FSB FINANCIAL STABILITY BOARD
Basel Committee on Banking Supervision
BANK FOR INTERNATIONAL SETTLEMENTS
BANK FOR INTERNATIONAL SETTLEMENTS

Summary of Findings from the TLAC Impact Assessment Studies

Overview Report

9 November 2015

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Executive Summary

On 10 November 2014, the Financial Stability Board (FSB) published, in consultation with the Basel Committee on Banking Supervision (BCBS), a consultative document on the total loss-absorbing capacity (TLAC) of global systemically important banks (G-SIBs) in resolution, including high-level principles and a more detailed Term Sheet.[1] The Term Sheet proposed that G-SIBs should be required to meet a minimum TLAC requirement set within the range of 16-20% of risk-weighted assets (RWA), and at a minimum twice any Basel III leverage requirement. Instruments that count towards satisfying minimum regulatory capital requirements and other liabilities that meet the eligibility criteria set out in the Term Sheet would be eligible to satisfy the minimum TLAC requirement.

To inform the final calibration of the minimum TLAC requirement within the 16-20% RWA range, the FSB conducted a comprehensive impact assessment during the course of 2015, comprising a Quantitative Impact Study (QIS) and micro- and macroeconomic impact analyses of costs and benefits. In addition, the FSB carried out a market survey to gauge the depth of markets for external TLAC-eligible instruments, and a study to evaluate historical losses and recapitalisation needs of large banks. Both components have provided important inputs to ensure the calibration is sufficient to achieve the objectives of TLAC.

The results of the impact assessment in relation to the minimum TLAC requirement under the final TLAC standard show that the impact of TLAC on economy-wide funding costs is relatively contained. The median estimated G-SIB lending rate increase to recuperate the costs of meeting the TLAC requirement is 5.4bps for the 16% RWA or 6% Exposure Measure (EM) calibration. This rises to 8.1bps for the 18% RWA or 6.75% EM calibration, and only one G-SIB would require an increase in excess of 20bps. These median rates translate into increases in lending rates for the average borrower of about 2.2bps and 3.2bps for the respective calibrations.

In terms of the macroeconomic costs, the impact assessment found that the median long-run loss in the level of annual GDP is estimated at less than 2bps for the 16% RWA or 6% EM calibration and 2.8bps for the 18% RWA or 6.75% EM calibration. Under the most conservative assumptions regarding G-SIB market share and interest rate sensitivity, the drop in annual GDP is less than 10bps and 15bps for the respective calibrations.

The estimated macroeconomic benefits of TLAC exceed these costs. The central estimate suggests that TLAC generates benefits of 48bps of annual GDP. Under the most conservative assumptions, the estimated benefits are between 15 and 20bps of annual GDP.

This Report summarises the findings of the four components of the impact assessment studies ('the Studies'): (i) QIS; (ii) Economic Impact Assessment; (iii) Market Survey; and (iv) Verification of Historical Losses and Recapitalisation Needs.

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[1] See http://www.financialstabilityboard.org/wp-content/uploads/TLAC-Condoc-6-Nov-2014-FINAL.pdf

Summary of key findings

QIS Shortfall Analysis

As an input to the Economic Impact Assessment, the BCBS QIS established the end-2014 levels of G-SIBs' regulatory capital and debt instruments relative to the eligibility criteria in the Term Sheet and the proposed calibration range for the minimum TLAC requirement:

