF1	Management of collective investment vehicles with features that make them susceptible to runs	MMFs, fixed income funds, mixed funds, credit hedge funds,[100] real estate funds
EF2	Loan provision that is dependent on short-term funding	Finance companies, leasing companies, factoring companies, consumer credit companies
EF3	Intermediation of market activities that is dependent on short-term funding or on secured funding of client assets	Broker-dealers, securities finance companies
EF4	Facilitation of credit creation	Credit insurance companies, financial guarantors, monolines
EF5	Securitisation-based credit intermediation and funding of financial entities	Securitisation vehicles, structured finance vehicles, asset-backed securities

4.1 Methodological improvements

As part of the monitoring exercise, authorities from jurisdictions considered the business models, activities, and associated financial stability risks of non-bank financial entities and classified these entity types into one (or more) of the five economic functions, as they are defined in the FSB Policy Framework.

In the 2016 monitoring exercise, while further refinement may be needed, the consistency of classification into economic functions has been improved vis-à-vis the 2015 monitoring exercise through the development of additional guidance and a strengthened process of discussion and mutual review. Based on the experience during the preceding monitoring exercise, a number of minimum criteria were developed that should be considered by authorities in their assessment of non-bank financial entities' involvement in the different economic functions. The process by which jurisdictions discuss each other's classification assessments was also improved.

[99] The FSB Policy Framework acknowledges that shadow banking may take different forms across jurisdictions due to different legal and regulatory settings as well as the constant innovation and dynamic nature of the non-bank financial sector. It also enables authorities to capture new structures or innovations that create shadow banking risks, by looking through to the underlying economic function and risks of these new innovative structures. Thus, the entity types listed should be taken as typical examples. For details, see FSB, *Policy Framework for Strengthening Oversight and Regulation of Shadow Banking Entities*, August 2013.

[100] Credit hedge funds are hedge funds that invest primarily in credit assets (e.g. bonds, loans).

Differences in assessments and their alignment **Box 4-1**

The FSB conducted a peer review on the progress made by FSB member jurisdictions in implementing its Policy Framework. The peer review recommendations were published in May 2016 and included the following for individual jurisdictions:[101]

- establishing a systematic process involving all relevant domestic authorities to assess the shadow banking risks posed by non-bank financial entities or activities;
- addressing data gaps to be able to better assess the potential financial stability risks posed by non-bank financial entities or activities;
- removing impediments to cooperation and information-sharing between authorities, including on a cross-border basis; and
- reviewing public disclosures by non-bank financial entities as necessary to help market participants understand the shadow banking risks posed by such entities, and enhancing those disclosures as necessary to address identified material gaps.

As part of its recommendation to improve the assessment of financial stability risks, the peer review highlighted the need for further work by the FSB to resolve material differences of view and thereby promote greater consistency in the classification of non-bank financial entities through, for example, developing guidance.

Many of the differences across jurisdictions in the approaches to classifying non-bank financial entities inside and outside of the five economic functions were anticipated and appropriate, given the FSB Policy Framework's focus on shadow banking *activities* described by the five economic functions, rather than the legal names or forms of the relevant non-bank financial entities.[102] However, some differences may also reflect inconsistencies in authorities' assessment of similar shadow banking activities. For these cases, a guidance document was developed to help jurisdictions in their assessment of domestic non-bank financial entity types' involvement in the different economic functions. The classification guidance was also helpful in providing a benchmark against which it was possible to assess the individual submissions and to identify instances that required an adjustment in the classification. Further enhancements to this guidance will help achieve more consistent assessments for future exercises.

4.2 Narrowing down towards an activity-based measure of shadow banking

As noted earlier, China is not included in the narrow measure of shadow banking presented in this Report, due to delays in the submission of relevant data and information. The results presented in this and the following Section are therefore based on data from 27 jurisdictions (the *28-group* excluding China).[103] Chinese authorities have committed to work closely with the FSB to derive a narrow measure for China as part of the 2017 monitoring exercise.

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[101] FSB, *Thematic Peer Review on the Implementation of the FSB Policy Framework for Shadow Banking Entities*, May 2016.

[102] For example the activities and associated financial stability risks of trust companies vary across jurisdictions, leading to valid differences in reporting relative to economic functions.

[103] See also Exhibit 1-1 for the composition of the samples.

The relationship between the MUNFI measure of all non-bank financial intermediation and the economic functions-based narrow measure of shadow banking presented in this section is illustrated in Exhibit 4-2. For the 27 jurisdictions, starting from the MUNFI estimate of $127 trillion, comprised of OFIs ($72 trillion), insurance corporations ($25 trillion), and pension funds ($29 trillion),[104] the narrowing down methodology involved the following steps:

(i) *Pension funds, insurance corporations, and OFIs reported as not shadow banking*. In a first step, assets of pension funds, insurance corporations and OFIs that jurisdictions identified as not being involved in any of the five economic functions are excluded from the narrow measure. As of end-2015, a total of $79.1 trillion was subtracted in this narrowing-down step, $28.8 trillion of which are pension funds, $25.2 trillion insurance corporations, and $25 trillion OFIs. These entities do not tend to directly engage in credit intermediation or to exhibit financial stability risks from shadow banking. Examples include "traditional" life insurance corporations that basically focus on simple life insurance businesses (where there is usually no maturity and/or liquidity transformation nor securities lending), equity investment funds, closed-ended funds without leverage and/or significant liquidity/maturity transformation, and equity real estate investment trusts and funds (see Annex 2).

(ii) *Prudential consolidation into banking groups*. Entities that are consolidated into banking groups for prudential purposes are already subject to prudential regulation and supervision of financial stability risks, including from shadow banking (i.e. maturity/liquidity transformation, leverage, and imperfect credit risk transfer) and are therefore excluded from the narrow measure. These entities typically include broker-dealers, finance companies and structured finance vehicles. Self-securitisation (or retained securitisation) assets are also excluded from shadow banking in this narrowing down step.[105] Prudential consolidation rules consider them as banks' group assets and as such subject to consolidated supervision and capital requirements. The amount of prudentially consolidated assets, including self-securitisation, as of end-2015 was $8.1 trillion.

(iii) *Statistical residual*. This narrowing-down category consists of statistical residuals which are generated in some jurisdictions' financial accounts. These residuals are the difference between total assets of OFIs, as they are published in sector balance sheet statistics, and the sum of all known subsectors therein. While in theory this residual should be zero, in practice it is quite large in some jurisdictions. This may be the consequence of inconsistencies between "top-down" national accounts calculations and "bottom-up" coverage of OFI subsectors, as well as challenges in aligning these two layers and differences in data granularity (see Annex 4). The residual is about $5.3 trillion, particularly large in Canada and the UK, and relevant authorities are working to improve the granularity of the national accounts data in the future. Residuals were also recorded for Germany, Ireland, Italy, the Netherlands, Russia, and Switzerland. From a methodological point of view, a further understanding of the shadow banking content of the identified residuals is needed going forward. In

[104] Note, these figures differ from those presented in Section 2 where data from China was included.

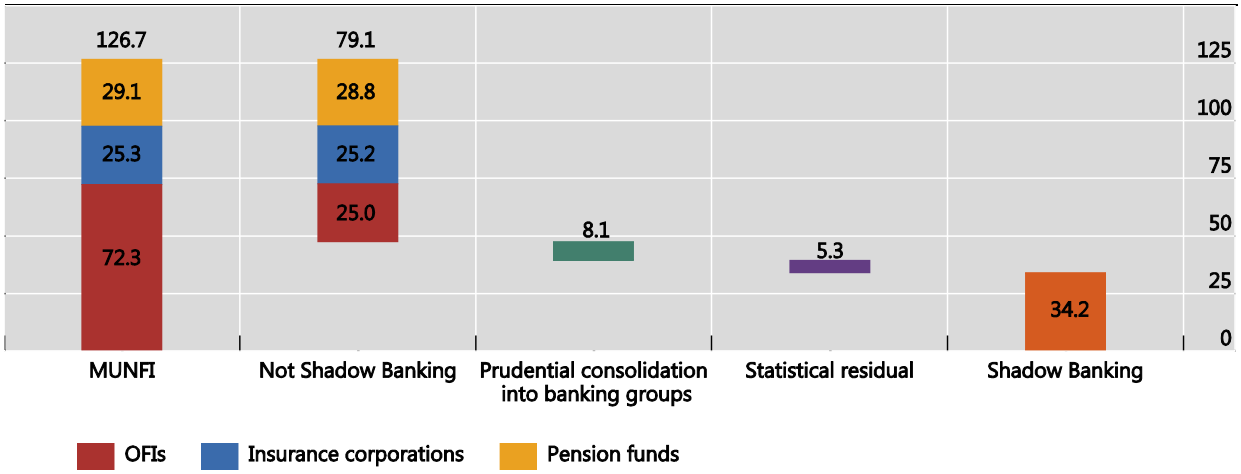
[105] Self-securitisation/retained securitisation vehicles take loans from a bank and turn these into debt securities which are given back to the same bank for use as collateral for accessing central bank funding.

order to avoid major inconsistencies across jurisdictions, however, they are excluded from the narrow measure of shadow banking for this Report.[106]

Narrowing down shadow banking

27 jurisdictions at end-2015, in trillions of US dollars

Exhibit 4-2



MUNFI = Monitoring Universe of Non-bank Financial Intermediation, includes OFIs, pension funds, and insurance corporations; OFIs also includes captive financial institutions and money lenders; Prudential consolidation into banking groups = assets of classified entity types which are prudentially consolidated into a banking group; Statistical residual = reported residual OFIs generated by the difference between total OFIs and the sum of all know subsectors therein; Shadow banking = narrow measure of shadow banking based on the economic functions.

Sources: National sector balance sheet and other data; FSB calculations.

The resulting narrow measure of shadow banking based on the economic functions approach amounted to $34.2 trillion at end-2015 in 27 jurisdictions. This represents approximately 27% of the MUNFI measure of all non-bank financial intermediation for the same set of jurisdictions, which is similar in magnitude to the 29% of MUNFI in the preceding monitoring exercise.[107]

In addition to the five economic functions, the narrow measure also includes about $2.3 trillion of assets which capture an "unallocated" shadow banking category for some jurisdictions in which the relevant authorities were unable to clearly assign shadow banking entities to a specific economic function, but which were assessed to be involved in credit intermediation or for which it was not possible to provide sufficient evidence to warrant their exclusion from the narrow measure. Over time this unallocated shadow banking category should ideally reduce as authorities, with better data and analysis, are able to allocate the entities to one of the five economic functions or they are able to obtain sufficient evidence to warrant their exclusion from the narrow measure.

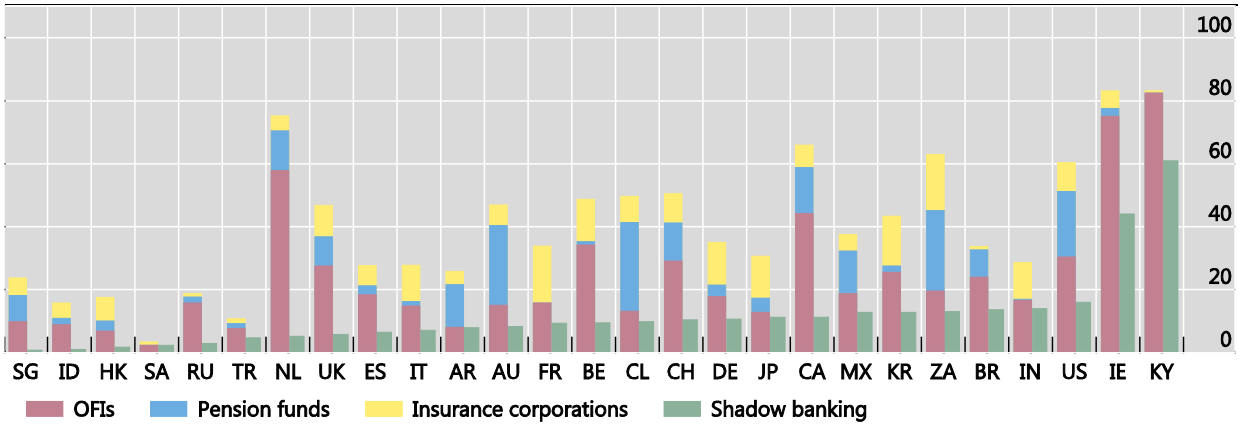
[106] The $5.3 trillion also include assets of OFIs that were neither classified into any of the five economic functions nor identified by jurisdictions as being outside of economic functions. However, if conservatively assessed, this statistical residual of $5.3 trillion may be added to the $34.2 trillion of identified narrow measure of shadow banking.

[107] FSB, *Global Shadow Banking Monitoring Exercise 2015*, November 2015. As a result of the progress during the 2016 monitoring exercise in improving and refining the narrow measure of shadow banking, these figures are not be strictly comparable.

Narrowing down shadow banking by jurisdiction as a percent of total financial assets

27 jurisdictions, end-2015; in percent

Exhibit 4-3



MUNFI = Monitoring Universe of Non-bank Financial Intermediation, includes OFIs, pension funds, and insurance corporations; OFIs also includes captive financial institutions and money lenders; Shadow banking = narrow measure of shadow banking based on the economic functions.

AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

Sources: National sector balance sheet and other data: FSB calculations.

The extent of narrowing-down varied significantly across jurisdictions. Exhibit 4-3 compares the entire non-bank financial sector (i.e. all OFIs, insurance corporations and pension funds), which is the "MUNFI" starting point for narrowing down, with the narrow measure of shadow banking based on economic functions, by jurisdiction.

4.3 Global perspective

Total financial assets of financial entities classified as shadow banking under the economic functions approach in 27 jurisdictions grew moderately. Controlling for exchange rates, they grew by 3% in 2015, reaching $34.2 trillion at the end of the year (Exhibit 4-4). Since 2011, aggregated shadow banking assets increased at an average yearly growth rate of 5.6%.[108]

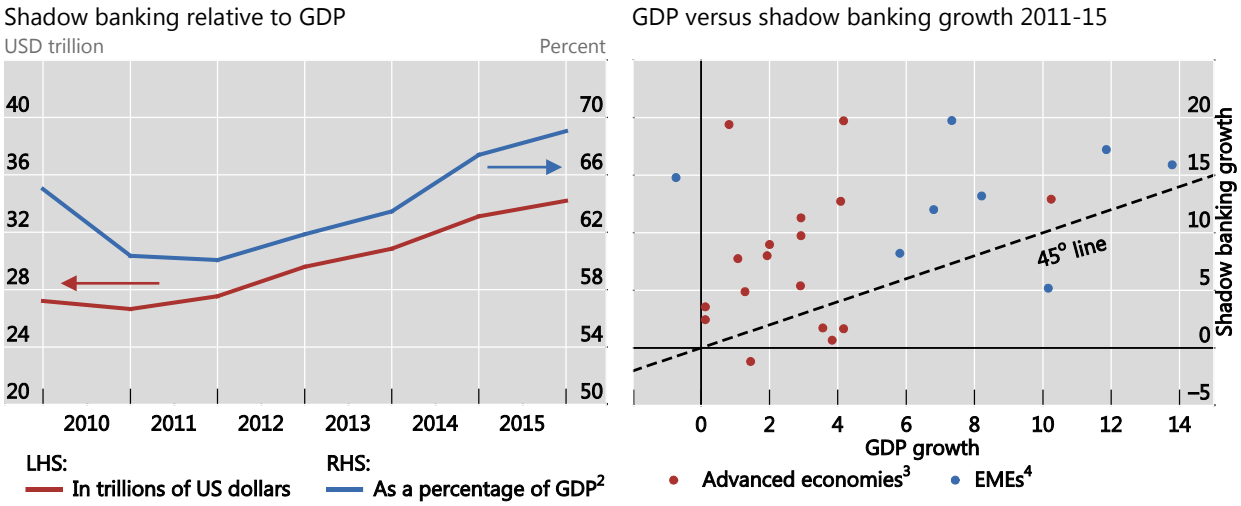
The narrow measure of shadow banking has continuously risen from 60% of GDP in 2011 to 69% in 2015, as the steady growth of the narrow measure in constant exchange rate terms has outpaced GDP in most jurisdictions, particularly in EMEs. Jurisdictions with a greater increase in the narrow measure between 2011 and 2015 tended to have greater increases in GDP over the same time period. As indicated by the dots above the 45°-line in the right panel of Exhibit 4-4, the narrow measure grew faster than GDP since 2011 in most of the 27 jurisdictions. It is worth noting that strong growth in shadow banking may occur from a low base and contribute to financial deepening, in particular in EMEs with relatively less developed financial systems.

[108] Growth rates have been calculated based on historical data included in jurisdictions' 2016 submissions. In some cases, in particular prior to 2011, increases in the value of cross-jurisdiction aggregates may also reflect improvements in the availability of data over time on a jurisdiction level. Exchange rate effects have been netted out by using a constant exchange rate (from 2015).

As a share of total financial intermediation, the narrow measure has remained relatively constant at about 13% since 2011 for the 27 jurisdictions.

Narrow measure of shadow banking and GDP[1]

27 jurisdictions Exhibit 4-4



[1] Shadow banking = narrow measure of shadow banking based on the economic functions. Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [2] As a weighted average based on rolling GDP weights. [3] Australia, Belgium, Canada, the Cayman Islands, France, Germany, Hong Kong, Ireland, Italy, Japan, South Korea, the Netherlands, Singapore, Spain, Switzerland, the UK and the US. [4] Argentina, Brazil, Chile, India, Indonesia, Mexico, Saudi Arabia, South Africa and Turkey. For Russia, the growth rate of the narrow measure could not be calculated because data prior to 2014 are incomplete. For Hong Kong, the growth rate of the narrow measure is based on 2012–15, due to incomplete data in 2011.

Sources: National sector balance sheet and other data; IMF *World Economic Outlook*; FSB calculations.

4.4 Cross-jurisdiction analysis

The aggregate numbers mask considerable heterogeneity between jurisdictions in terms of the importance and recent evolution of shadow banking in their respective domestic financial system.

The US had the largest shadow banking sector, with $13.8 trillion in 2015, representing 40% of the total shadow banking sector reported by the 27 jurisdictions (Exhibit 4-5). The Cayman Islands reported the second largest shadow banking sector, amounting to $4.3 trillion, followed by Japan ($3.2 trillion), and Ireland ($2.2 trillion).

Compared to 2011, the US share of the total shadow banking sector for 27 jurisdictions declined from 48% to 40% according to the narrow measure, whereas the Cayman Islands' share increased from 8% to 13%. Combined together, the US, the UK, and participating euro area jurisdictions represented 65% of total global shadow banking at end-2015, compared to 73% in 2011.[109] Combined, participating euro area jurisdictions represented 20% of the global narrow measure, amounting to $6.8 trillion in 2015.

Assets of entities classified into the narrow measure of shadow banking rose by 3% in 2015 from the previous year. The calculated growth rates are net of exchange rate effects but do not

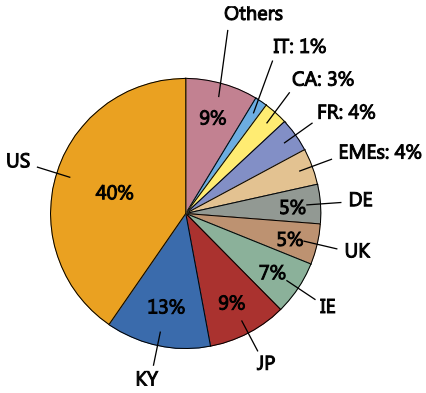
[109] These comparisons over time assume a constant exchange rate (from 2015).

account for any additional valuation effects which would likely dampen the growth figures given the overall appreciation of assets prices in 2015.

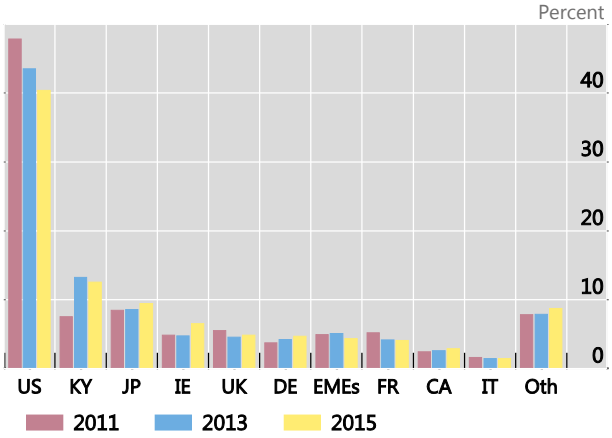
Share of the reported narrow measure of shadow banking[1]

27 jurisdictions Exhibit 4-5

At end-2015



Historical evolution of the shares by jurisdiction[2]



DE = Germany; EMEs excl. CN= emerging market economies excluding China; FR = France; IE = Ireland; IT = Italy; JP = Japan; KY = Cayman Islands; UK = United Kingdom; US = United States.

[1] EMEs include Argentina, Brazil, Chile, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa and Turkey. Others include Australia, Belgium, Hong Kong, Korea, the Netherlands, Singapore, Spain and Switzerland. [2] Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Calculated based on historical data included in jurisdictions' 2016 submissions.

Sources: National sector balance sheet and other data; FSB calculations.

All but four jurisdictions saw their shadow banking assets rise in 2015, and several experienced a marked increase (Exhibit 4-6). Exchange rate-adjusted growth rates of shadow banking assets in 2015 exceed 10% in Argentina, South Africa, Ireland, Belgium, India, Turkey, Singapore, Korea, and Russia. However, for Argentina, Turkey, and Singapore, the strong growth in shadow banking is largely due to the low base effect given the relatively small size of the narrow measure in these jurisdictions.

Adjusting for inflation significantly lowers the growth rate for some jurisdictions, as shown by the dots in Exhibit 4-6. However, to the extent that changes in relative prices are already reflected in the exchange rate movements, adjusting for both, exchange rate changes and price effects, may lead to some over-adjustments, such that the relevant *real* growth rate for 2015 lies between the dots and the blue bar.