- **Available external TLAC levels** –29 G-SIBs had an average eligible external TLAC ratio of 13.1% RWA and 7.2% of the exposure measure (EM) of the Basel III leverage ratio (refer to Case 1 of the BCBS QIS). When including unsubordinated liabilities that are otherwise TLAC-eligible, these ratios increased to 16.5% RWA and 8.7% EM (refer to Case 3 of the BCBS QIS).
- **External TLAC shortfalls** – For the minimum TLAC requirement that will apply from 1 January 2019 under the final TLAC standard (16% RWA or 6% EM), the shortfalls range from €307bn to €790bn depending on which instruments are considered (and, if excluding emerging market G-SIBs, from €42bn to €520bn).
- For the minimum TLAC requirement that will apply from 1 January 2022 under the final TLAC standard (18% RWA or 6.75% EM) the shortfalls range from €457bn to €1,130bn depending on which instruments are considered (and, if excluding emerging market G-SIBs, from €107bn to €776bn).
- **Available internal TLAC levels and shortfalls** – For the low number of material subsidiaries that G-SIBs reported, the average current internal TLAC risk-based ratio was 17.5% RWA, and 27.2% RWA when unsubordinated liabilities that are otherwise TLAC-eligible are included. However, there was some variation in shortfalls across material subsidiaries located in different jurisdictions, and the analysis considered individual material subsidiaries, rather than material sub-groups as defined under the final TLAC standard.
- **Maturity analysis** – Nine additional G-SIBs would meet the 16% RWA or 6% EM minimum TLAC requirement if they were able to replace with eligible TLAC their unsubordinated but otherwise TLAC-eligible liabilities that mature in the next five years. If all unsecured liabilities issued by resolution groups were considered, then the vast majority of the 17 G-SIBs that have no shortfall in this case could meet this minimum TLAC requirement if they are able to replace such liabilities with eligible TLAC as they mature in the next five years. Whether such replacement is economically feasible will depend on market absorption capacities.

Market Survey

The market survey assessed the size of the TLAC shortfall relative to the size of relevant markets and their capacity to absorb incremental TLAC issuance.

- **Market size** – For the 16% RWA or 6% EM (16/6) and 20% RWA or 6% EM (20/6) calibrations respectively, the aggregate TLAC shortfalls represent 1.0% to 1.7% of the €80 trillion global debt securities market and 16.9% to 30.7% of the €4.5 trillion G-SIB-issued unsecured debt market. When including unsubordinated but otherwise TLAC-

eligible liabilities the percentages relative to the global debt market decline to 0.7% and 1.3%, respectively.

- **Impact on spreads –** Market participants estimated that new issuance under the TLAC requirements would cause bond spreads to rise 30bps from their prevailing levels. However, this estimate is subject to uncertainty.

Economic Impact Assessment

The Economic Impact Assessment calculated the costs to G-SIBs of closing their respective shortfalls. The analysis then assumed that G-SIBs would seek to recoup these costs by increasing their lending rates. In turn, the increase in lending rates was fed through macroeconomic models to estimate the impact on GDP of higher credit costs. The macroeconomic benefits of TLAC were analysed by assessing the effects of a reduced likelihood of a systemic crisis and a reduced cost of crises.

- **G-SIBs' costs of meeting the shortfall** – At prevailing funding spreads, and including the shortfalls of emerging market G-SIBs, the 'least cost' conversion of non-eligible TLAC liabilities to TLAC eligible liabilities ones is estimated to increase median annual G-SIB funding costs by €195 million and €511 million, respectively, for the 16/6 and 20/6 calibrations.
- The aggregate costs do not change substantially under robustness calculations that analyse an increase in spreads (and, thus, higher funding costs for G-SIBs) from a surge in the supply of TLAC-eligible instruments. However, there is considerable variation between different markets and the impact on G-SIB funding costs is concentrated on those G-SIBs with large shortfalls (and hence large issuance needs) and that issue in thin market segments.
- **Impact on economy-wide funding costs** – The impact on G-SIB lending rates to recuperate these costs is relatively contained. For the 16/6 calibration, the median estimated G-SIB lending rate increase is 5.4bps, with no G-SIB needing to increase rates by more than 20bps. For the 20/6 calibration, the median increase in G-SIB lending rates is estimated at 9.2bps and only two G-SIBs require an increase in excess of 20bps. Applying a G-SIB lending market share of 40%, (a weighted average estimate across jurisdictions), these median rates translate into increases in lending rates for the average borrower of about 2.2bps and 3.7bps, respectively, for the 16/6 and 20/6 calibrations.
- **Macroeconomic costs** – For the lowest calibration (16/6), using the median macro model-estimated response of GDP to lending spread changes, and a G-SIB market share of 40%, the median long-run loss in the level of annual GDP is estimated at less than 2bps. Assuming a G-SIB market share of 100% (equivalent to the entire banking sector increasing rates in lockstep with the G-SIBs) and the highest range of model-estimated responses of output, the drop in annual GDP relative to benchmark is less than 10bps for the 16/6 calibration and less than 20bps for the 20/6 calibration.
- **Spillovers** – Using a model of the world economy, which allows for spillovers and feedback effects via trade and financing flows, the impact of increases in lending spreads on GDP is estimated for a number of G-SIB home and host countries. For G-SIB home countries, the estimated median peak annual output loss is 3 to 4bps, of which 1bp is