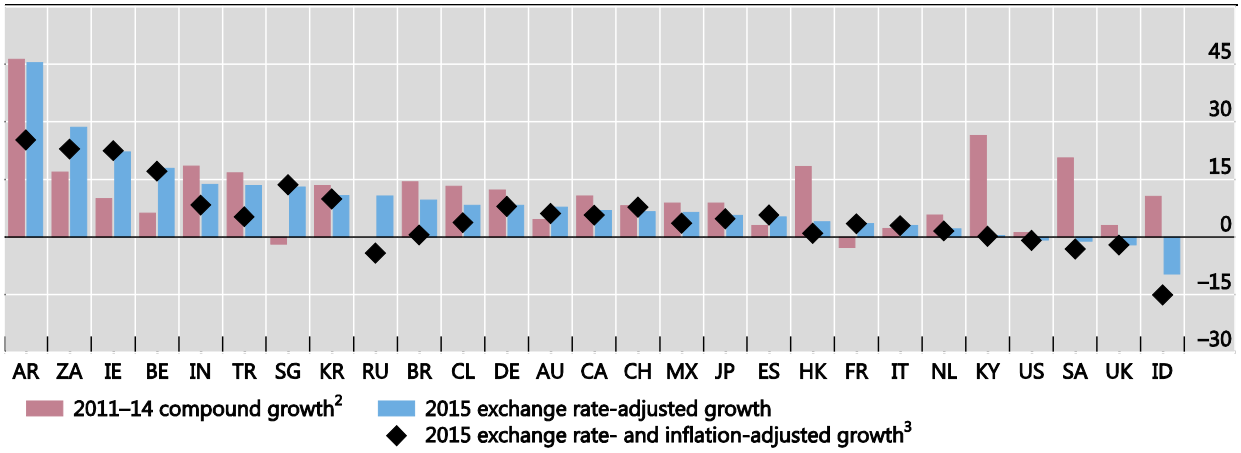
Exhibit 4-7 plots the narrow measure of shadow banking as a share of the non-bank financial intermediaries (MUNFI) and the size of MUNFI relative to the total national financial assets (NFAs). Dots further to the right indicate where jurisdictions' non-bank financial sectors are predominantly comprised of shadow banking. Those jurisdictions that serve as hubs for international capital flows (e.g. the Cayman Islands) also have relatively large non-bank financial sectors involved in shadow banking.[110] EMEs that have relatively smaller shadow

[110] For jurisdictions which act as hubs for international capital flows, a large share of domestically domiciled shadow banking assets often do not have direct linkages to the domestic economy. As such, the financial stability risks carried by these activities within the jurisdiction are more directly linked to the international financial system rather than the jurisdiction's domestic financial system.

banking sectors are generally experiencing higher growth rates as increased financial deepening occurs.

Annual growth of the narrow measure of shadow banking[1]

27 jurisdictions, in percent — Exhibit 4-6



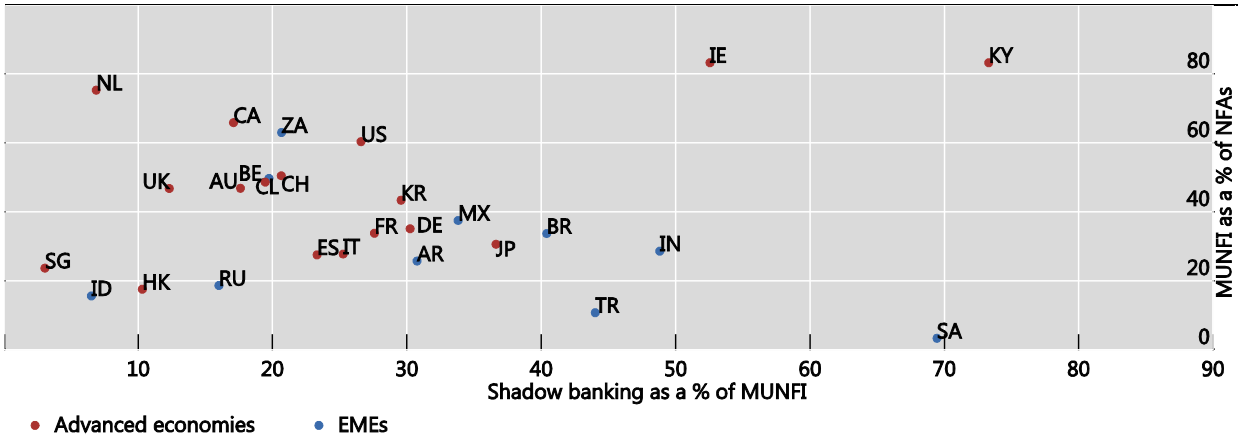
AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

[1] Shadow banking based on the economic functions. Calculated based on historical data included in jurisdictions' 2016 submissions. [2] For Russia, the compounded growth rate could not be calculated because OFIs data prior to 2014 are incomplete. For Hong Kong, the compounded growth rate is based on 2012–15, due to incomplete data in 2011. [3] Inflation adjusted using CPI.

Sources: National sector balance sheet and other data; Bank for International Settlements; FSB calculations.

The narrow measure of shadow banking shares by jurisdictions

Based on 2015 observations — Exhibit 4-7



MUNFI = Monitoring Universe of Non-bank Financial Intermediation, includes OFIs, pension funds, and insurance corporations; NFAs =total national financial assets; Shadow banking = shadow banking based on the economic functions.

AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa.

Sources: National sector balance sheet and other data: FSB calculations.

5. The narrow measure of shadow banking assessment by economic functions

This section provides a breakdown of the narrow measure of shadow banking according to the five economic functions (or activities). Across the 27 jurisdictions, a total of $34.2 trillion of non-bank financial entities' assets were reported as being related to at least one of the five economic functions (EF1 to EF5) or to shadow banking but not allocated to one of the five economic functions (unallocated shadow banking).

The narrow measure of shadow banking by economic functions

27 jurisdictions — Exhibit 5-1

	Narrow measure of shadow banking	EF1	EF2	EF3	EF4	EF5	Unallocated shadow banking[1]
Size in 2015 ($ trillion)	34.2	22.2	2.7	3.8	0.1	3.0	2.3
Share of total shadow banking (%)	100	65.0	7.9	11.1	0.4	8.9	6.7
Growth in 2015 (year-over-year, %)	3.2	3.7	2.5	-2.8	-0.1	-2.7	22.0

Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). EF1 = Economic function 1; EF2 = Economic function 2; EF3 = Economic function 3; EF4 = Economic function 4; EF5 = Economic function 5; Unallocated SB = assets of entities that were assessed to be involved in shadow banking activities, but which could not be assigned to a specific economic function.

[1] The high growth rate of unallocated shadow banking in 2015 partly reflects improvements in the availability of data over time on a jurisdiction level.

Sources: National sector balance sheet and other data; FSB calculations.

EF1 was by far the largest among the five economic functions, representing $22.2 trillion worth of assets at end-2015 (Exhibit 5-1 and Exhibit 5-2), or 65% of the narrow measure. It also experienced the highest growth rate of the economic functions in 2015 at 3.7%. EF3 was the second largest economic function, making up 11% of the narrow measure, followed by EF5 (9%), EF2 (8%), and EF4 (0.4%). A more detailed examination of trends and risks related to each of the five economic functions is provided below.

Also included in the narrow measure is the unallocated shadow banking category, which captures OFIs that the relevant authorities assessed to involve financial stability risks from shadow banking, but which could not be assigned to a particular economic function. This category constituted 7% of total shadow banking assets in 2015, or $2.3 trillion.

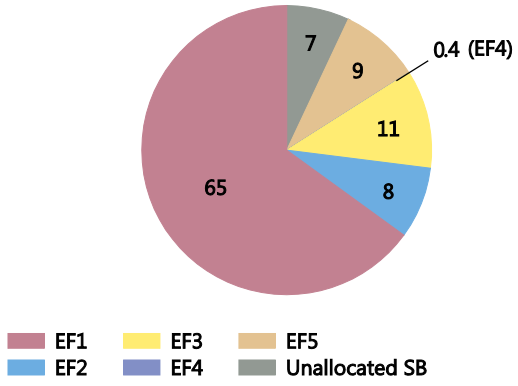
While the management of collective investment vehicles with features that make them susceptible to runs (EF1) was the largest economic function in most jurisdictions at end-2015, loan provision that is dependent on short-term funding (EF2) was the largest in India and the intermediation of market activities dependent on short-term funding (EF3) was the largest in Japan and Korea (Exhibit 5-3).

Classification by economic function[1]

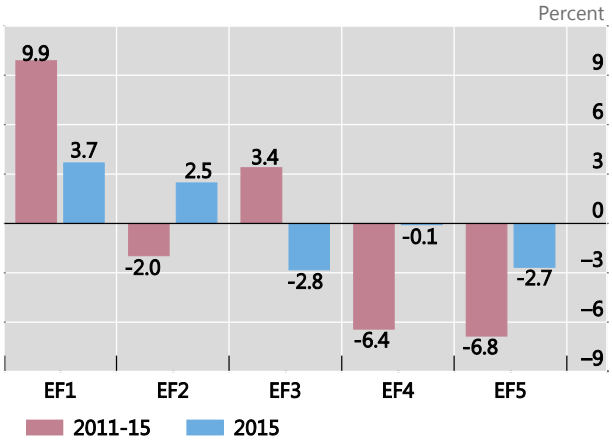
27 jurisdictions

Exhibit 5-2

Relative size of economic functions, at end-2015, percent



Annual growth of economic functions[2]



EF1 = Economic function 1; EF2 = Economic function 2; EF3 = Economic function 3; EF4 = Economic function 4; EF5 = Economic function 5; Unallocated SB = assets of entities that were assessed to be involved in shadow banking activities, but which could not be assigned to a specific economic function.

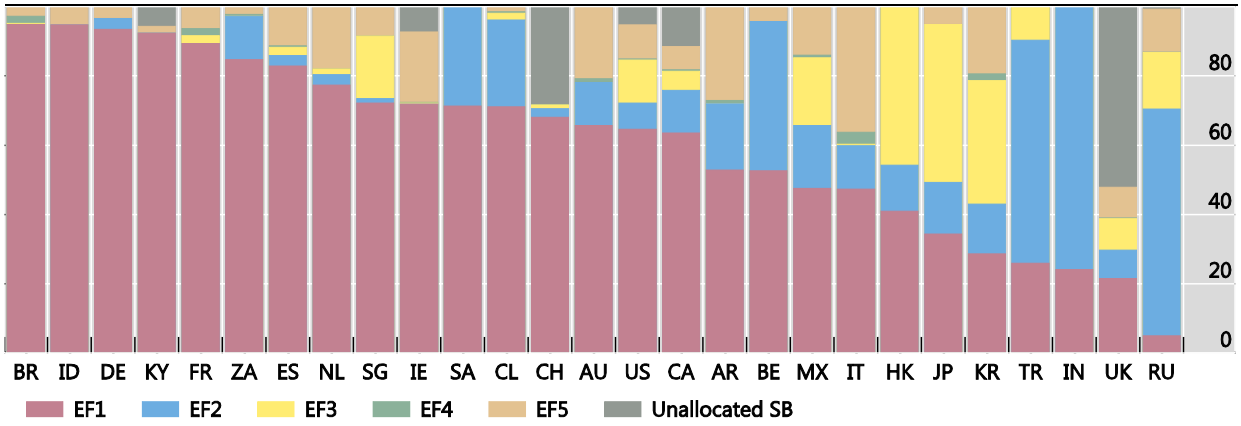
[1] Net of entities prudentially consolidated into banking groups. [2] Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Calculated based on historical data included in jurisdictions' 2016 submissions.

Sources: National sector balance sheet and other data: FSB calculations.

Economic function classification by jurisdictions[1]

27 jurisdictions at end-2015, as a percentage of the narrow measure of shadow banking in each jurisdiction

Exhibit 5-3



EF1 = Economic function 1; EF2 = Economic function 2; EF3 = Economic function 3; EF4 = Economic function 4; EF5 = Economic function 5. Unallocated SB = assets of entities that were assessed to be involved in shadow banking activities, but which could not be assigned to a specific economic function. AR = Argentina; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; DE = Germany; ES = Spain; FR = France; HK = Hong Kong; ID = Indonesia; IE = Ireland; IN = India; IT = Italy; JP = Japan; KR = Korea; KY = Cayman Islands; MX = Mexico; NL = Netherlands; RU = Russia; SA = Saudi Arabia; SG = Singapore; TR = Turkey; UK = United Kingdom;[2] US = United States; ZA = South Africa.

[1] Net of entities prudentially consolidated into banking groups. [2] For the UK, to adopt a conservative approach to measuring the narrow measure of shadow banking, "unallocated SB" largely consists of investment funds (including closed-ended funds), not classified elsewhere, for which it was not possible to provide sufficient evidence to warrant their exclusion from shadow banking.

Sources: National sector balance sheet and other data; FSB calculations.

5.1 Economic Function 1

EF1 relates to the management of collective investment vehicles (CIVs) with features that make them susceptible to runs. In many circumstances, CIVs can act as shock absorbers in the financial system by spreading losses from an entity's distress or insolvency or from adverse financial market conditions among a disparate group of investors. In certain circumstances, however, CIVs involved in credit intermediation with maturity/liquidity transformation and/or leverage may be susceptible to runs.

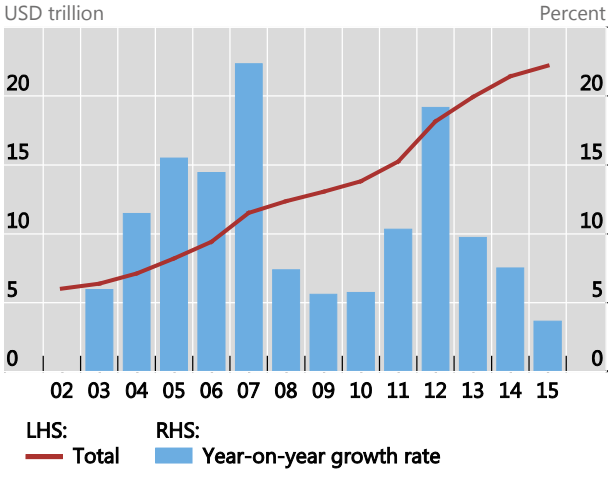
5.1.1 Trends in Economic Function 1

As stated earlier, the assets of CIVs classified into EF1 represent by far the largest share (65%) of the narrow measure of shadow banking. At end-2015, EF1 comprised $22.2 trillion, a 3.7% increase over the previous year, after controlling for exchange rate effects (Exhibit 5-4). The growth rate of EF1 entities' assets has slowed in the last two years, but it remains higher than the growth rate of total assets included in the narrow measure, driving the overall growth of the narrow measure of shadow banking.

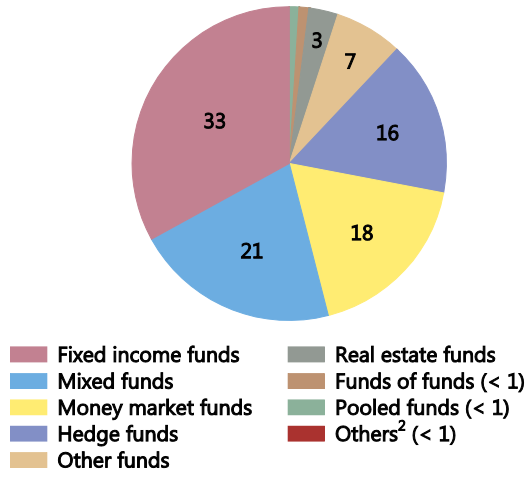
Economic Function 1 trends and composition

27 jurisdictions — Exhibit 5-4

Financial assets level and growth[1]



Breakdown by entity type, percent



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Calculated based on historical data included in jurisdictions' 2016 submissions. Increases in EF1 may also reflect improvements in the availability of data over time at the jurisdiction level.
[2] Others = ETFs, investment funds (FX), investment funds (external debt), and convertible bond funds.

Sources: National sector balance sheet and other data; FSB calculations.

There were a number of different types of CIVs that jurisdictions judged as having features which make them susceptible to runs, including fixed income funds (33% of EF1), mixed funds (21%), MMFs (18%) and hedge funds (16%). Some jurisdictions also classified real estate funds, including REITs, fund of funds, exchange traded funds (ETFs) and pooled funds into

EF1, as such entities were judged to either be involved in credit intermediation or part of a credit intermediation chain, with potential risk of runs (Exhibit 5-4 right panel).[111]

Financial stability risk metrics **Box 5-1**

The FSB's 2016 monitoring exercise seeks to capture financial stability risks associated with each of the five economic functions through the collection of a set of on- and off-balance sheet data to assess aspects of four financial stability risks from shadow banking: maturity transformation, liquidity transformation, imperfect credit risk transfer, and leverage. Where sufficient data granularity exists across at least some jurisdictions, risk metrics were calculated to illustrate potential risks associated with the main entity types classified into the different economic functions.[112]

The reporting of a set of on- and off-balance sheet data for classified entity types has improved compared to the 2015 exercise, though there remain gaps in reported data. In particular, some jurisdictions continue to face significant challenges collecting these data, in part because regulatory data collection of various non-bank institutions are not sufficiently granular, and national financial accounts often do not provide specific breakdowns with respect to maturity and liquidity factors.[113] In addition to data gaps, differences in the accounting standards and the treatment of certain aspects of risk data also posed challenges in comparing financial stability risks posed by similar entity types in different jurisdictions.[114]

Due to these data limitations, some of the exhibits and results presented in Section 5 come from a subsample of jurisdictions and may therefore not be extrapolated to describe the entire sample of jurisdictions. More specifically, any conclusion from the data related to the subsample may not apply to all of the jurisdictions that participated in this Report. However, to the extent possible, this Report discusses broad messages, findings, and trends that can be gleaned from the reported data. In addition, some risk metrics include data from entities prudentially consolidated into banking groups, as some jurisdictions' granular data do not distinguish between consolidated and non-consolidated entities.

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[111] Mixed funds holding a mix of equity and credit assets were classified into EF1 based on their holdings of equities/credit assets. To ensure consistency in the assessment, in principle, funds holding 80% or more of their AUM in equities were considered not to be involved in credit intermediation and jurisdictions did not classify such funds into EF1. The remaining mixed funds were classified into EF1. The same assessment criteria are applied to other type of entities such as fund of funds, real estate funds, and ETFs. MMFs, both CNAVs and VNAVs, were classified into EF1 based on their susceptibility to runs. Closed-ended funds were generally not classified into EF1 unless they were leveraged. However, some of these funds in certain jurisdictions were excluded from the classification based on the in-depth analysis of jurisdictions, where jurisdictions had an opportunity to present a case for demonstrating the absence of run risks for consideration by other jurisdictions.

[112] The sample size for calculating risk metrics represents jurisdictions rather than individual entities. Thus, one jurisdiction's data submission could include many individual entities that range from large to small entities.

[113] These measures provide a conservative illustration of potential financial stability risks from shadow banking because, in some cases, jurisdictions are not able to break out credit intermediation and related risks where activities are mixed between credit and non-credit investment activities and so included all funds rather than only funds with more than 20% fixed income investments (e.g. hedge funds, investment funds).

[114] For example, some jurisdictions classified the equity assets of funds as long-term assets, while some others treated them as short-term assets. There were also differences which arose due to some jurisdictions reporting total assets, while others reported total net assets for EF1 entities. In some cases, it was not feasible for jurisdictions to report risk-oriented data net of entities prudentially consolidated into banking groups, while others were able to do so. This contributes to the challenges in comparing calculated risk metrics. The jurisdictions plan to improve consistency going forward.

The FSB intends to take forward the work on the risk analysis for the 2017 monitoring exercise, through focused work to refine risk metrics so that they are better tailored to the business models of the entities in each of the EFs; to make better use of widely available data and minimise the challenges presented by significant data gaps; and to better assess financial stability risks from shadow banking.

Exhibit 5-5 provides an overview of collected basic on- and off-balance sheet items and calculated risk metrics. For the largest three entity types classified into each economic function, authorities were asked to report balance sheet items on a gross basis, i.e. reporting weighted averages of all entities making up a particular entity type. However, if gross reporting was not feasible, authorities reported weighted averages of a sample pool (e.g. the largest three entities, by assets, for an entity type) for some entity types or other relevant proxies.

On- and off-balance sheet items and risk metrics[1] Exhibit 5-5

Basic on- and off-balance sheet items	Examples of risk metrics
• Total financial assets • Credit assets • Long-term assets • Short-term assets • Liquid assets	**Credit intermediation** (CI) $CI1 = \frac{\text{credit assets}}{\text{total financial assets}}$ $CI2 = \frac{\text{loans}}{\text{total financial assets}}$
• Long-term liabilities • Short-term liabilities • Equity	**Maturity transformation** (MT) $MT1 = \frac{\text{long term assets} - (\text{long term liabilities} + \text{equity})}{\text{total financial assets}}$ $MT2 = \frac{\text{short term liabilities}}{\text{short term assets}}$
• Off-balance sheet items[2]	**Liquidity transformation** (LT) $LT = \frac{\text{total financial assets} - \text{liquid assets} + \text{short term liabilities}}{\text{total financial assets}}$ **Leverage** (L) $L = \frac{\text{total financial assets}}{\text{equity}}$

[1] For EF1 entity types, the collected balance sheet data and calculated risk metrics were expanded to also include AUM (instead of total financial assets), Gross Notional Exposure and Net Asset Value (to calculate leverage ratios), and non-/redeemable equity (as a form of long-/short-term liability). [2] Includes off-balance sheet credit exposures (e.g. due to contingent liabilities such as credit guarantees or lines of credit and, where applicable, credit default swaps).

(i) Credit intermediation

Different metrics sought to assess the degree of credit intermediation undertaken by classified entity types. The metrics compare the amount of credit assets and loans held by a particular

entity type to its total assets (CI1 and CI2, respectively). These metrics fall between 0 and 1, with higher values showing more involvement in credit intermediation while "0" indicating no involvement in credit intermediation.

(ii) Maturity transformation

Two different metrics sought to assess the degree of maturity transformation. The first (MT1) looks at the portion of long-term assets funded by short-term liabilities and scaled by the entity type's total financial assets. The metric falls between −1 and +1. A value of "0" shows the absence of maturity transformation with the sum of long-term liabilities and non-redeemable equity matching long-term assets. Negative maturity transformation is taking place between −1 and 0, while a ratio between 0 and +1 indicates positive maturity transformation.

The second metric (MT2) is defined as the ratio of short-term liabilities (plus redeemable equity in the case of EF1 entity types) to short-term assets. A "1" signifies that the short-term liabilities (plus redeemable equity in the case of EF1) are fully covered with short-term assets. As the ratio moves toward a 2, there could be short-term funding dependence and additional analysis may be warranted. A ratio between 0 and 1 indicates negative maturity transformation.

Negative maturity transformation is taking place when the maturity of the liabilities is longer than the maturity of the assets while positive maturity transformation indicates that the maturity of the liabilities is shorter than the maturity of the assets.

(iii) Liquidity transformation

The liquidity transformation ratio (LT) seeks to measure the amount of less liquid assets funded by short-term liabilities (and/or redeemable equity in the case of CIVs), approximated by short-term liabilities minus liquid assets.[115] Total financial assets are then also added to the numerator to obtain interpretable results, such that a value of "1" means there is no transformation, as all near-term demands on liquidity are supported by liquid assets. A "2" means that all of the assets are less liquid and are funded by short-term liabilities, including redeemable equity.

(iv) Leverage

Basic balance sheet leverage (L) is measured by the ratio of total financial assets to equity (or AUM to NAV in the case of CIVs). The results can be interpreted as a financial leverage ratio or equity multiplier, however, these are not risk-based measures. Although this measure enables comparisons across entity types, it does not take into account non-bank financial entities' leverage through the use of derivatives and other off-balance sheet transactions (i.e. synthetic leverage).

(v) Imperfect credit risk transfer

Ratios related to imperfect credit risk transfer were also considered in the 2016 monitoring exercise. However, collected data were not sufficient to allow any meaningful conclusions. In particular, off-balance sheet data items such as off-balance sheet credit exposures were often not available across jurisdictions.

[115] See Footnote 118 for a definition of liquid assets.

5.1.2 Financial stability risks in Economic Function 1

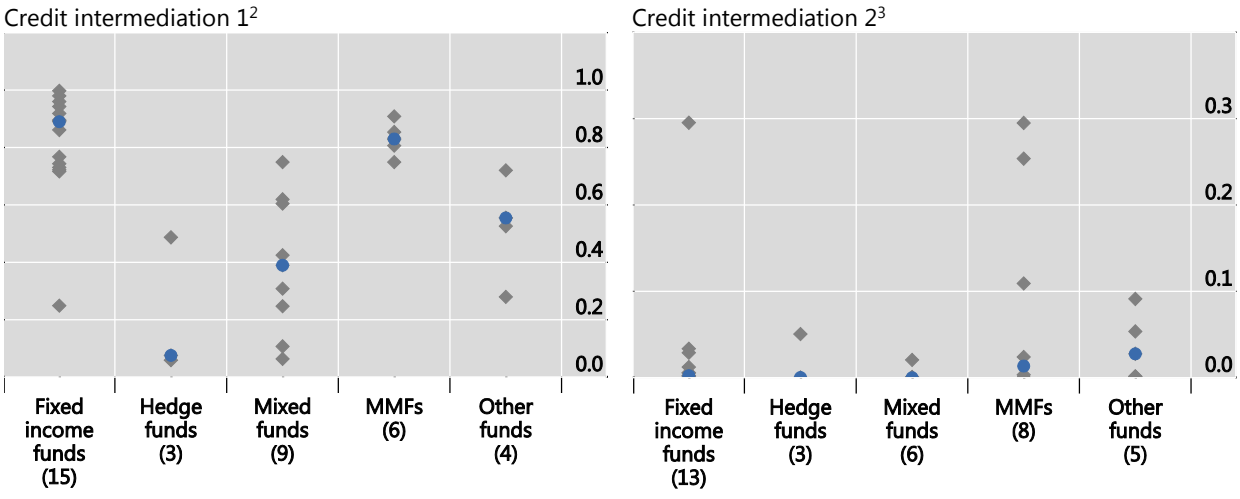
(i) Credit intermediation

Exhibit 5-6 sets out the credit intermediation metrics for selected EF1 entity types. Credit intermediation as measured through the risk metric CI1 (which measures the ratio of credit assets to AUM) was relatively higher for fixed income funds, MMFs, and mortgage and real estate funds, reflecting their business models, compared to other types of CIVs. When measured by the ratio of loans to AUM (CI2), credit intermediation was much lower for most types of entities, except mortgage and real estate funds, indicating limited direct lending undertaken by most EF1 entity types.

The risk metrics for similar entity types differ across jurisdictions, with the most pronounced differences being evidenced in case of mixed funds and other funds, likely due to differences in the share of fixed income assets held by these types of funds in different jurisdictions.[116] In addition, the sample sizes reflected in Exhibit 5-6 indicate that the data reported for calculating risk metrics was best for fixed income funds followed by mixed funds and MMFs.

Credit intermediation

Sample size in parentheses[1] Exhibit 5-6



[1] The sample size indicates the number of jurisdictions submitting the relevant data. One jurisdiction's data submission represents data collected by authorities on individual entities within that jurisdiction, which is a much larger sample set. [2] Credit assets / AUM. [3] Loans / AUM.

Sources: National sector balance sheet and other data; FSB calculations.

(ii) Maturity transformation

For most EF1 entity types, maturity transformation as measured by MT1 (the portion of long-term assets funded by short-term liabilities and scaled by the entity type's total financial assets) is positive but small (Exhibit 5-7), indicating that the absolute amount of short-term liabilities may not be very high relative to long-term assets. MT2 (the ratio of short-term liabilities plus

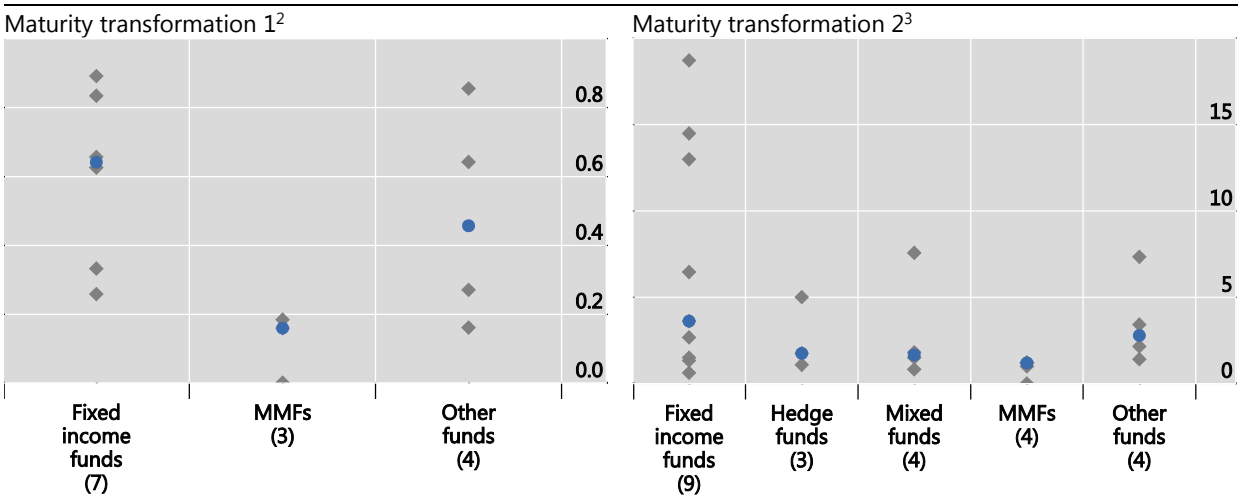
[116] See Footnote 111. These differences could also be due to different investment strategies.

redeemable equity to short-term assets), which may reflect potential funding risks, tended to be higher than the MT1 measure for most EF1 entity types indicating that some of these funds are typically funding a portion of their long-term assets with short-term liabilities and may be vulnerable to periods of diminished market liquidity.[117]

There are differences across jurisdictions in the inputs to the maturity transformation risk metrics for some of the entity types classified into EF1. Specifically, there are some inconsistencies in the treatment of equity assets as well as in the treatment of narrow and broad liquidity,[118] which will need to be addressed in future monitoring exercises to obtain more meaningful cross-jurisdictional comparisons of the risk metrics. Finally, data were less available to calculate risk metrics for maturity transformation than for credit intermediation, with the reported data again being the best for fixed income funds on a relative basis.

Maturity transformation

Sample size in parentheses[1] Exhibit 5-7



[1] The sample size indicates the number of jurisdictions submitting the relevant data. One jurisdiction's data submission represents data collected by authorities on individual entities within that jurisdiction, which is a much larger sample set. [2] (Long term assets-long term liabilities - equity) / AUM. [3] (Short term liabilities + redeemable equity) / short term assets.

Sources: National sector balance sheet and other data; FSB calculations.

(iii) Liquidity transformation

The data reported to calculate these risk metrics was relatively limited as many jurisdictions were not able to provide the liquidity breakdowns of assets required to calculate this metric.[119] The LT measure was well above one for reported fixed income, MMFs and mixed funds

[117] MT1 and MT2 are not comparable. However, in terms of values, MT2 seems to take larger values than MT1, possibly because for most funds other than MMFs, short-term assets are small compared to fund's redeemable equity.

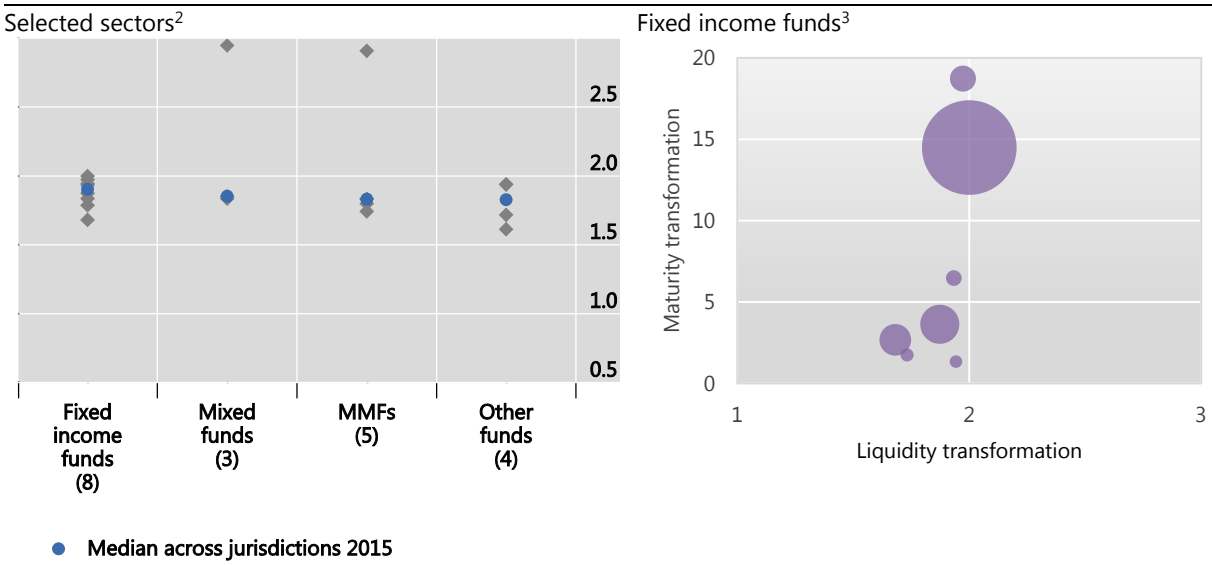
[118] Liquid assets are considered to be all assets that can be easily and immediately converted into cash at little or no loss of value during a time of stress (see also characteristics and definition of High Quality Liquid Assets (HQLAs) in Part 1, Section II.A in BCBS, *Basel III: Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools*, January 2013). In a broad definition, liquid assets include HQLAs. In a narrow definition, liquid assets only include cash and cash equivalents.

[119] Some authorities are currently working to better understand and/or measure liquidity risk associated with CIVs (Annex 5).

(Exhibit 5-8), indicating that short-term liabilities and short-term redeemable equity are in excess of liquid assets. This ratio will be biased downwards for jurisdictions that reported total NAV in the total assets field, instead of total AUM without netting of any liabilities. In jurisdictions where EF1 displayed higher levels of maturity transformation, this also tended to be associated with higher levels of liquidity transformation (Exhibit 5-8, right panel).

Liquidity transformation[1]

At end-2015 Exhibit 5-8



[1] Liquidity transformation = (AUM – liquid assets + short term liabilities + redeemable equity) / AUM. [2] Number of submissions in parentheses. One jurisdiction's data submission represents data collected by authorities on individual entities within that jurisdiction, which is a much larger sample set. [3] Size of bubble denotes the sector's absolute size. Maturity Transformation = (short term liabilities + redeemable equity) / short term assets. Liquidity transformation = (AUM – liquid assets + short term liabilities + redeemable equity) / AUM.

Source: National sector balance sheet and other data; FSB calculations.

(iv) Leverage

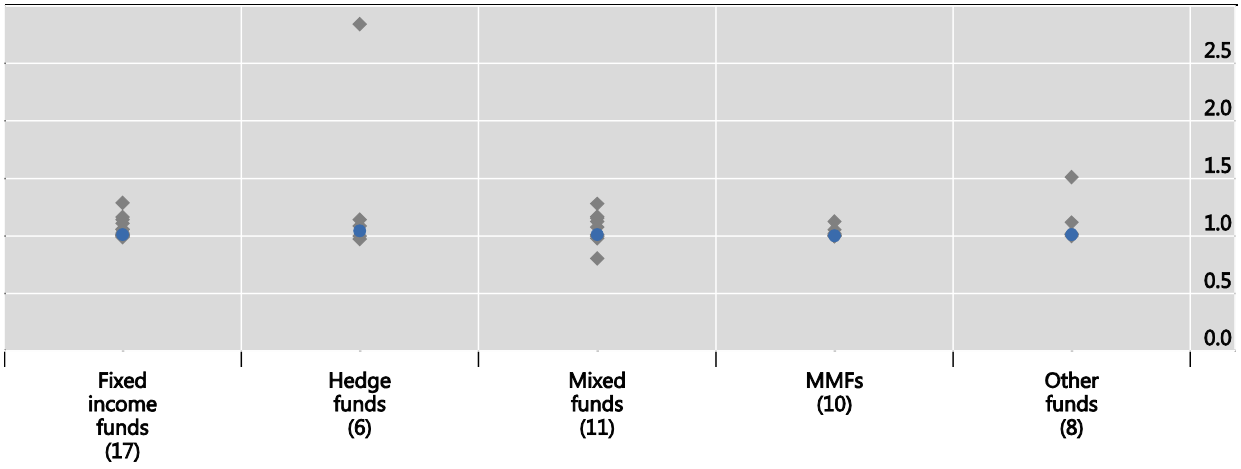
Reported balance sheet leverage, as measured by AUM divided by NAV, is relatively higher amongst hedge funds compared to other EF1 entity types, with considerable cross-jurisdictional variation (Exhibit 5-9). For fixed income funds, mixed funds and MMFs, leverage seems to be relatively low or limited, with a risk metric value of 1, reflecting regulatory limits on balance sheet leverage in many jurisdictions.

As off-balance sheet exposures were only provided by some jurisdictions, examining the potential impact of synthetic leverage continues to be a challenge. Data on synthetic leverage should become more widely available through IOSCO's operationalisation of the FSB's January 2017 *Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities*.[120]

[120] FSB, *Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities*, January 2017. According to Recommendation 12, IOSCO, in coordination with the FSB, should collect national/regional aggregated data on leverage across their member jurisdictions by end-2019.

Leverage[1]

Sample size in parentheses[2] Exhibit 5-9



[1] AUM / NAV. [2] The sample size indicates the number of jurisdictions submitting the relevant data. One jurisdiction's data submission represents data collected by authorities on individual entities within that jurisdiction, which is a much larger sample set.

Sources: National sector balance sheet and other data; FSB calculations

5.2 Economic Function 2

EF2 consists of entities engaged in loan provision that is dependent on short-term funding. This economic function captures a wide range of activities including consumer finance, auto finance, retail mortgage provision, commercial property finance, and equipment finance. Entities engaged in these activities tend to either compete with banks or offer services in niche markets where banks are not active players, and often concentrate their lending in specific sectors due to expertise and other reasons. This may create significant risks if the sectors they focus on are cyclical in nature. Such risk may be exacerbated if these entities are heavily dependent on short-term funding or wholesale funding, or are dependent on parent companies for funding and the parent companies are themselves in the same sectors that are cyclical in nature.

5.2.1 Trends in Economic Function 2

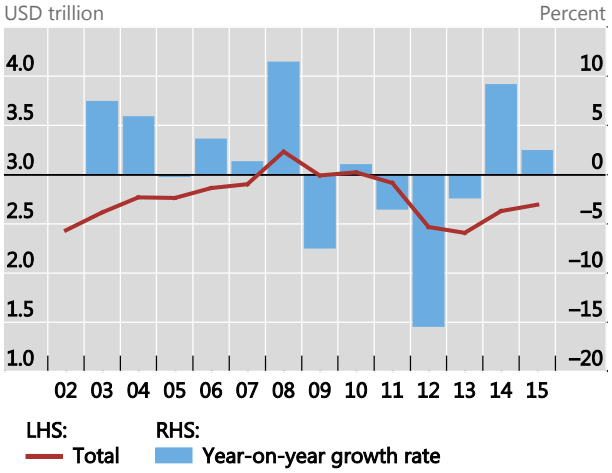
Of the total shadow banking assets at end-2015, EF2 constituted 8% or $2.7 trillion, a 2.5% increase from the end-2014 value of $2.6 trillion. Of the entity types classified into shadow banking, finance companies comprised of 83% of total EF2 assets (Exhibit 5-10). This activity was relatively concentrated, with 39% of the total EF2 assets held by entities in the US, followed by Japan (18%) and India (12%).

In terms of the distribution of growth, jurisdictions in which finance companies were a larger share of the overall national financial system tended to see a slightly higher growth rate for these entities, after accounting for exchange rate fluctuations.

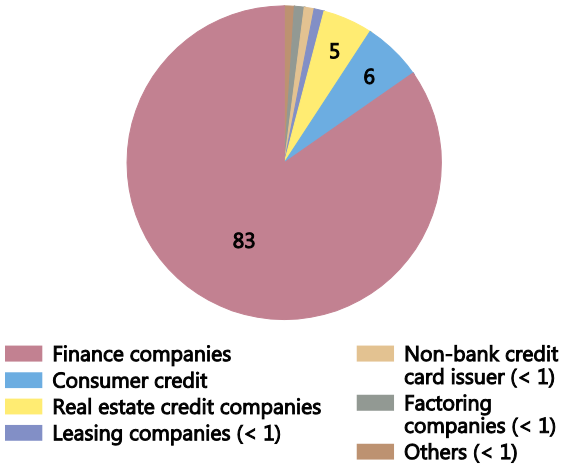
Economic Function 2 trends and composition

27 jurisdictions Exhibit 5-10

Financial assets level and growth[1]



Breakdown by entity type, percent



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Calculated based on historical data included in jurisdictions' 2016 submissions. Increases in EF2 may also reflect improvements in the availability of data over time at the jurisdiction level. Net of prudential consolidation into banking groups.

Sources: National sector balance sheet and other data; FSB calculations.

5.2.2 Financial stability risks in Economic Function 2

Since finance companies account for most EF2 assets, the analysis of risk metrics focuses primarily on finance companies and on the risk metrics most relevant for these entities (Exhibit 5-11).[121]

There are a number of key observations that can be made from these risk metrics:

- The median credit intermediation ratio (the ratio of credit assets to total financial assets) for finance companies stood at 0.76. As the maximum value of this ratio is 1, this suggests that these entities engage in significant credit intermediation. This is perhaps not surprising as EF2 entities, and in particular finance companies, are involved in more traditional forms of lending.
- The median maturity transformation metric MT2 (the ratio of short-term liabilities to short-term assets) was 0.89 across the 10 jurisdictions that provided the relevant data, indicating that some short-term liabilities are being used to fund long-term assets. However, we know from MT1 (the relative share of long-term assets funded by short-term liabilities) that only a negligible or negative portion of long-term assets have been funded through short-term liabilities, showing that the absolute amount of short-term liabilities is very small compared to long-term liabilities.
- The median liquidity transformation metric LT1 (the amount of less liquid assets funded by short-term liabilities) was close to 1 across the five jurisdictions that provided it,

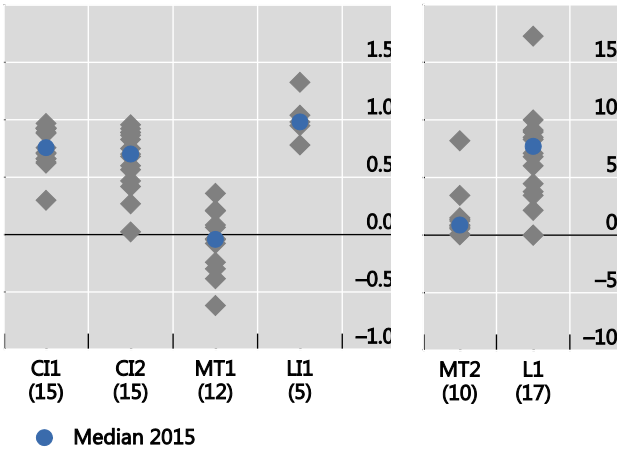
[121] Each jurisdiction reports only one aggregated number per entity type for each risk metric, so this analysis does not account for important distributional differences between finance companies (which are quite heterogeneous).

indicating that short-term liabilities are roughly equivalent to liquid assets for these jurisdictions (i.e. no significant liquidity transformation).