accounted for by spillovers. For host and other countries, the estimated median peak output loss is lower at 2 to 3bps.

- **Macroeconomic benefits** – The introduction of TLAC and bank resolution regimes is estimated to reduce the GDP cost of crises by 5.4 percentage points (ppt). This is the combined effect of: (i) the lower fiscal costs (no bail-outs) and thus greater leeway for use of fiscal policy (accounting for 3.8ppt); and (ii) the impact from lower sovereign yields in a crisis on credit costs of the private sector (accounting for 1.6ppt). The introduction of TLAC will also influence the occurrence of crises because of the disciplinary impact by holders of bail-in-able debt on G-SIBs' risk-taking. This is estimated by the academic literature to reduce the likelihood of failure by at least one-third.
- **Benefits exceed costs across all calibrations –** Even for the most conservative assumptions employed in the study (low cost of crises, weak disciplinary impact of TLAC, and low G-SIB market share), the benefits are between 15 and 20bps of annual GDP. For the more reasonable (but still conservative) assumptions, the benefits are greater than the costs, by a good margin.
- **Cost and benefit analysis** – The analysis aims to provide a fair but conservative assessment of the longer term costs and benefits, and when confronted with equally plausible alternatives the choice is biased towards those that err on the side of higher costs and/or lower benefits. This may lead to an underestimation of the net benefits, though the analysis is subject to uncertainty.

Additional findings from the Market Survey

- **G-SIB TLAC issuance strategy** – Most G-SIBs do not plan to replace existing ineligible TLAC prior to maturity, and subordination was the most frequently cited challenge for G-SIBs in meeting the TLAC requirements.
- **Additional management buffer –** On average, market participant respondents expect G-SIBs to hold TLAC buffers of around 1.8% RWA above the minimum TLAC requirement.
- **Credit rating implications** – Rating agencies generally expect rating downgrades of G-SIB debt as resolution regimes become operational, but rating uplifts for senior unsecured debt issued by operating companies once minimum TLAC requirements are in place.
- **Emerging market economy (EME) issuance –** Few comments were made about issuing in EMEs, but several Multiple Point of Entry (MPE) subsidiaries expressed concerns with issuing in emerging economies that lack developed local bond markets.

Historical Losses and Recapitalisation Needs

- Of the banks studied, the interquartile range of total losses was approximately 3% - 7% RWA, and up to a maximum of 12% - 13% RWA. The interquartile range of losses and recapitalisation together was approximately 6% - 15% RWA, and up to a maximum of around 25% RWA.

Terminology

For reference, this Report uses the following terminology:

AT1	Additional Tier 1 instruments
Calibration	Four different TLAC calibrations were used in the economic impact analyses: Calibration 1 - the higher of 16% RWA or 6% of EM ("16/6 calibration"); Calibration 2 - the higher of 20% RWA or 6% of EM ("20/6 calibration"); Calibration 3 - the higher of 16% RWA or 10% of EM ("16/10 calibration"); Calibration 4 - the higher of 20% RWA or 10% of EM ("20/10 calibration"). *Note that the BCBS QIS examined Calibration 1 and Calibration 2 only.*
EM	Exposure Measure, which refers to the exposure measure for the Basel III leverage ratio
Emerging Market G-SIBs	Refers to G-SIBs headquartered in emerging market economies
RWA	Risk-weighted assets
T2	Tier 2 instruments
Term Sheet	Refers to the term sheet in the TLAC Consultation Document published in November 2014, see http://www.fsb.org/wp-content/uploads/TLAC-Condoc-6-Nov-2014-FINAL.pdf