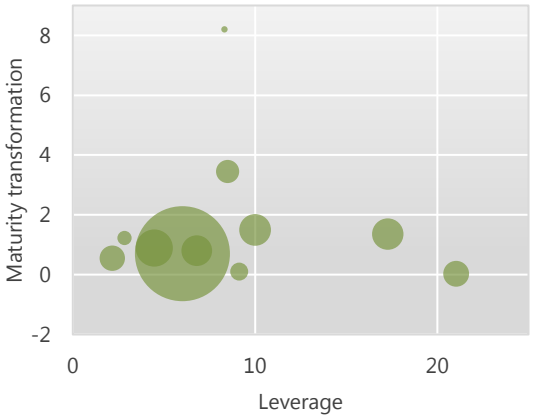
Risk metrics for finance companies

At end-2015 Exhibit 5-11

Selected risk metrics[1]



Maturity transformation (MT2) vs leverage vs size[2]



[1] Credit Intermediation 1 (CI1) = credit assets / total financial assets; Credit Intermediation 2 (CI2) = loans / total financial assets; Maturity Transformation 1 (MT1) = (long term assets - long term liabilities - equity) / total financial assets; Maturity Transformation 2 (MT2) = short term liabilities / short term assets; Liquidity Transformation = total financial assets - liquid assets + short term liabilities) / total financial assets; Leverage (L) = total financial assets / equity. Number of submission in parentheses. One jurisdiction's data submission represents data collected by authorities on individual entities within that jurisdiction, which is a much larger sample set. [2] Size of bubble denotes the sector's absolute size. Maturity Transformation = (short term liabilities + redeemable equity) / short term assets. Leverage = total financial assets / equity.

Source: National sector balance sheet and other data; FSB calculations.

5.3 Economic Function 3

EF3 involves the intermediation of market activities that is dependent on short-term funding, including activities such as secured funding of client assets and securities borrowing and lending. There were 21 jurisdictions that classified entities into EF3, which made up about 11% of total shadow banking assets. Broker-dealers/investment firms are the most prevalent entity type reported by jurisdictions in EF3. However, some jurisdictions reported other EF3 entity types.[122]

5.3.1 Trends in Economic Function 3

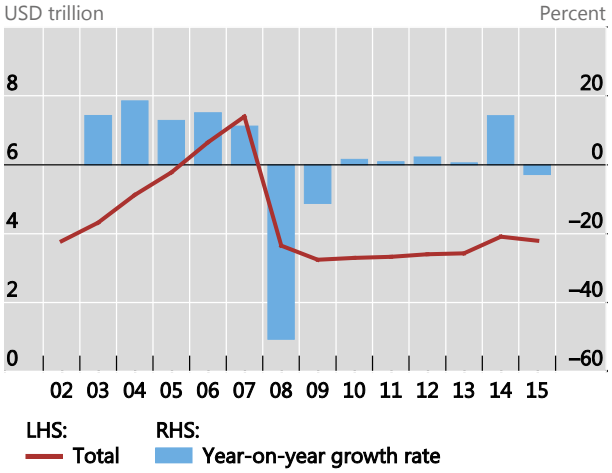
As at end-2015, total financial assets of EF3 entities was $3.8 trillion, declining by 2.8% net of exchange rate effects, from $3.9 trillion in 2014. EF3 assets dropped from its peak of $7.4 trillion in 2007 to $3.7 trillion in 2008 in some jurisdictions, and remained relatively constant since then (Exhibit 5-12). To some extent, this is due to changes in the regulatory status during the financial crisis of some large broker-dealers to bank holding companies or due to their consolidation into banking groups or regulatory/supervisory changes leading to the increased use of leverage-based capital requirements at the parent bank or bank holding company that indirectly apply to broker-dealer subsidiaries.

[122] Jurisdictions have also classified entities described as securities finance companies.

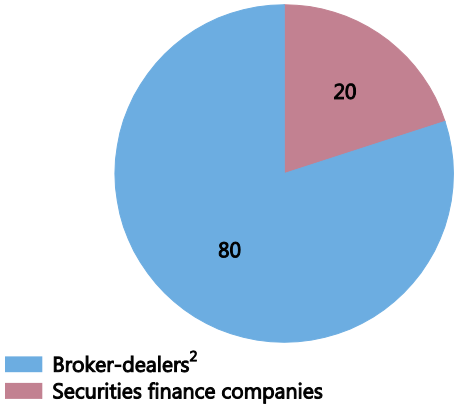
Economic Function 3 trends and composition

27 jurisdictions Exhibit 5-12

Financial assets level and growth[1]



Breakdown by entity type, percent



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Calculated based on historical data included in jurisdictions' 2016 submissions. Increases in EF3 may also reflect improvements in the availability of data over time at the jurisdiction level. Net of prudential consolidation into banking groups. [2] Also includes investment firms.

Sources: National sector balance sheet and other data; FSB calculations.

In terms of assets, total EF3 assets continue to be concentrated in a handful of jurisdictions. In 2015, the top four jurisdictions in EF3, by financial assets, accounted for more than 90% of the total size of EF3 (the US, Japan, Korea, and the UK).

5.3.2 Financial stability risks in Economic Function 3

Intermediation activity may include securities broking services (i.e. buying and selling of securities and derivatives on and off exchanges including in a market making role) as well as prime brokerage services to hedge funds. Depending on entities' funding model, these activities may involve liquidity risks, including intra-day liquidity risk. These entities may also be vulnerable to roll-over risk or runs by lenders if they are leveraged, particularly if their funding is primarily dependent on wholesale funding (e.g. repos). While engaging in market intermediation, entities such as broker-dealers may at times take on excessive degrees of leverage and transform maturity, which could exacerbate or result in runs if general market and asset price conditions deteriorate, and if funding providers become concerned that the price deterioration of collateral supporting short-term borrowing could precipitate viability concerns.[123]

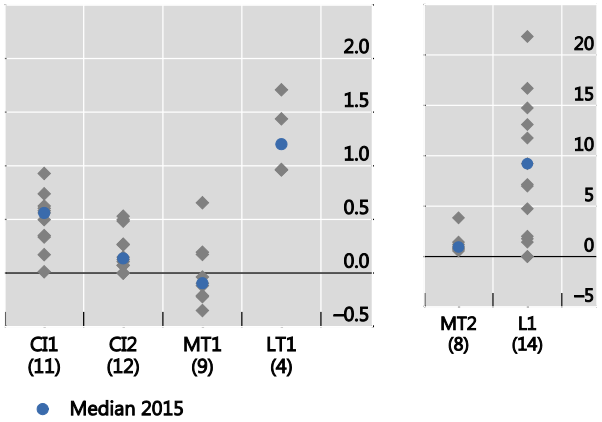
[123] In some jurisdictions (e.g. the US), while broker-dealer leverage is over-collateralised with liquid securities, a significant percentage of which is US treasury securities, if counterparties and customers were to have concerns about the viability of the firm (i.e. the holding company, the bank or broker-dealer affiliate), counterparties could either demand additional collateral when providing wholesale funding, or refuse to provide wholesale funding. Clearing houses could also demand additional collateral as well, and customers may also remove free balances from the firm, further straining liquidity. If, in the aggregate, these liquidity strains were to cause the firm to fail, in the case of a very large broker-dealer with significant wholesale funding balances, a mass liquidation of collateral held by the failed broker-dealer's counterparties could cause downward pressure on securities prices, particularly in a situation where there is an existing market-wide stress event.

Exhibit 5-13 shows the range of values for metrics on credit intermediation (CI), maturity transformation (MT), liquidity transformation (LT), and leverage (L) reported by some jurisdictions that classified entities into EF3.[124]

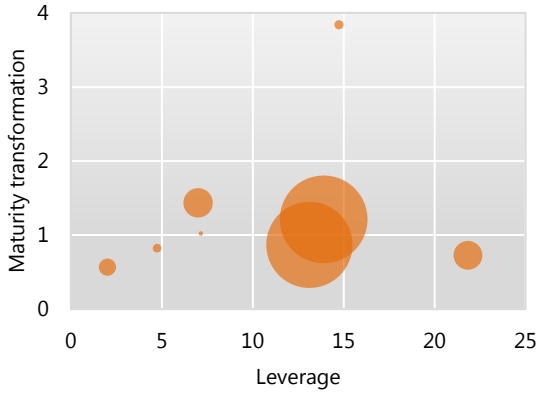
Risk metrics for broker-dealers

At end-2015 Exhibit 5-13

Selected risk metrics[1]



Maturity transformation (MT2) vs leverage vs size[2]



[1] Credit Intermediation 1 (CI1) = credit assets / total financial assets; Credit Intermediation 2 (CI2) = loans / total financial assets; Maturity Transformation 1 (MT1) = (long term assets - long term liabilities - equity) / total financial assets; Maturity Transformation 2 (MT2) = short term liabilities / short term assets; Liquidity Transformation (LT1) = total financial assets - liquid assets + short term liabilities) / total financial assets; Leverage (L) = total financial assets / equity. Number of submission in parentheses. One jurisdiction's data submission represents data collected by authorities on individual entities within that jurisdiction, which is a much larger sample set. [2] Size of bubble denotes the sector's absolute size. Maturity transformation = (short term liabilities + redeemable equity) / short term assets. Leverage = total financial assets / equity.

Source: National sector balance sheet and other data; FSB calculations.

CI1 (ratio of credit assets to total financial assets) saw a relatively higher dispersion across jurisdictions than CI2 (ratio of loans on the asset side of the balance sheet to total financial assets). Jurisdictions reporting total assets instead of financial assets may have biased these two risk metrics downwards. Eleven jurisdictions reported that on average 56% of the total assets of their EF3 entities were fixed income assets, while on average 14% were loans on the asset side of the balance sheet. Of the 11 jurisdictions that submitted data, four reported a ratio of fixed income assets to total financial assets equal to or in excess of 60%. A quarter of the jurisdictions that submitted data reported a ratio of loans on the asset side of the balance sheet to total financial assets equal to or in excess of 40%.

MT1 (ratio of long-term assets minus long-term liabilities minus equity capital to total financial assets) takes both positive and negative values. The negative values, reported by about two-thirds of jurisdictions that provided such metrics, are not necessarily unexpected; long-term liabilities could be financing both long-term credit and non-credit (e.g. equity) assets.

All jurisdictions that classified broker-dealers were able to calculate L (the ratio of total financial assets to equity capital). Financial assets exceeded equity by more than five times for about half of the jurisdictions, and by more than 10 times for a third of the jurisdictions.

[124] See also Footnote 114 on the reporting of risk metrics gross and net of entities prudentially consolidated into banking group.

5.4 Economic Function 4

EF4 entities facilitate the creation of credit, for example, when financial guarantors or monoline insurers extend various forms of guarantees to bank and non-bank financial entities, such as off-balance sheet commitments and derivatives. Investors find this additional credit protection attractive as it increases the likelihood that investments will be repaid in full, even in the event the borrower is unable to meet its obligations. From the borrower's perspective, the principal's creditworthiness is improved by the credit quality of the financial guarantor, reducing funding costs for a given risk profile. Credit insurance providers and holders of credit derivatives facilitate credit creation through engagement in markets that offer insurance for credit instruments, thereby enhancing their marketability.

Credit facilitators played a significant role during the period leading to the financial crisis. For example, by enhancing the credit quality of subprime mortgages or tranches of mortgage-backed securitisation (e.g. collateralised debt obligations), they facilitated easy credit and boosted the build-up of excessive leverage in the financial system. The pricing of insurance protection should in principle reflect the creditworthiness of both borrower and guarantor. However, credit risk transfer might be imperfect in the presence of asymmetric information or other market failures as seen in the financial crisis. For instance, if credit, liquidity or counterparty risks are not properly priced, or the incentive structures not well designed, the entities facilitating credit enhancements may create excessive risk-taking, potentially contributing to boom-bust cycles.[125]

5.4.1 Trends in Economic Function 4

Facilitation of credit creation was a relatively small part of shadow banking at end-2015, with assets classified into EF4 by 17 jurisdictions totalling just under $141 billion and representing only 0.4% of total shadow banking assets (Exhibit 5-14), a decline of less than 0.1% relative to end-2014, net of exchange rate effects. However, the size of this economic function and its importance relative to the other economic functions may be significantly understated due to the difficulty of adequately capturing off-balance sheet exposures. This is largely because the balance sheet assets of credit insurers, which are typically classified into this economic function, are often modest due to the nature of their business, while they can still facilitate substantial volumes of credit extended by bank or non-bank financial entities.

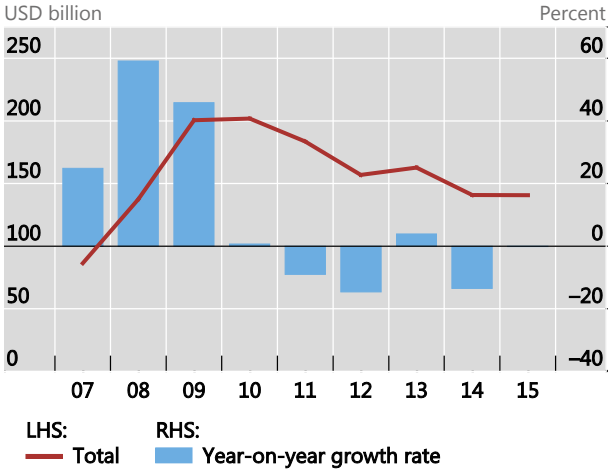
The entity types most commonly reported as facilitating credit creation were financial guarantors, credit insurance corporations and investment firms making use of credit derivatives, although some of these were only reported by a number of jurisdictions indicating a potential need to address data gaps and/or concentration of certain business in these jurisdictions. After adjusting for exchange rates, jurisdictions whose EF4 entities comprised a larger share of their financial system generally saw their entities grow slightly more quickly than jurisdictions whose EF4 entities were a smaller share of their financial system.

[125] FSB, *Policy Framework for Strengthening Oversight and Regulation of Shadow Banking Entities*, August 2013.

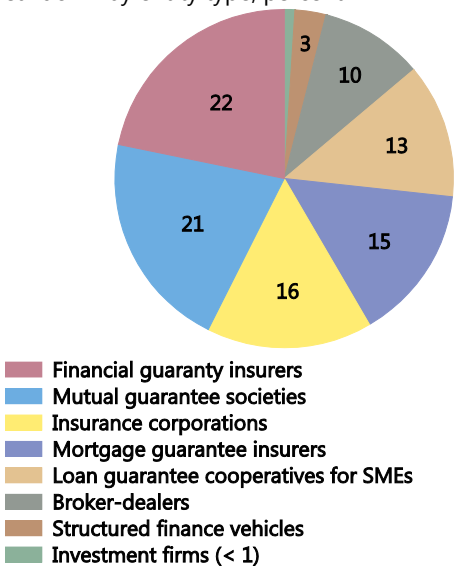
Economic Function 4 trends and composition

27 jurisdictions Exhibit 5-14

Financial assets level and growth[1]



Breakdown by entity type, percent



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Calculated based on historical series data included in jurisdictions' 2016 submissions. Increases in EF4 may also reflect improvements in the availability of data over time at the jurisdiction level. Net of prudential consolidation into banking groups.

Sources: National sector balance sheet and other data; FSB calculations.

5.4.2 Financial stability risks in Economic Function 4

Due to the small size of EF4, the relatively sparse risk data provided by jurisdictions[126] and the unique nature of EF4, it is difficult to infer broad conclusions about the risks posed by EF4 to the financial system.

5.5 Economic Function 5

The securitisation-based provision of funding to banks and/or non-bank financial entities, with or without the transfer of assets and risks from banks and/or non-bank financial entities, is usually an integral part of credit intermediation chains (or often the regular banking system). Both bank and non-bank financial intermediaries often use securitisation for funding purposes as well for improving their lending portfolios and capital management purposes. By facilitating the transfer of credit risk off-balance sheet, securitisation reduces funding costs for both bank and non-bank financial entities and facilitates the availability of credit to the real economy.

These beneficial effects could, however, also contribute to a build-up of excessive maturity/liquidity transformation, leverage, or regulatory arbitrage in the system, which becomes a greater risk in environments with relatively less stringent lending standards. The securitisation market is sensitive to sudden reductions in market liquidity, particularly in the case of complex securitisations or securitisations that lack transparency to investors.

[126] Only Chile, Ireland, Italy and Mexico provided risk data.

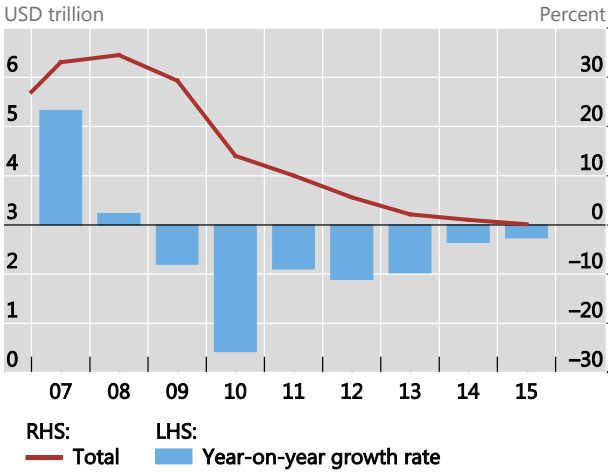
5.5.1 Trends in Economic Function 5

Securitisation-based credit intermediation and funding of financial entities continued to decline to $3.0 trillion at end-2015 for the 23 jurisdictions which classified entities into this economic function. This represents 9% of the total narrow measure of shadow banking, a 2.7% decrease relative to end-2014 based on constant exchange rates.

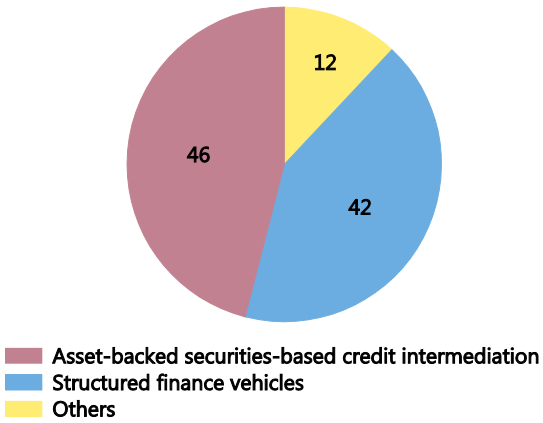
Economic Function 5 trends and composition

23 jurisdictions Exhibit 5-15

Financial assets level and growth[1]



Breakdown by entity type, percent[2]



[1] Exchange rate effects have been netted out by using a constant exchange rate (from 2015). Calculated based on historical data included in jurisdictions' 2016 submissions. Increases in EF5 may also reflect improvements in the availability of data over time at the jurisdiction level. Net of prudential consolidation into banking groups. [2] The classifications in this chart reflect labels provided by jurisdictions, with financial vehicle corporations, asset-backed commercial paper, mortgage REITs and funds, asset-backed short-term bonds, receivable investment funds, exchange-traded funds and others grouped into "Others". Mortgage REITs and funds are primarily classified in EF1, but jurisdictions may also classify mortgage REITs and funds into EF5 if they also meet the criteria for this economic function, in which case their value will be proportionately allocated between EF1 and EF5 (see Footnote 97).

Sources: National sector balance sheet and other data; FSB calculations.

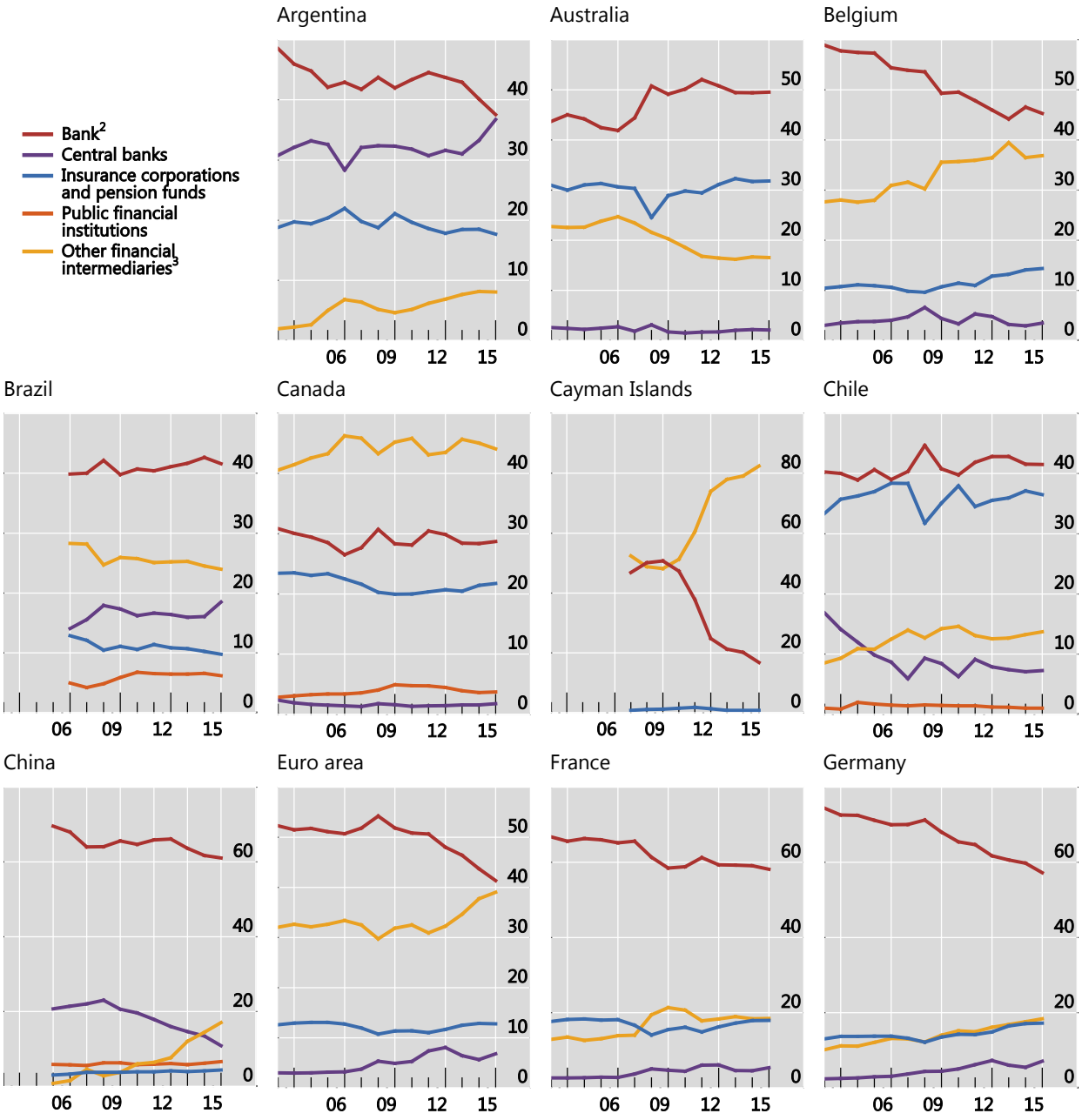
5.5.2 Financial stability risks in Economic Function 5

The EF5 risk metrics provided by jurisdictions suggest that the risk associated with credit intermediation is the largest risk faced by structured finance vehicles in the 10 jurisdictions for which CI1 and CI2 metrics could be calculated, although there was some variance across jurisdictions. For the two jurisdictions that provided the LT risk metric, its values also appeared to be quite elevated (with an average LT of 0.97).

Annex 1: Jurisdiction-specific summaries

Share of total national financial assets by jurisdiction

Percent[1] Exhibit A1-1



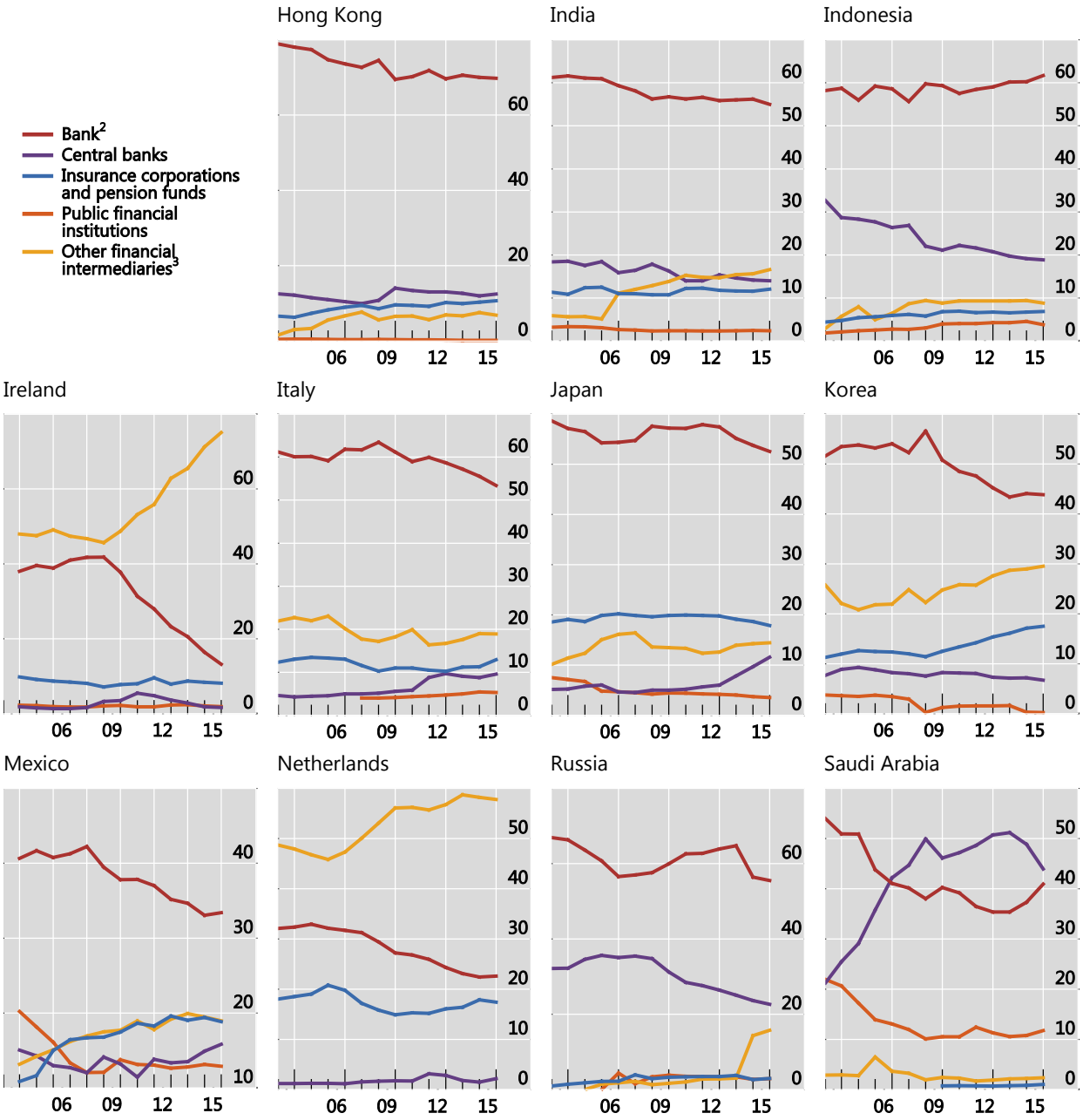
[1] Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [2] All deposit-taking corporations. [3] Also includes captive financial institutions and money lenders, and financial auxiliaries. Increases in the value of OFI assets may also reflect improvements in the availability of data for some OFI subsectors over time.

Sources: National sector balance sheet and other data; FSB calculations.

Share of total national financial assets by jurisdiction

Percent

Exhibit A1-1



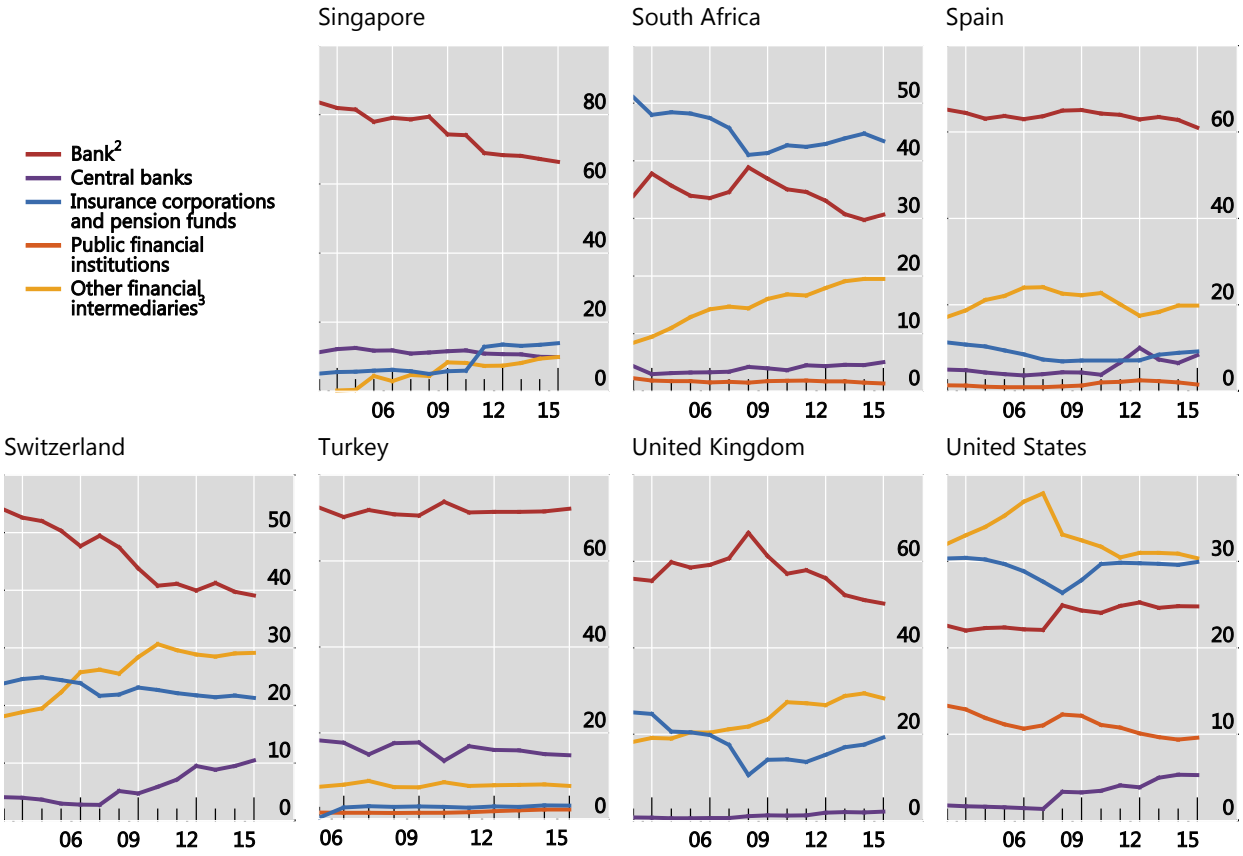
[1] Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [2] All deposit-taking corporations. [3] Also includes captive financial institutions and money lenders, and financial auxiliaries. Increases in the value of OFI assets may also reflect improvements in the availability of data for some OFI subsectors over time.

Sources: National sector balance sheet and other data; FSB calculations.

Share of total national financial assets by jurisdiction

Percent

Exhibit A1-1



[1] Based on historical data included in jurisdictions' 2016 submissions. Exchange rate effects have been netted out by using a constant exchange rate (from 2015). [2] All deposit-taking corporations. [3] Also includes captive financial institutions and money lenders, and financial auxiliaries. Increases in the value of OFI assets may also reflect improvements in the availability of data for some OFI subsectors over time.

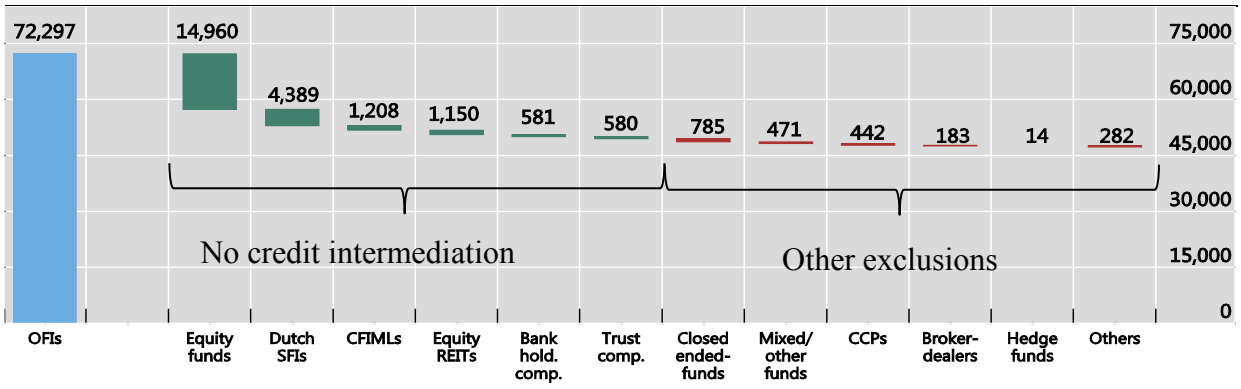
Sources: National sector balance sheet and other data; FSB calculations.

Annex 2: Exclusion of OFI entity types from the narrow measure of shadow banking

Through the narrowing down process, authorities collectively removed $25 trillion of OFI assets from the MUNFI measure by determining that entity types did not engage in credit intermediation or did not engage in activities as described by the five economic functions (see Section 4.2). This Annex seeks to provide a more detailed breakdown of what was removed and why it was considered not to be engaged in shadow banking activities.

Exclusion of OFI entity types from shadow banking

USD billion, for 27 jurisdictions, 2015 Exhibit A2-1



OFIs also includes CFIMLs; SFI = special financial institutions; CFIMLs = captive financial institutions and money lenders; REITs = real estate investment trusts and RE funds; Bank hold. comp. = bank holding companies; Trusts = trust companies; CCPs = central counterparties.

Sources: National sector balance sheet and other data; FSB calculations.

- **Equity funds** that invest principally in equity securities are therefore not involved in credit intermediation. To ensure sufficient liquidity in their portfolios to meet redemptions, equity funds often hold a modest amount of cash and highly liquid fixed income assets for cash management purposes. Thus equity funds that hold no more than 20% of their AUM in fixed income assets have been assessed as outside of shadow banking. ETFs referencing equity indices are not engaged in credit intermediation and have not been considered as shadow banking.
- **Dutch special financial institutions (SFIs)** are subsidiaries of foreign multinationals which are used almost exclusively for the pass-through of capital. They are not considered to be involved in shadow banking because such entities either do not perform credit intermediation or are prudentially consolidated into parent financial institutions.
- **Captive financial institutions and money lenders (CFIMLs)** include captive financial institutions in Belgium, France, Germany, Korea and Spain, as well as Irish non-securitisation structured finance vehicles. These entities are not considered to be involved in shadow banking as they are either linked to non-financial corporations (i.e. used almost exclusively for the pass-through of capital) or consolidated into banks.
- **REITs (or equity REITs)** and other real estate funds that invest into equities or directly into properties (i.e. no credit intermediation) have been assessed as not shadow banking.

- **Bank holding companies**. Although UK bank holding companies are included in the UK's OFI statistics, they are a part of prudentially regulated banking entities and hence are not classified into shadow banking.
- **Trust companies** in Singapore and South Africa provide a range of administrative and advisory services to individual clients. As these are not CIVs they were not classified into EF1. Mexican Capital Development Certificates were also excluded from the narrow measure of shadow banking, as these are equity trusts. Korean trust accounts are separately managed accounts (i.e. not CIVs), and hence are also excluded from EF1.
- **Closed-ended funds** with limited maturity and liquidity transformation, and which are not leveraged are not considered as susceptible to runs in the same way as open-ended funds, and have been assessed as outside of shadow banking. For example, in Brazil, a portion of investment funds (including referenced investment funds, fixed income funds and multimarket investment funds) are closed-ended funds with negligible leverage or are exclusive investment funds (i.e. conceptually similar to a single fund), and hence have not been classified into the narrow measure of shadow banking.
- **Mixed/other funds**. Authorities have determined that a portion of mixed and/or other funds in Canada, Hong Kong, India, Indonesia, Ireland, and Korea either do not engage in material credit intermediation, or present only negligible liquidity and maturity transformation risks with immaterial leverage, or are exclusive investment funds. For example, Discretionary Funds (Kontrak Pengelolaan Dana) in Indonesia have been assessed not to be CIVs as the investments are made on behalf of individuals and not funds. Similarly, precious metal funds (e.g. in Turkey) have not been considered to be involved in shadow banking.
- **CCPs** were generally excluded from the narrow measure of shadow banking due to the absence of credit intermediation. With both sides of the balance sheet typically matched, CCPs are not engaged in bank-like activities such as leverage or liquidity/maturity transformation. However, they take on counterparty risk and their collateral policies may involve elements of liquidity and maturity transformation.
- **Broker-dealers**. Certain types of broker-dealers in some jurisdictions (Belgium, Hong Kong, Ireland, and the Netherlands) were classified outside of shadow banking as these entities were not engaged in credit intermediation (i.e. they acted as "pure" brokers/agents for clients). Broker-dealers in these jurisdictions that were seen to be involved in credit intermediation were classified into EF3.
- **Hedge funds** in Canada, India and Ireland that largely do not engage in credit intermediation are classified outside of shadow banking. These funds may engage in equity or derivatives strategies, though do not provide credit directly to the economy.
- **Others** is comprised of relatively small OFI entity types, including venture capital entities that are not or only marginally engaged in credit intermediation (Indonesia, Spain and Turkey), government-guaranteed mortgage-backed securities (Korea), and some jurisdiction-specific entity types, such as for example self-help groups in India, catastrophe bonds in the Cayman Islands, central mortgage bond institutions in Switzerland, non-deposit-taking development banks in Turkey, and an asset management company in Spain.

Annex 3: Property funds in the UK[127]

Introduction

The experience of UK property funds in the period following the EU referendum (on 23 June 2016) provides valuable insights into how certain non-bank financial entities responded to a period of market stress, and the processes employed by funds holding illiquid assets during the period of stress. This particular period of stress, however, was not a wide-spread credit event, but primarily a UK-specific event causing a re-assessment of future property prices. The event (i.e. referendum) was also predetermined and thus, allowed market participants to prepare for any consequences from the event.

Existing tools to meet redemption pressures, such as the ability to suspend redemptions, helped avoid an escalation of the market shock. Funds were not forced to conduct wide-spread fire sales, which in turn helped avoid the materialisation of other systemic risks. This experience nonetheless highlighted some potential concerns regarding the appropriateness of funds offering daily redemptions while investing in illiquid assets, which the Financial Conduct Authority (FCA) is currently investigating.[128]

Size and structure of the UK Property Investment Market

The total UK property market is worth around £6,246 billion,[129] comprising:

- Residential property, which accounts for around 85% of the market (£5,375 billion) and is 80% owner-occupied (by property value); and
- Commercial property, which represents the remaining 15% of the market (£871 billion), of which around 55% is considered "investable".

Property funds in the UK can invest directly in property and/or property-related securities and can be structured as either open- or closed-ended investment vehicles.[130] The 2016 episode focused primarily on open-ended property funds which, as of June 2016 had invested approximately £35 billion in commercial real estate (CRE), or around 7% of total investments in the UK CRE market.[131] Fifteen of these open-ended funds were UK property funds authorised by the FCA that offer daily redemptions to their investors. The total assets of these 15 open-ended property funds amounted to £24 billion in June 2016, i.e. around 5% of total investments in the UK CRE.

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[127] This case study has been contributed by the UK's Financial Conduct Authority (FCA).

[128] The FCA published a discussion paper and for public consultation in February 2017, see FCA, *Illiquid Assets and Open-ended Investment Funds*, February 2017.

[129] Data taken from Investment Property Forum, *The Size and Structure of the UK Property Market: End 2015 Update*, July 2016.

[130] Property funds in other jurisdictions are under different regulatory regimes and thus may have different features and risks compared to UK property funds.

[131] Bank of England, *Financial Stability Report*, July 2016.

Property funds and the UK's EU referendum vote

Pre-referendum impact

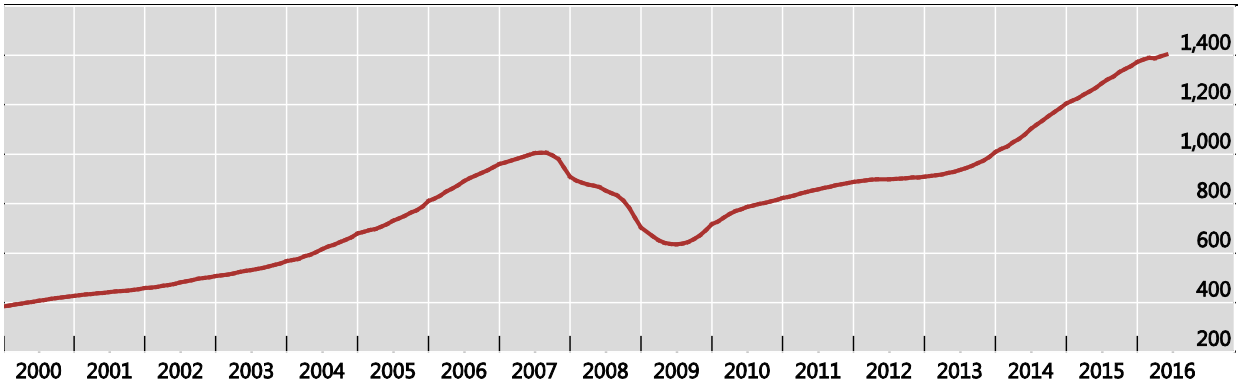
In the run-up to the UK's EU referendum on 23 June 2016, investors began to withdraw from UK property funds amid concerns over weakening property markets.

These concerns about expected future returns from UK property markets arose not only from uncertainty related to the referendum, but also from high market prices and low yields following several years of strong performance since the 2007-09 financial crisis (Exhibit A3-1).

IPD UK Property Index

GBP

Exhibit A3-1



Source: Thomson Reuters Datastream.

Before the referendum, the five largest property funds offering daily redemptions had total assets of £15.5 billion or nearly two thirds of the total assets held by such funds. Expecting continued net redemptions by investors, three of these five funds moved to price on a "bid basis" in May (i.e. redeeming investors would receive the proceeds from selling the underlying assets less any related costs). In the week leading up to the referendum, these funds also held increasing amounts of cash to meet redemptions, with three funds holding over 15% of their assets in cash.