1. Introduction

On 10 November 2014, the Financial Stability Board (FSB) published, in consultation with the Basel Committee on Banking Supervision (BCBS), a consultative document on the total loss-absorbing capacity (TLAC) of global systemically important banks (G-SIBs) in resolution, including high-level principles and a more detailed Term Sheet.[2]

To finalise the TLAC standard, including the final calibration of the minimum external TLAC requirement, the FSB conducted a comprehensive impact assessment during the course of 2015. The impact assessment studies ('the Studies'), carried out by the FSB, BCBS and Bank for International Settlements (BIS), as well as staff from G-SIB home and host authorities, comprised four elements:

(i) A **Quantitative Impact Study (QIS)** to analyse the impact of external TLAC requirements, including shortfall analyses, for each resolution entity of each G-SIB, internal TLAC requirements for material subsidiaries of each G-SIB, and holdings of TLAC instruments by G-SIBs and non G-SIBs;

(ii) An **Economic Impact Assessment** consisting of two components: a microeconomic component that looks at the impact on the liability structure of G-SIBs and the likely effect on their cost of capital and funding, and a macroeconomic component that focuses on the impact on bank credit supply and the wider economy, and the economic benefits of lower expected cost of financial crises;

(iii) A **Market Survey** of G-SIBs, market participants and credit rating agencies to assess the potential impact of the TLAC standard on pricing of TLAC-eligible liabilities, investor behaviour and market capacity; and

(iv) Analysis of **Historical Losses and Recapitalisation Needs** for selected systemically important financial institutions that failed or received official support.

The results of the QIS and Economic Impact Assessment were used to inform the calibration of the minimum TLAC requirement for all G-SIBs, while the Market Survey and analysis of Historical Losses and Recapitalisation Needs were important inputs to ensure that the calibration of the minimum TLAC requirement achieves the objectives of TLAC, namely that G-SIBs can be resolved without exposing public funds to loss.

This Report summarises the findings of the Studies. Section 2 presents the QIS analysis, Section 3 presents the Market Survey results, Sections 4 and 5 present the Economic Impact Assessment Analysis, and Section 6 presents the Historical Losses and Recapitalisation Needs analysis. The full findings of the QIS, Economic Impact Assessment and analysis of Historical Losses and Recapitalisation Needs are published alongside this Report by the BCBS, BIS and FSB, respectively.

Data used in the Studies from participating banks and other institutions were submitted on a voluntary and best-efforts basis. Nevertheless data are only used in the analysis of the Studies to the extent that they are of sufficient quality. Limitations in the various data sets are made clear throughout this Report.

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[2] See http://www.fsb.org/wp-content/uploads/TLAC-Condoc-6-Nov-2014-FINAL.pdf

2. QIS Shortfall Analysis

The QIS analyses the impact of the external TLAC requirements, including shortfall analyses for each resolution entity of each G-SIB, internal TLAC requirements for material subsidiaries of each G-SIB, and holdings of TLAC instruments by G-SIBs and non-G-SIBs. The results included in this Report use bank data as of end-2014 and regulatory capital instruments are reported on a Basel III fully loaded basis. The data set includes 30 G-SIBs, of which the primary sample size used is 29 G-SIBs due to insufficient data..

The template tests four different Cases in order to show existing TLAC resources as well as instruments that do not currently meet the TLAC eligibility criteria but could potentially be replaced with TLAC-eligible instruments:

(i) **Case 1** includes instruments that meet the TLAC Term Sheet criteria, including subordination. However, it excludes senior unsecured debt that qualifies as a result of 2.5% concessions in the Term Sheet. This case is intended to analyse current shortfalls to reflect the consultative version of the Term Sheet criteria (except the 2.5% exemptions) and shows the amount which G-SIBs need to fill. The Economic Impact Assessment uses this Case as its main scenario.