Post-referendum impact

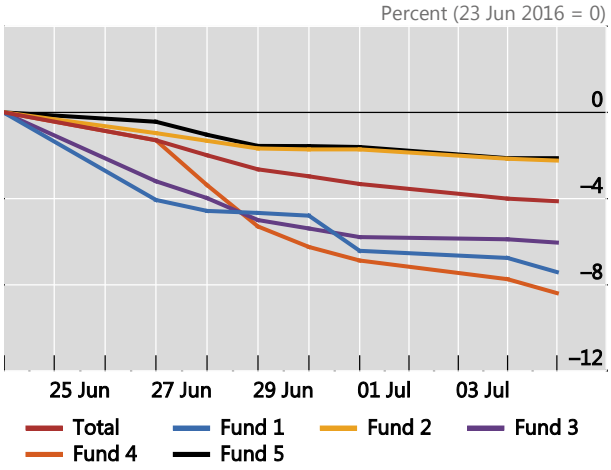
(i) Liquidity management

The "Leave" outcome prompted investors to request redemptions from UK property funds. Overall, the 15 property funds offering daily redemptions experienced cumulative redemptions of 4.1% of the NAV in the eight dealing days following the referendum (Exhibit A3-2, left panel).

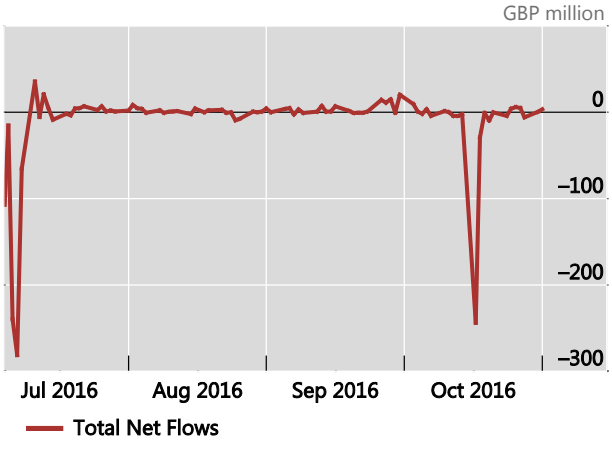
UK property funds

Exhibit A3-2

Cumulative flows as % NAV of UK property funds that suspended and sector total



Total net flows of daily redemption property funds (not suspended)



Source: UK FCA.

Several funds experienced more significant redemptions, with one fund seeing redemptions amounting to around 8% of NAV. On the ninth dealing day following the referendum, three funds suspended redemptions and three others followed soon after.

While suspended, the funds sold properties in order to establish cash positions of 15-20% of NAV to meet future redemptions, and these levels of cash were maintained following re-opening. These funds have indicated that the property disposals to establish cash positions following the referendum were transacted at modest discounts in the 2-3% range (i.e. fire sales were avoided). It is noteworthy that four of the six funds that suspended redemptions had experienced heavier redemptions than other funds in the sector. The other two funds to suspend had relatively low redemptions, indicating that other factors contributed to their decisions to suspend.

After having suspended redemptions for four dealing days, one of these funds re-opened redemptions but at a diluted price that reflected the current market environment and the fact that short-term sales in the property market had relatively penal consequences. A second fund lifted its suspension on 26 September, two more followed in mid-October and another on 4 November. The last fund re-opened on 15 December 2016.

The remaining nine funds have continued to deal on a daily basis throughout the period following the referendum.

(ii) Property valuations

Following the referendum, the UK property fund sector faced the challenge of valuing their property fund portfolios in a period of considerable uncertainty for UK property prices. Independent valuers attached "uncertainty clauses" to property portfolio valuations and Fair Value Adjustments (FVAs) were made by the majority of funds. Ten of the 15 daily redemption funds made FVAs ranging from 4% to 15% to property portfolios (three of which also suspended redemptions). By September 2016, post-referendum transaction data was providing additional visibility to UK commercial property prices. At this point, valuers dropped their

uncertainty clauses and funds began to remove FVAs (with all FVAs removed by the end of October).

(iii) Unit-linked funds

Unit-linked life insurance funds[132] investing in UK property were also impacted by the referendum; in part because many of these funds invested in open-ended funds to gain exposure to the asset class. On 19 August 2016, 72 unit-linked funds with a total AUM of £3.8 billion were in deferral. Of these, 59 (with total AUM of £2 billion) invested in the open-ended property funds that suspended redemptions.

While the difficulties encountered by UK property funds had an impact on some unit-linked life insurance funds, there was no observed contagion to other asset classes. It appears that the impact from redemptions on property funds offering daily redemptions was well-contained through existing tools to manage redemptions during periods of stress.

Key observations

The FCA's monitoring of property funds offering daily redemptions that remained open indicates that, in general, net flows stabilised and remained close to zero after mid-July 2016 (Exhibit A3-2, right panel). In mid-October 2016, there was another downward spike in net flows reflecting a backlog of redemption orders in a fund which re-opened following suspension. Overall it appears that there was limited impact on fund flows at funds that remained open following the suspension of other funds in the sector.

The UK's commercial property market may have been resilient to the referendum outcome in part due to the impact of changing ownership and reduced debt financing in this market. Exposure of banks to commercial real estate fell from more than £250 billion in 2008 to around £170 billion in 2015.[133] Authorised funds have only very limited short-term borrowing powers, which further dampens any potential amplification of risks.

The FCA is currently investigating the appropriateness of funds offering daily redemptions while investing in illiquid assets, as well as the recent behaviour of property funds and their investors.[134] If policy changes are required, a wide range of solutions would need to be carefully considered. Supervisory interventions are also being considered to better understand firm preparedness for the recent events and whether lessons can be learned for the future. If changes to the regulatory framework are considered, it is particularly important that regulators do not inadvertently create systemic risks in the transition phase (or new or amplified risks later on). The FCA published a discussion paper in 2017 assessing the appropriateness of the rules applied to illiquid assets held in open-ended collective investment schemes, which includes a case study on the experience of UK property funds following the EU referendum.

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[132] A unit linked life insurance product is a long-term insurance contract between a policyholder and an insurance company.

[133] De Montfort University, *The Commercial Property Lending Market Research Report - Year End 2015*, 2016.

[134] See Footnote 128.

Annex 4: Innovations to the measurement of the OFI residual in the UK and in Ireland[135]

Introduction

The FSB's monitoring exercise has revealed data gaps in the measurement of the non-bank financial sectors across participating jurisdictions. This Annex explores two alternative, though complementary, methods employed by the Bank of England (BoE) and Central Bank of Ireland (CBI), respectively, to measure the non-bank financial sector and reduce the difference between the total assets of the non-bank financial sector, as measured in by sector balance sheet statistics, and all known non-bank financial subsectors therein (i.e. the financial sector residual, which is normally classified as a residual within OFIs). While, in theory, this residual should be zero, in practice, it is often quite large. This may be the consequence of imperfect "top-down" sector balance sheet statistics, "bottom-up" coverage of the financial subsectors, or some combination of the two.

For example, total financial assets are typically an aggregate number from a jurisdiction's sector balance sheet statistics, often based on survey data that must be adjusted through statistical techniques to estimate the population and balance this estimate with other parts of the national accounts. Meanwhile, sector balance sheet statistics often lack the granularity required to break down these assets into a complete set of financial subsectors, so many jurisdictions have used a variety of non-national accounts sources to estimate these sectors. This combination of data sources rarely sum to the financial accounts total.

This Annex aims to provide a framework for authorities to deliver short- to medium-term improvements in measuring the non-bank financial sector, while embarking on a longer-term strategy to implement granular balance sheet reporting, as far as possible, for each non-bank financial entity.

The BoE strategy to measure the UK residual

Sector balance sheet statistics were used to estimate the total size of the UK's financial sector for the 2016 exercise. However, UK's sector balance sheet statistics currently do not provide a very granular breakdown of the OFI category. To break down the OFIs into non-bank financial sectors, the BoE collected data from a variety of public and private sources, including data providers and industry associations. The resulting estimates of the non-bank financial sectors, however, did not sum up to the aggregate OFI assets number, leaving a "residual" of unexplained assets.

To address this issue in the coming years, the BoE is working with the Office for National Statistics (ONS) to improve the granularity of the national accounts data.[136] In the meantime, however, the BoE is developing another method to improve its measurement of the OFI sector.

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[135] This Annex was contributed by Rajveer Berar (BoE), James Howat (BoE), Brian Golden (CBI), and Eduardo Maqui (CBI) for the FSB annual monitoring exercise. The views expressed here are those of the authors and do not necessarily reflect the assessment of the BoE, CBI or FSB. This work is based on preliminary analysis and, as such, the conclusions drawn from this analysis may evolve as further work is carried out. The authors would like to thank Niki Anderson, Stephen Burgess, Mark Cassidy, Gerry Cross, Rosie Foster, Joe McNeill, Martin Moloney, Cian Murphy and Gareth Murphy for their helpful comments.

[136] For further details on the ONS' Enhanced Financial Accounts project, see ONS, *Economic Statistics Transformation Programme: Developing the Enhanced Financial Accounts (UK Flow of Funds)*, July 2016.

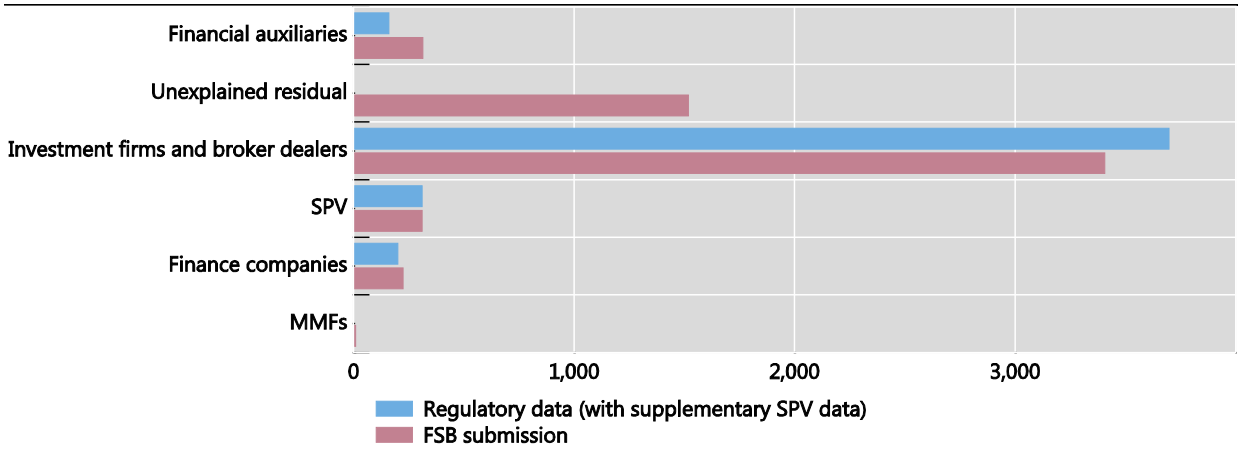
This alternative method adopts a "bottom-up" approach to mapping the non-bank financial sector. Using regulatory and company accounts data, it re-constructs the whole universe of financial entities authorised to operate in the UK. Based on primary activity classifications decided by the FCA at the point of authorisation, firms are assigned to the entity types defined in the FSB's reporting templates. In the event of data gaps or where firms are not regulated by UK authorities, company accounts and industry associations' data are used to supplement the regulatory data, where possible.

This new comprehensive approach improves on the current sector balance sheet estimate of OFI assets because it aims to capture the whole population of financial entities, rather than relying on sample data. It also avoids the application of balancing adjustments to the sector's balance sheet, which are used in the sector balance sheet estimate in order to ensure the overall consistency of the national accounts, but may distort the estimate of specific sectors. In the case of the OFI sector, these can be quite large.

Although at a preliminary stage, this alternative approach could potentially allow the UK reduce its OFI residual in submissions future monitoring exercises. Broadly speaking, this method produces a similar estimate of the OFI subsectors as that calculated for the monitoring exercise (see Exhibit A4-1). Given that this approach yields a similar estimate of the known OFI subsectors and, in theory, captures the whole universe of financial firms registered in the UK, it suggests that much of the OFI residual is due to balancing items and sampling adjustments. But in order to conclude that the OFI residual is a statistical anomaly, further work is required to ensure that the new approach accurately captures, amongst other things, passported financial services and AUM for investment firms.

UK OFI sector balance sheet: a comparison of the sector balance sheet statistics and new methods

GBP billion, end-2014 Exhibit A4-1



Data are provisional estimates.

Sources: ONS, FCA, AFME, Morningstar, Investment Property Forum, Firm Financial Statements, BoE and BoE calculations.

Over the coming years, the BoE expects to reduce the UK's OFI residual, by either increasing the size of known OFI assets, or indicating that the estimate of the total size of the OFI sector should be reduced because it is inflated by statistical anomalies. In any case, the new method outlined above is an invaluable additional tool to estimating the size of the OFI sector. This

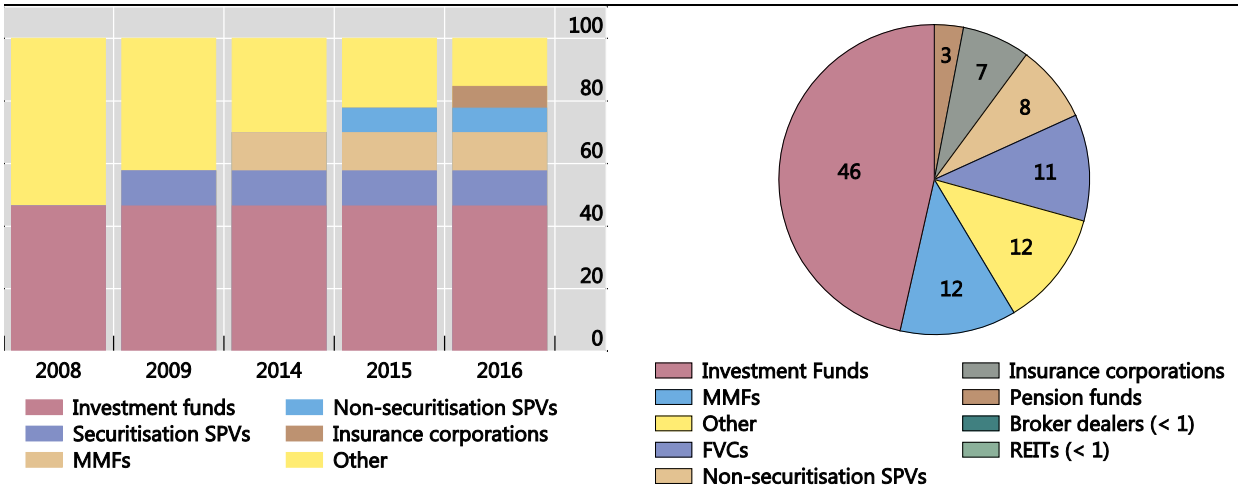
work will contribute to the ONS' ongoing Enhanced Financial Accounts project and it will also benefit future FSB monitoring exercises.

The CBI strategy to measure Ireland's residual

The CBI's data strategy for the non-bank financial sector is to phase-in extended coverage and granularity. Within the non-bank financial sector, the aggregate OFI sector is based on published national accounts data, which includes a significant residual element, for which limited data are available. In this area, the CBI's approach has focussed on clearly defining a particular population, such as investment funds, and applying comprehensive, granular reporting requirements. By mid-2016, granular reporting requirements covered 84% of the Irish non-bank financial sector from 46% in 2008 (Exhibit A4-2, left panel). The "other" sector remains substantial, even accounting for sectors reported at a non-granular level (Exhibit A4-2, right panel).

Percent granular data coverage and sectoral breakdown of Irish non-bank sector

Rebased to Q4 2015 Exhibit A4-2



Source: Central Bank of Ireland.

The extension of reporting requirements to non-securitisation vehicles allowed for a more refined measure of shadow banking, with financial assets of €152 billion included in shadow banking at end-2015.[137] In calculating the size of Ireland's OFI subsectors, non-securitisation special purpose vehicles (SPVs) are included where they are part of a credit intermediation chain, as they are not themselves currently classified as financial intermediaries (and excluded if the balance sheet contains no credit instruments or they are consolidated into a bank or linked to a non-financial corporation). This reporting extension provides some specific insights:

(i) Closer measurement can lead to significant revisions to previous estimates of OFI subsectors, which affect the residual itself. For example, of the €324 billion in total assets covering 822 non-securitisation SPVs in Ireland at end-2015, €303 billion were

[137] See Barrett, D., Golden B. and Maqui E, *New Data Collection on SPVs in Ireland: Findings and Implications for the Measurement of Shadow Banking*, March 2017.

previously classified in the "other" sector.[138] The "other" sector, however, only marginally declined from €498 billion at end-2014 (including non-securitisation SPVs) to €471 billion at end-2015 (excluding non-securitisation SPVs). This was due to ongoing strong growth in the other sector in 2015 and substantial revisions to the 2014 figure driven by the previous underestimation of the new reporting population.

(ii) Non-securitisation SPVs are classified as non-financial intermediaries although securitisation SPVs are considered financial intermediaries in the European System of Accounts (2010). The dividing line for where financial intermediation ceases is not clear-cut, particularly given the diversity of the population. Irish non-securitisation SPVs undertake 14 different types of activity and are linked to a wide range of sponsors covering almost every institutional sector. "Credit intermediation" is a key part of the FSB's definition of shadow banking and most Irish non-securitisation SPVs contain credit assets.

(iii) Just over half of the total assets of non-securitisation SPVs are consolidated into another entity. However, as the data feeding into the FSB monitoring exercise are on a non-consolidated basis, risks could be overestimated (i.e. to the extent that this is seen as double counting). Furthermore, risks may ultimately reside in other sectors and jurisdictions.

(iv) There is no clear definition of a non-securitisation SPV. A pragmatic approach was undertaken to define these SPVs, confining the reporting population to vehicles availing of particular tax provisions.

The CBI's phased strategy would be more challenging to apply to the remaining "other" entities, given difficulties in defining these entity types. Nevertheless, the strategy has delivered rich datasets that improved the granularity of OFIs, the derivation of the narrow measure of shadow banking, and the isolation of risks. The CBI is working with the Central Statistics Office and intends to employ a comprehensive register of all financial entities, similar to the BoE's approach.

Conclusion

The BoE's and the CBI's strategies provide additional insight into the measurement of non-bank financial sectors and the narrow measure of shadow banking. They both conclude that national accounts data, as currently constructed, may not accurately capture the size of non-bank financial entities that are involved in shadow banking.

Classifying financial entities to shadow banking is a more realistic short-to-medium approach, with extending granular data reporting to entities is a longer-term objective. Granular data, if available, also facilitates the identification of interconnectedness and risk. Information on the consolidation or sponsorship of non-bank financial entities can help to define the extent of shadow banking risks and hence, benefit future FSB monitoring exercises.

[138] Operational leasing vehicles accounted for assets totalling €20 billion, which are classified as non-financial corporations.

Annex 5: Liquidity in Irish MMFs and government bond funds[139]

Introduction

The FSB's two-step monitoring approach asks authorities to assess non-bank financial entities' involvement in financial stability risks from shadow banking, such as liquidity transformation. For collective investment vehicles (CIVs), assessment of their portfolio liquidity and redemption terms is important in understanding their involvement in liquidity transformation or susceptibility to runs. In this regard, a number of authorities have been working on methods for assessing such risks in CIVs, including the European Systemic Risk Board (ESRB),[140] the IMF[141] and the BoE.[142] A key element of any such exercise is to assess the liquidity of funds' portfolios. This Annex intends to contribute to such work by providing a comparative analysis of portfolio liquidity (or liquid asset holdings) in Irish authorised MMFs and government bond funds using the High Quality Liquid Asset (HQLA)-type classification methodology adapted from the Basel III liquidity framework (to be explained later).

Portfolio liquidity of Irish authorised MMFs and government bond funds

The CBI collects security-by-security holdings data from all Irish authorised investment funds on a quarterly basis and from MMFs on a monthly basis, and combines this with data obtained from the Centralised Securities Database (CSDB) maintained by the ECB. This data allows the CBI to build point-in–time, security-by-security balance sheets to analyse the liquidity of assets held by investment funds and MMFs.

Irish authorised funds are also required to report an annual sub-fund profile, which includes, amongst other information, details related to a fund's investment strategy. Based on this information, three categories of government bond funds have been identified: (i) emerging market government bond funds, (ii) non-emerging market government bond funds, and (iii) non-emerging market government bond funds with a currency-specific investment focus. At the end of June 2016, MMFs held €464.6 billion in AUM, while emerging market government bond funds held €8.4 billion, non-emerging market government bond funds held €46.3 billion and currency-specific government bond funds held €23.5 billion. As Exhibit A5-1 (left panel) portrays, currency-specific and general non-emerging market government bond funds have the highest levels of liquid assets, followed by MMFs and emerging market funds. The results for currency-specific funds are driven by the fact that they are predominantly focussed on USD, GBP and EUR government debt securities.

Using the reported balance sheet and investment strategy data, a simple portfolio liquidity proxy is calculated for open-ended MMFs and government bond funds which allow daily redemptions of fund shares, based on certain types of securities held as well as their credit quality and

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[139] This case study was contributed by Naoise Metadjer (CBI) for the FSB annual monitoring exercise. The views expressed here are those of the author and do not necessary reflect the assessment of the CBI or FSB. This case study is based on preliminary analysis and, as such, the conclusions drawn from this analysis may evolve as further work is carried out. The author would like to thank Brian Golden, Mark Cassidy, Gerry Cross, Eduardo Maqui, Joe McNeill, Kitty Moloney, Martin Moloney, Cian Murphy, Gareth Murphy, Iulian Obreja, Evin O'Reilly and Katrina Wilson for their helpful comments.

[140] ESRB, *Macroprudential Policy Beyond Banking: An ESRB Strategy Paper*, July 2016.

[141] IMF, *Global Financial Stability Report*, April 2015.

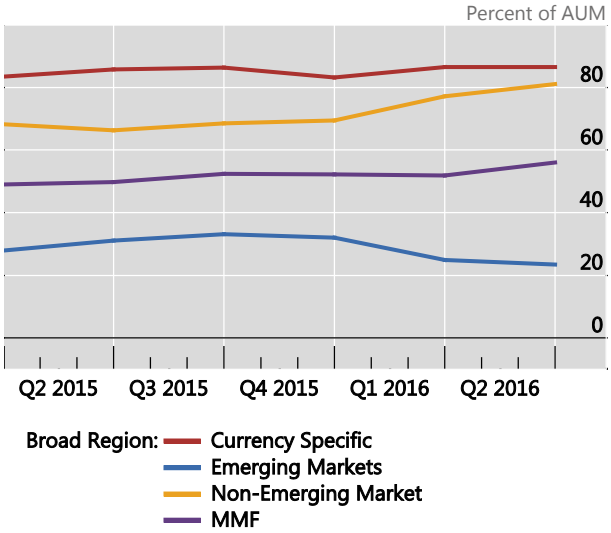
[142] Bank of England, *Financial Stability Report*, December 2015.

residual maturity. This HQLA-type classification methodology is adapted from the Basel III Liquidity Coverage Ratio (LCR).[143] In this methodology, haircuts are applied to assets to protect against potential adverse price movements in stressed market conditions. These haircuts were empirically assessed by the European Banking Authority (EBA).[144] Although assessed for a different purpose, this assessment provides a reasonable level of assurance with regard to all but the most exceptional potential changes in liquidity. However, since these haircuts may not be sufficient in all potential stress scenarios, the calculated liquidity measure should be seen as merely a proxy for the liquidity of a fund's portfolio.[145]

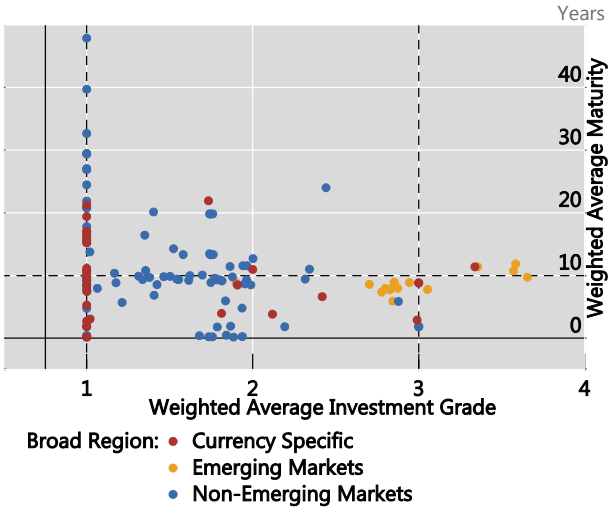
Irish MMFs and government bond funds

Exhibit A5-1

Weighted average HQLA for MMFs and government bond funds



Government bond fund weighted average maturity and investment grade



Right-hand panel: end Q2 2016, calculated using portfolio weights for funds with greater than 70% of AUM reporting credit ratings. Each point represents a fund. Investment grade of 1, 2, 3 and 4 represents prime, upper medium, lower medium and non-investment grade respectively. The vertical line represents a portfolio weighted average investment grade of lower medium and the horizontal line represents a portfolio weighted average maturity of 10 years.

Sources: CBI statistical and regulatory funds data and CBI calculations.

[143] BCBS, *Basel III: The Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools*, January 2013. Under this methodology, level 2 liquid assets can only comprise 40% of total HQLA. In the measure presented below no such restriction is applied.

[144] EBA, *Report on Appropriate Uniform Definitions of Extremely High Quality Liquid Assets and High Quality Liquid Assets and on Operational Requirements for Liquid Assets under Article 509(3) and (5) CRR*, December 2013.

[145] *Level 1 – 0% haircut*: Cash and cash equivalents, debt securities maturing within the stress period and debt securities issued or guaranteed by sovereigns, central banks, the BIS, the IMF, multilateral development banks and the European Community with a credit rating of at least AA-.

Level 2a – 15% haircut: Debt securities issued by or guaranteed by sovereigns, central banks, the BIS, the IMF, multilateral development banks and the European Community with a credit rating between A+ and A- and corporate debt securities not issued by financial institutions. Includes commercial paper and covered bonds with credit rating of at least AA-.

Level 2b – 50% haircut: Corporate debt securities not issued by financial institutions. Includes commercial paper and covered bonds with credit rating between A+ and BBB- and common equity shares in advanced economies that are not issued by financial institutions.

Comparing the weighted average residual maturity to the weighted average investment grade of their debt portfolios provides further insights into the liquidity of government bond funds, as illustrated in Exhibit A5-1 (right panel). The results of this comparison highlight that currency-specific and general non-emerging market government bond funds are predominantly invested in highly rated debt securities. The analysis also shows that, where longer-term positions are held, the credit quality of the portfolio is generally in the prime to upper-medium investment grade category.[146] MMFs are excluded from the analysis due to the high credit quality and low weighted average maturity of their portfolio, which is constrained under Undertakings for the Collective Investment in Transferrable Securities (UCITS) regulations.[147]

Conclusion

The analysis presented above uses residual maturity, credit ratings and security type as proxies for liquidity. This approach provides us with a relatively simple method for assessing portfolio liquidity and observing aggregate trends over time. However, in-depth security liquidity analysis based on market depth and transaction volume may be required for more advanced CIV portfolio liquidity assessment methods, such as liquidity stress testing and scenario analysis.

[146] With credit ratings that range between, for instance, Aaa to A on Moody's credit rating scale. See Moody's, *Rating Symbols and Definitions*, December 2016.

[147] Directive 2009/65/EC of the European Parliament and of the Council of 13 July 2009 states that MMF investments must be of high credit quality and a MMF's portfolio must have a weighted average maturity of no more than six months.

Annex 6: Lending-based crowdfunding in the euro area: credit provision outside of the banking sector[148]

Introduction

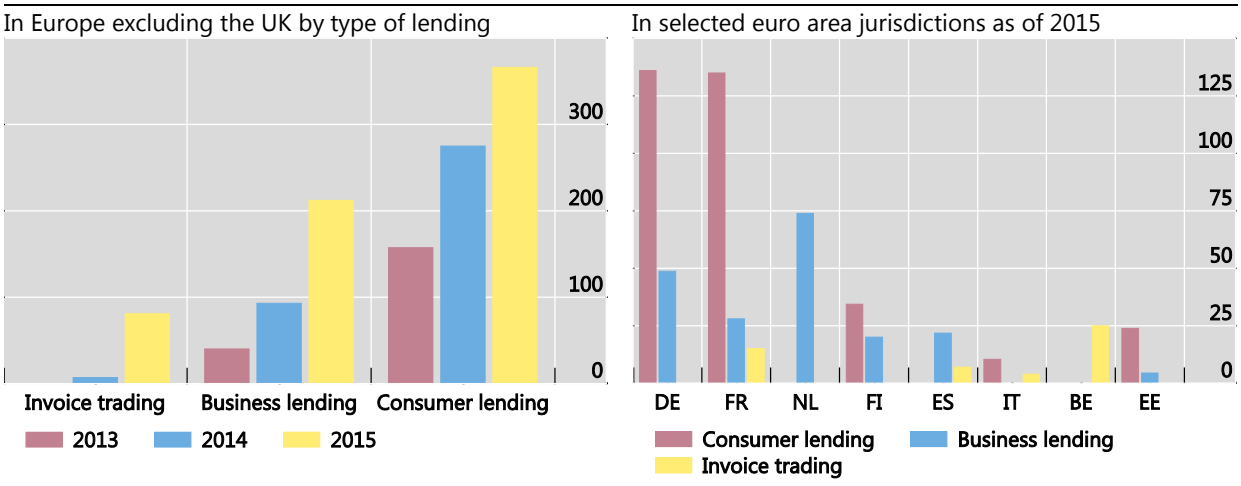
The market for technology-enabled financing has been expanding rapidly in recent years, in particular for lending-based crowdfunding,[149] which is a means for raising debt-funding from investors via an internet-based platform. The low operational costs of crowdfunding platforms benefit both borrowers and investors. However, since the business models of some of these platforms include the provision of loans or engagement in credit facilitation outside the regulated banking sector, these activities should be carefully monitored from a financial stability perspective, including their involvement in shadow banking.

In the EU, the volume of lending raised through these crowdfunding platforms has on average increased by 60% every year since 2013 with nearly €12 billion lent between 2013 and 2016, with the market much larger in the UK compared to the euro area.[150] More than 50 crowdfunding platforms remaining active have been launched each year since 2013. However, while many new platforms still enter the market and growth has been exceptional, the pace of expansion has slowed somewhat in 2016.

Amounts raised by lending-based crowdfunding platforms per year

EUR million

Exhibit A6-1



Source: Cambridge Centre for Alternative Finance.

Lending-based crowdfunding by market segment

The largest crowdfunding market segment in the euro area is the peer-to-peer consumer lending (see Exhibit A6-1, left panel), which involves lending-based crowdfunding platform that help

[148] This case study has been contributed by Christian Weistroffer and Lieven Hermans from the European Central Bank for the FSB annual monitoring exercise. The views expressed here are those of the authors and do not necessarily reflect the assessment of the ECB or FSB.

[149] The term "lending-based crowd funding" is often used interchangeably with "peer-to-peer (P2P) lending", "online marketplace lending", "crowd-ending" and "loan-based crowdfunding".

[150] Based on data estimates provided by Crowdsurfer Ltd.

consumers acquire mostly unsecured personal loans in amounts ranging from several hundred to tenths of thousand euros. To provide these loans, the crowdfunding platform aggregates small amounts dedicated by individual lenders, with the loans granted when funding commitments have reached a targeted amount. However, while peer-to-peer consumer lending remains the largest market segment, the small and medium-sized business finance segment is relevant and quickly expanding. In this segment, small and medium-sized enterprises obtain loans ranging in value from several thousand to more than a million euros. A smaller but growing segment of the market facilitates invoice financing (the sale of accounts receivables by a company for short-term funding) or factoring, which is often used to improve a company's working capital position or for general liquidity management purposes.

Lending-based crowdfunding by jurisdiction

In the euro area, Germany, France and the Netherlands are the largest and the most rapidly developing markets. In these jurisdictions, the amounts raised by lending based crowdfunding platforms have more than doubled each year between 2013 and 2015. Some northern European jurisdictions, such as Estonia and Finland have sizable and fast-developing markets too. Lending-based crowdfunding in Spain and Italy is also fast-growing, yet markets remain smaller compared to the domestic financial sector. Outside the euro area, the UK is to date by far the largest market for lending-based crowdfunding in the EU, both in terms of funds raised and the number of active platforms. Total amount raised by lending-based crowdfunding in the UK were about eight times larger than the figures reported for Europe excluding the UK.

There is some heterogeneity not only in the size of markets but also as regards predominance of business models across euro area jurisdictions.[151] Peer-to-peer consumer lending is particularly strong in France and Germany, as well as in the Nordic jurisdictions, while peer-to-peer business lending is much more developed in the Netherlands (see Exhibit A6-1, right panel). The issuance of debt-like securities through crowdfunding companies has evolved mainly in the Netherlands, while this business model is much less used in other euro area jurisdictions. Finland is the third largest market for peer-to-peer consumer lending and Belgium is the largest market for invoice trading, despite the comparably small domestic economies of these latter jurisdictions.

Market developments

Relatively low barriers to market entry help make the lending-based crowdfunding sector very dynamic. To enter the market, platforms employ various strategies, ranging from servicing a slice of the credit market neglected by banks to competing directly with incumbent banks. To compete with such banks, these platforms can leverage on their lower back- and front-end costs and, in some cases, by attending to under-serviced consumer or small-business finance segments (e.g. by servicing higher-risk clients or providing smaller-sized loans).[152]

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[151] Cambridge Centre for Alternative Finance, *Sustaining Momentum: The 2nd European Alternative Finance Industry Report*, September 2016.

[152] See de Roure, C., Pelizzon, L., and Tasca, P., *How Does P2P Lending Fit into the Consumer Credit Market?*, 2016. Using data from a German consumer loan platform, the authors suggest that funding goes to borrowers which would not have easily obtained credit through a bank.

Crowdfunding platforms sometimes also work with incumbent firms, for example by partnering with banks and asset managers to offer alternative investment products to investors.

Potential financial stability risks

While lending-based crowdfunding platforms employ different business models across markets and European jurisdictions, they typically do not take on significant risks. Maturity mismatches are limited as loan and funding provisions are generally matched,[153] while credit risks are passed on to lenders in client segregated-accounts.[154] The arrangement of funding and provision of loans may or may not involve other financial intermediaries including credit institutions. However, crowdfunding platforms do not necessarily intermediate credit on their own balance sheets: their role is usually limited to screening borrowers, as well as arranging loan and funding contracts. Where on-balance sheet credit intermediation is possible, credit risks are passed-on to funders. Finally, some business models offer protection against credit risk, for example through guarantees or insurance, thereby facilitating credit intermediation.

Despite its rapid growth, the scale of crowdfunding remains too small in the euro area to be a risk for financial stability. Further, while crowdfunding platforms provide some bank-like services, most do not carry on-balance sheet risks, and spill-over risks to banks or the broader financial system are limited as direct exposures to the crowdfunding sector are very small in most jurisdictions. Yet some risks may become relevant if the sector's growth continues.

Such risks may potentially arise from the activities these platforms perform, notably from the screening of borrowers and matching of supply and demand in funding markets. For example, the "originate-to-distribute" model used has in the past proven to lead to a lowering of credit standards. Specifically, platforms may face moral hazard as their fee-based income gives them an incentive to originate large volumes of loans with potentially less attention to credit quality. Moreover, investor appetite may be driven by elements of risk-seeking and risk-avoidance in a pro-cyclical manner and translate directly into lending conditions.

In addition, while common business models do not involve leverage or liquidity transformation, adaptations of existing business models could give rise to such risks. Some business models involve credit intermediation outside the banking sector and can be considered to be involved in shadow banking, including non-bank provision of loans, credit facilitation, early sell-out options raising maturity and liquidity transformation, and guaranteed return models. These activities may warrant careful monitoring by the relevant authorities.

Nonetheless, peer-to-peer or business-to-consumer platforms are generally subject to a number of European and national rules that govern, for instance, consumer protection, data protection, public disclosures and conduct of business requirements.[155] Prudential regimes that account for crowdfunding activities also apply in some jurisdictions which go beyond transparency and conduct of business requirements. For instance, in Germany, depending on the business model, lending-based crowdfunding might require a bank intermediary to be involved.

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[153] Most platforms have no maturity mismatches, at all. There are only few platforms which offer investors the option to buy out early at a discount, raising potential run risks.

[154] See Kirby, E. and Worner, S., *Crowd-funding: An Infant Industry Growing Fast*, 2014.

[155] See European Commission, *Crowdfunding in the EU Capital Markets Union*, May 2016.

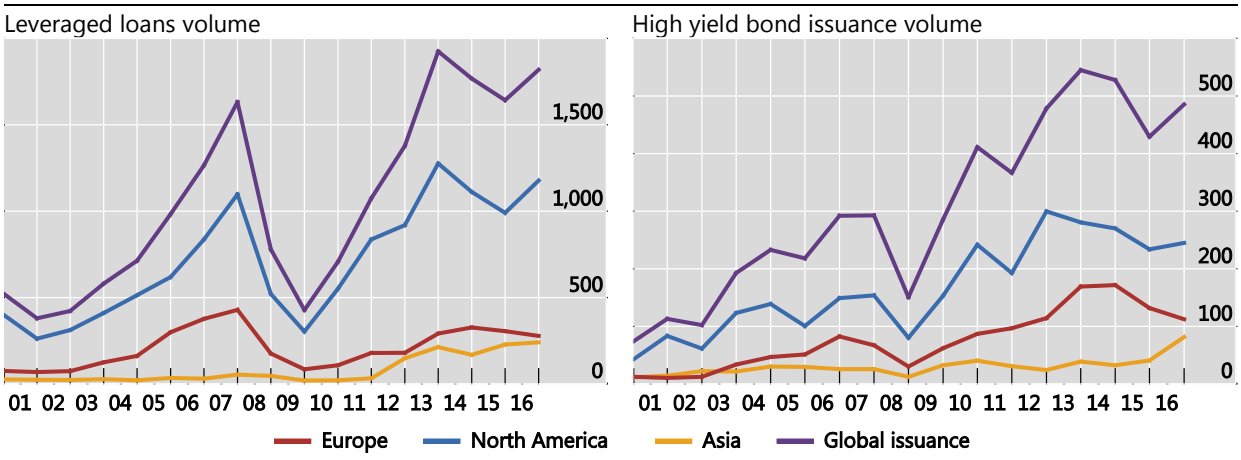
Annex 7: Leveraged finance and institutional investment: recent trends and risks[156]

Introduction

Leveraged finance, which consists of leveraged loans[157] and high-yield bonds,[158] has been on the rise since 2009. Volumes are now higher than just before the 2007-09 financial crisis (Exhibit A7-1), a significant increase that has taken place against a background of low interest rates and the accompanying search for yield that has stimulated demand for more risky instruments. The involvement of institutional investors in this market has also increased over the past years.

Leveraged loans and high yield bond issuance by region

USD billion Exhibit A7-1



Sources: Dealogic and DNB computations.

Market developments

Although the majority of leveraged finance consists of leveraged loans (Exhibit A7-1), high-yield bond issuance is growing quickly with issuance now exceeding pre-crisis levels. The strong growth in leveraged finance volumes has taken place in all regions, including Asia, where volumes have increased since 2011.

Companies have used the low interest rate environment to refinance existing loans at lower rates. In addition, cash-rich companies have used loans to grow by acquiring other companies.

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156 This case study has been contributed by Peter Wierts and René de Sousa van Stralen from de Nederlandsche Bank (DNB) for the FSB annual monitoring exercise. The views expressed here are those of the authors and do not necessarily reflect the assessment of the DNB or FSB.

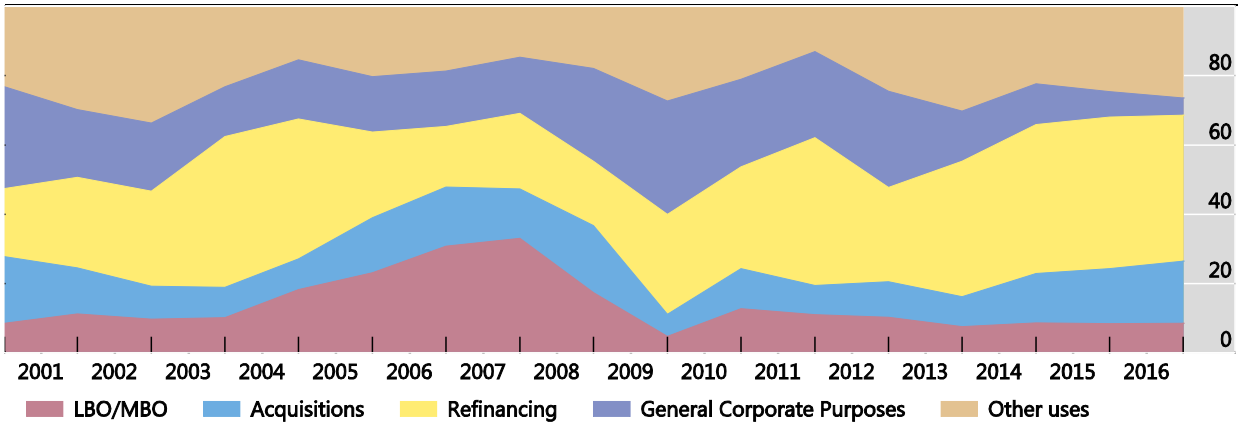
157 Leveraged loans are loans to sub-investment grade companies. Operational definitions may differ across jurisdictions and market participants. For example, the ECB's draft guidance on leveraged transactions includes any type of transaction that meets at least one of these conditions: (i) all types of loan or credit exposure where the borrower's post-financing level of leverage exceeds a total debt to EBITDA ratio of 4.0 times; or (ii) all types of loan or credit exposures where the borrower is owned by one of more financial sponsors. See ECB *Draft Guidance on Leveraged Transactions*, November 2016. This case study mostly uses market data from Dealogic. Based on their definition, loan tranches must have a sub-investment grade rating or a margin spread of more than 125 basis point if a tranche is unrated.

158 High yield bonds are corporate bonds with a sub-investment grade rating.

Finally, the role of Leveraged Buy-Outs (LBOs) and Management Buy-Outs (MBOs) is now less prominent than just prior to the crisis, due to stronger competition from acquisitions. But LBOs/MBOs remain an important driver of the market (Exhibit A7-2), which is also reflected in the growth in private equity sponsors of such deals and a general shift in ownership from publicly-listed to private companies.[159]

Leveraged loans: use of proceeds

Percent Exhibit A7-2



Sources: Dealogic; DNB computations.

A broad overview of the involvement of banks and institutional investors can be obtained by comparing the relative shares of pro-rata tranches and institutional tranches (Exhibit A7-3). The pro-rata tranches are mostly syndicated by banks and consist of revolving credit facilities and amortising term loans. The institutional tranches, on the other hand, repay towards the end of the term and therefore tend to be riskier; collateralised loan obligation (CLO) vehicles, prime funds, hedge funds and insurance companies typically comprise the bulk of institutional investors.[160] Institutional investors dominate the market in North America, while the share of bank loans are at similar levels as institutional loans in Europe (Exhibit A7-4, left panel). Moreover, the share of institutional investors – who hold the more risky tranches – tends to rise when markets are booming.

Recent studies and market intelligence indicate an increasing role for institutional investors, particularly for bank loan funds that hold leveraged loans.[161] At the same time, the CLO market has recovered considerably since the 2007-09 financial crisis, although it has not returned to pre-crisis levels (Exhibit A7-4, left panel). In the US, some of these CLOs may be held as collateral for bilateral and triparty repo transactions.

[159] For a more in-depth description of the trend from public to private ownership, see The Economist, *The Barbarian Establishment*, October 2016.

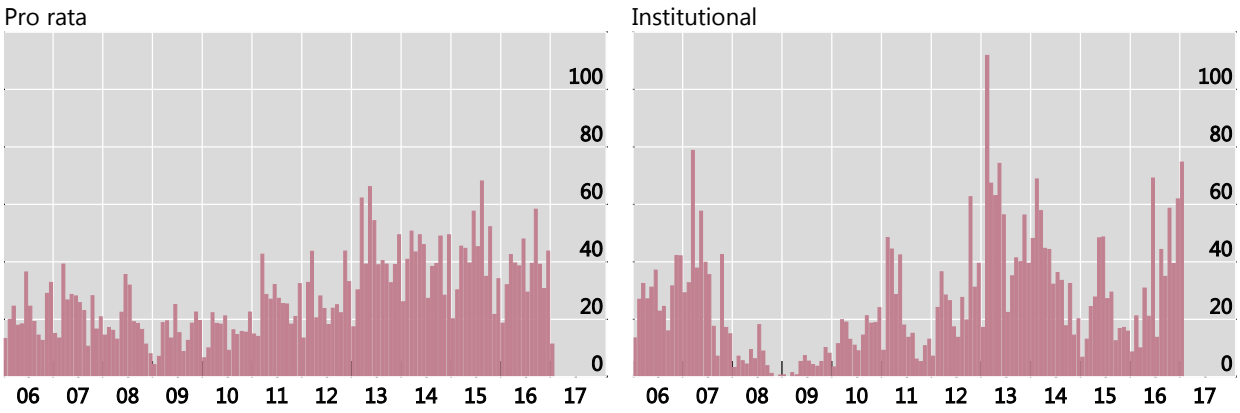
[160] Shivdasani, A. and Wang, Y., *Did Structured Credit Fuel the LBO Boom?*, July 2011.

[161] According to Becker and Ivashina, the share held by these mutual funds nearly tripled in the US after the 2007-09 financial crisis, rising from roughly 10% in 2006 to 27% by end-2013. Similarly, in Europe asset managers also increasingly move towards leveraged loans, often acting as lenders for pension funds and insurance corporations. Becker, B. and Ivashina, V., *Covenant-light Contracts and Creditor Coordination*, May 2016.

Breakdown into pro-rata and institutional, US

Monthly issuance in USD billion

Exhibit A7-3

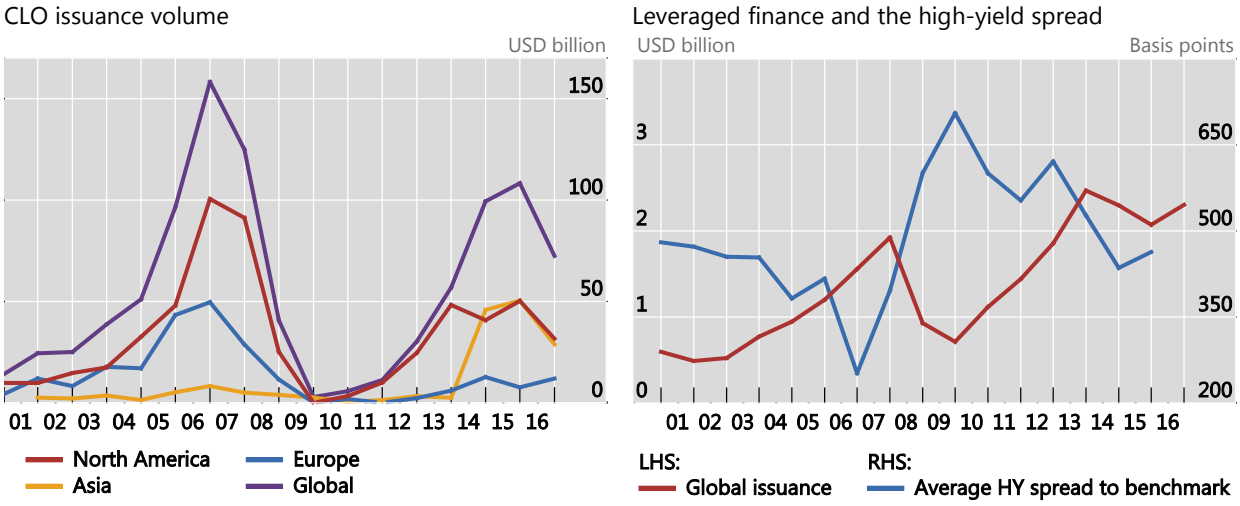


Sources: Thompson Reuters LPC, Leveraged Loan Monthly, January 2017.

Overall, institutional investors appear to be involved in the more risky tranches, and this involvement tends to increase when volumes rise (as they did before the crisis and have done recently). Leveraged finance activities appear to cut across several economic functions in the FSB's narrow measure, including EF1 (e.g. loan funds), EF2 (e.g. finance companies), EF3 (the role of leveraged loans and CLOs as collateral) and EF5 (securitisation-based credit intermediation through CLOs).

CLO issuance, leveraged finance and high-yield spread

Exhibit A7-4



Sources: Dealogic; DNB computations.

Risks

Since leveraged loans tend to be sub-investment grade, the primary risk associated with them is credit risk. Liquidity risk is also relevant, however, given the low liquidity of loans, especially for open-ended structures. From the perspective of the lender, interest rate risk is limited, as this risk is shifted to the borrower. Still, interest rate changes may cause second round effects through their effects on repayment capabilities of risky borrowers. Finally, given that bank loan

funds can be open-ended or closed-ended, maturity mismatch is another risk factor to be taken into account. In sum, all of the main risk factors from the FSB Policy Framework appear present in this part of the market.

The recent increase in leverage finance has been in a macro-economic environment characterised by low interest rates that have depressed returns relative to past levels, and hence contributed to a search for yield in riskier instruments. Developments in leveraged finance appear to be consistent with this macro-economic trend (Exhibit A7-4, right panel), as increases in the volume of leveraged finance coincided with yield spread decreases. In line with this decrease in the price of credit risk, credit standards (as measured by the percentage of covenant-light loans) have also deteriorated.[162] At the same time, the valuations of companies have increased, making profitable deals for acquisition and LBOs increasingly difficult to find, which could spur a movement into riskier parts of the market. In sum, it appears that many characteristics of a financial cycle are present in this market. The combination of increasing credit volumes, higher valuations and declining yield spreads could also be interpreted as under-pricing of aggregate risk (Exhibit A7-4).

The large increase in leveraged finance has already attracted the attention of banking supervisors. In 2013, regulators in the US issued interagency guidance on leveraged lending which indicated, among other things, that transactions for which the borrower's total debt divided by earnings before interest, tax, depreciation and amortisation exceeds six would generally raise concerns for most industries.[163] The ECB recently issued similar draft guidance on leveraged transactions.[164] Work evaluating the effect of the US supervisory guidance on leveraged lending suggests that it may have resulted in some banks decreasing their leveraged lending. First anecdotal indications suggest that this may not have led to an equivalent reduction in risk in the financial system as the role of non-bank lenders increased, but more research is needed.[165,166] Overall, a deepening of monitoring of the role of bank and non-bank lenders in leveraged finance therefore appears warranted.

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[162] Becker and Ivashina (2016) report an almost three-time increase in covenant-lite issuance in the US compared to the previous peak in 2017. As the share of riskier tranches and institutional investors increases when volumes increase, loan conditions become more "bond-like" and contracts involve fewer monitoring tools and weaker control right.

[163] FRB, *Interagency Guidance on Leveraged Lending*, March 2013.

[164] ECB, *Draft Guidance on Leveraged Transactions*, November 2016.

[165] Kim, S, M. Plosser and J. Santor, *Did the Supervisory Guidance on Leveraged Lending Work?*, May 2016.

[166] Cizel, J., J. Frost, A. Houben and P. Wierts, *Effective Macroprudential Policy: Cross-Sector Substitution from Price and Quantity Measures*, April 2016.

Annex 8: FSB Regional Consultative Group for the Americas third report on shadow banking [167]

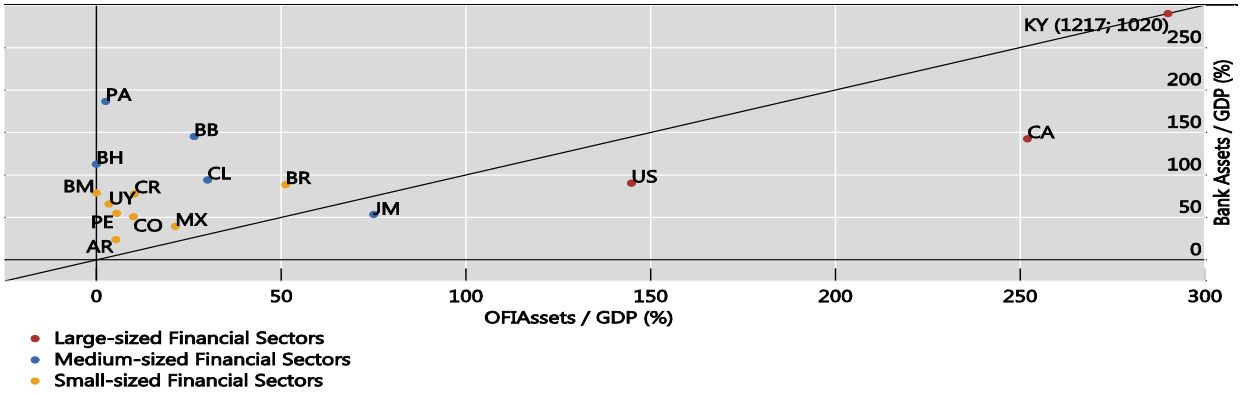
Introduction

In December 2012, the FSB Regional Consultative Group for the Americas (RCGA) decided to conduct a regional shadow banking monitoring exercise similar to that of the FSB's global exercise to achieve a better understanding and identify specific characteristics of shadow banking activities in the Americas. For this purpose, the RCGA set up a working group on shadow banking (WGSB) to conduct the exercise based on the FSB's monitoring methodology.

The RCGA published its first report in August 2014 followed by its second report in October 2015.[168] Among the second report's recommendations were that the work of the WGSB: should continue; should adopt a narrow measure of shadow banking in future exercises; and should pay particular attention to two areas that were identified as posing potential risks to financial stability in the region (open-ended funds and finance companies).

Relative sizes of banking and OFI sectors

As a percentage of assets over GDP, at end-2015 Exhibit A8-1



AR = Argentina; BB = Barbados; BH = Bahamas; BM = Bermuda; BR = Brazil; CA = Canada; CL = Chile; CO = Colombia; CR = Costa Rica; JM = Jamaica; KY = Cayman Islands; MX = Mexico; PA = Panama; PE = Peru; US = United States; UY = Uruguay.

* All OFI activities have been classified under IFC because it is estimated that the domestic proportion is immaterial.

Source: FSB RCGA's Third Report on Shadow Banking.

Consistent with these recommendations, the WGSB undertook a third monitoring exercise that, together with the "macro-mapping" analysis, introduced the narrowing down process also included in the FSB's 2013 and 2014 global monitoring exercises.[169] To do this, the WGSB's reporting templates were modified to focus on non-bank financial entities that may be involved in financial stability risks from shadow banking (e.g. maturity/liquidity transformation,

[167] The views expressed in the document are those of the RCG for the Americas and do not necessarily reflect those of the FSB. For the full report see FSB RCGA, *Third Report on Shadow Banking in the Americas*, May 2017.

[168] See FSB RCGA, *Second Report on Shadow Banking in the Americas*, October 2015.

[169] The narrow measure is described in Sections 2 and 3.5 of the RCGA's third report. In addition, the WGSB adopted the "activity-based" approach based on economic functions (in the FSB, *Global Shadow Banking Monitoring Report 2015*, November 2015) only on a trial basis for a set of volunteering member jurisdictions. The results of this trial are not published in the third RCGA report, but are expected to serve as the basis for future monitoring exercises.

leverage) and identify non-bank financial entities within consolidated banking groups to be excluded from the narrow measure. In consideration of the recommended focus on open-ended funds made in the second report, the WGSB exercise also included a questionnaire on investment funds.

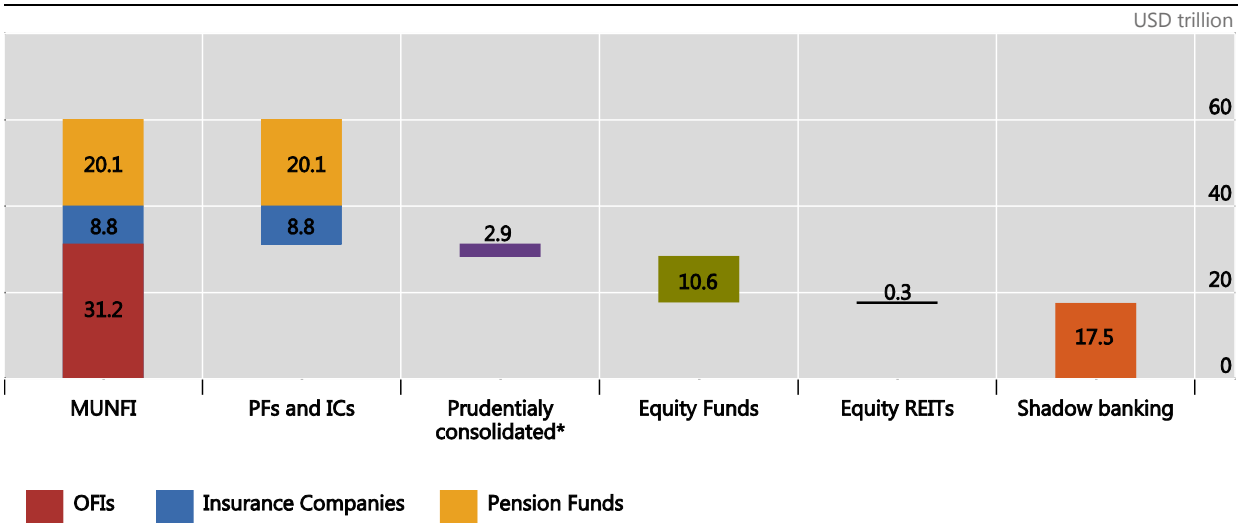
Key results

The key findings from the third RCGA shadow banking monitoring exercise are as follows:

- The Monitoring Universe of Non-bank Financial Intermediaries (MUNFI), comprised of OFIs, insurance corporations and pension funds, reached just over $60 trillion in the Americas at end-2015.
- The narrow measure of shadow banking, adopted for the first time by the WGSB in this exercise and which excludes pension funds, insurance corporations, equity funds and prudentially consolidated entities, was $17.5 trillion, or 29% of MUNFI (Exhibit A8-1). These totals do not include offshore assets of international financial centres (IFCs).

Narrowing down shadow banking

15 jurisdictions at end-2015 Exhibit A8-2



* Also includes bank-like regulated institutions.

Source: FSB RCGA's Third Report on Shadow Banking.

- On average, all OFI subsectors grew in 2015 across participating jurisdictions.[170] Investment funds continued to be the largest driver of OFI growth since 2008.
- Offshore assets in IFCs in the Americas grew from $7.9 trillion to $8.1 trillion between 2013 and 2015. Of that $8.1 trillion total, $1.4 trillion represent assets of banks, $0.7 trillion of insurance corporations and pension funds, and $6.1 trillion of OFIs (including investment funds and securitisation vehicles).[171] The OFI sector in the Cayman Islands drove this growth, rising to $5.8 trillion in 2015, from $5.1 trillion in 2013.

[170] Measured in local currency terms.

Results of investment funds survey

A total of 12 jurisdictions responded to the questionnaire, covering 21,000 investment funds with total NAV of approximately $11 trillion at end-2015.[172]

The main results from the responses to the questionnaire on investment funds can be summarised as follows:

- Canada, Cayman Islands and the US reported the largest share of the responding jurisdictions' total assets, representing 16%, 33% and 48% of total NAV, respectively. These amounts include offshore assets of IFCs.[173]
- The total NAV for the top 10 funds in each fund type reported for each jurisdiction, for ten out of twelve participating jurisdictions, was approximately $2.4 trillion.[174]
- Most jurisdictions reported having a legislative or regulatory definition of liquid assets, with the exception of Bermuda, the Cayman Islands, Jamaica and Panama. Approximately half of respondents reported that they collect information regarding their investment funds' liquid assets. Of those, the amount of liquid assets held by funds varied widely among jurisdictions and fund types. Six jurisdictions reported imposing limits on the amount of illiquid assets a fund can purchase and four jurisdictions reported liquidity buffer requirements.
- Data on the interconnectedness of investment funds to banks and OFIs was only reported by six jurisdictions.[175] In those jurisdictions, while MMFs were most interconnected with banks, less than 25% of the assets held by most funds were from banks.
- Most regulators reported collecting information on fund leverage, although a standard definition of leverage was not reported across respondent jurisdictions. The responses to the survey revealed a wide degree of variation in fund leverage across reporting jurisdictions and even within a particular type of fund; but this variation may reflect the different definitions of leverage and ways of measuring leverage ratios.
- Bermuda, the Cayman Islands and Mexico do not impose leverage limits on any investment funds.
- All participating jurisdictions reported that, across most fund types, regulators allow, but do not necessarily impose, some combination of redemption gates, suspensions of

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[172] Respondents were Argentina, Bermuda, Canada, Cayman Islands, Chile, Colombia, Costa Rica, Jamaica, Panama, Peru, Mexico and the US. Some responding jurisdictions provided a limited subset of data on fund types in their jurisdictions, such that the results do not represent the total number and aggregate size of all funds in that jurisdiction. For example, the US response provided data only on the following open-ended funds: bond funds, bond ETFs, hybrid funds, hybrid ETFs, and "special" funds (alternative credit strategies funds that may invest in less traditional fixed income products such as structured products, including collateralised mortgage obligations. The US response to the investment fund questionnaire does not cover other open-ended funds, including equity funds, equity ETFs, and MMFs. The US response also does not cover closed-ended funds, REITs, or hedge funds. The aggregate total net assets of the investment funds and ETFs that are not covered by the US response is approximately $11.3 trillion. See Annex 4 of the RCGA report for a detailed list of the scope of jurisdictions' responses.

[173] For some jurisdictions this is an underestimate of the funds in their jurisdiction, as not all fund types in each jurisdiction were captured. For example, these figures exclude the approximately $10 trillion in US equity funds.

[174] Argentina, Bermuda, Canada, Cayman Islands, Chile, Colombia, Costa Rica, Peru, Mexico and the US.

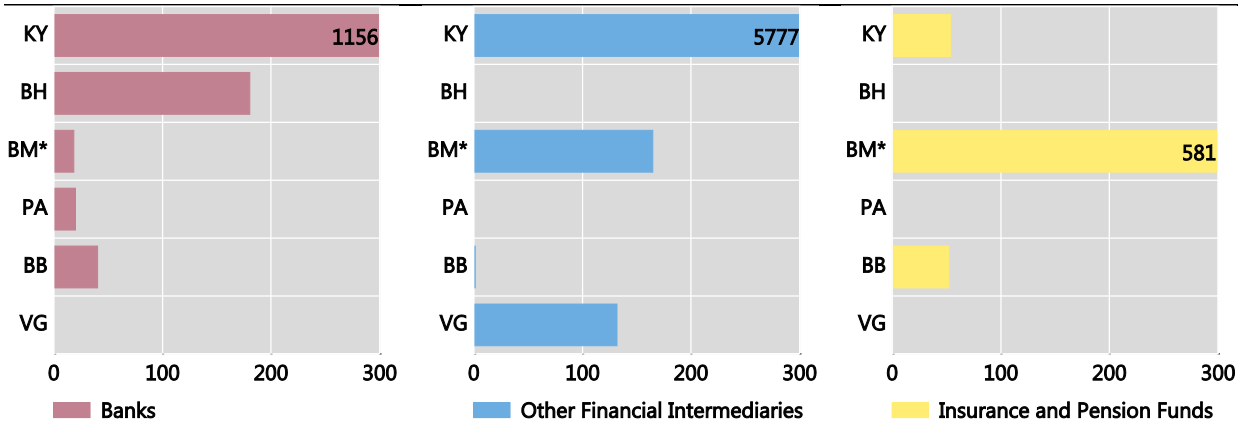
[175] Argentina, Canada, Colombia, Costa Rica, Peru and Mexico.

redemptions, redemption fees, side pockets or stress testing mechanisms to manage redemption pressures in stressed market conditions. Often funds require authorisation from their regulator to use such tools.

- With the exception of those in Colombia, funds have no access to central bank liquidity. In Colombia, funds are able to do repurchase operations with the central bank (so long as they have admissible collateral).

Size of financial intermediaries in the international financial centres

Offshore assets, 6 jurisdictions, at end-2015, in billions of US dollars Exhibit A8-3



BB = Barbados; BH=Bahamas; BM = Bermuda; KY = Cayman Islands; PA = Panama; VG = British Virgin Islands.

Source: FSB RCGA's Third Report on Shadow Banking.

Concluding remarks and recommendations

The third RCGA shadow banking monitoring exercise continues to provide useful data on non-bank credit intermediation activities in the region. The exercise complements the FSB's monitoring exercise through the participation of non-FSB members located in the Americas. Participation by IFCs, in particular, addresses an important data gap. The WGSB continues to take steps to align the RCGA monitoring exercise with the FSB's global monitoring exercise. A MUNFI and narrow measure of shadow banking were introduced in the third RCGA monitoring report. Overall, the regional shadow banking in the Americas continues to exhibit similar characteristics to that reported in previous exercises.

The report included four recommendations:

1. WGSB should continue to conduct the shadow banking exercise on an annual basis following the timeline of the FSB monitoring exercise at the global level.
2. Future RCGA exercises should examine finance companies (including micro-credit) in order to identify the potential risks they pose to financial stability in the region.
3. Future RCGA exercises should incorporate the economic functions approach following the work of the FSB monitoring exercise.
4. Regulators could consider whether it would be beneficial to collect information on funds' portfolio maturity and liquidity.