(ii) **Case 2** is the same as Case 1, but the instruments must also meet certain additional criteria that are currently required of Tier 2 instruments under Basel III.[3]

(iii) **Case 3** is the same as Case 1, except the instruments do not need to meet the subordination requirements in the TLAC Term Sheet (i.e., it includes all senior unsecured debt issued by resolution entities meeting all the Term Sheet criteria, except subordination). If G-SIBs can replace ineligible TLAC included in Case 3 with eligible TLAC with limited migration or conversion costs, Case 3 might be a better prediction of future TLAC liabilities. However, all of the Case 3 senior debt might not be easily replaceable with TLAC,[4] especially in jurisdictions with a limited investor base.

(iv) **Case 4** is the broadest case. It includes all unsecured liabilities, except those arising from derivatives, deposits, and those not arising from contract (e.g., tax liabilities). For example, it includes liabilities issued by entities other than resolution entities as well as structured notes. Similar to Case 3, Case 4 might be a prediction of future TLAC liabilities if it is possible to replace some of these liabilities with eligible TLAC. However, the wider set of instruments captured by Case 4 is likely to be more challenging to replace with TLAC than those captured by Case 3.

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[3] These additional criteria include that TLAC-eligible instruments must: be paid in; not have a credit sensitive feature; not have a right of acceleration of the principal and interest outstanding in respect of the instrument outside liquidation; be calculated based on the effective maturity, i.e. the date of an incentive to redeem when it includes such an incentive.

[4] For example, current investors may be restricted by investment mandates or internal policy restrictions on exposures to subordinated debt.

2.1 External TLAC – current levels and shortfalls

For the Single Point of Entry (SPE) resolution groups and aggregated Multiple Point of Entry (MPE) resolution groups, the average external TLAC ratios and aggregate shortfalls for different calibrations of the minimum TLAC requirement are summarised in Exhibit 1 below. The sample size is 29 G-SIBs, to facilitate comparison across the four Cases.[5] The aggregate shortfalls for the minimum TLAC requirement that will apply from 1 January 2022 under the final TLAC standard (the higher of 18% RWA or 6.75% EM) have been included for reference.

Average external TLAC ratios and aggregate TLAC shortfalls — Exhibit 1

	Case 1	*Case 2*	*Case 3*	*Case 4*
Average external TLAC risk-based ratios	*13.1%*	*12.9%*	*16.5%*	*20.9%*
Average external TLAC EM-based ratios	7.2%	7.2%	8.7%	10.6%
Aggregate shortfalls				
16% RWA or 6% of EM	€767bn	€790bn	€526bn	€307bn
18% RWA or 6.75% of EM	€1,110bn	€1,130bn	€773bn	€457bn
20% RWA or 6% of EM	€1,388bn	€1,406bn	€1,025bn	€662bn
16% RWA or 6% of EM ex. emerging market G-SIBs	€498bn	€520bn	€260bn	€42bn
18% RWA or 6.75% of EM ex. emerging market G-SIBs	€755bn	€776bn	€422bn	€107bn
20% RWA or 6% of EM ex. emerging market G-SIBs	€949bn	€966bn	€588bn	€227bn

Note: The external TLAC risk-based ratios have been reduced to take account of the amount of CET1 required to meet the combined buffer (capital conservation and G-SIB surcharge) of €712 bn. The 2.5% allowances in Sections 8 and 13 of the November 2014 Term Sheet (recognition of certain resolution funds and a subordination allowance, respectively) may reduce shortfalls by up to €137bn in Cases 1 and 2. Cases 3 and 4 do not apply the subordination requirements, so the potential shortfall reduction from the subordination allowance is not relevant in these cases.

Source: Basel Committee on Banking Supervision.

i. Impact of Term Sheet Section 8 and the last paragraph of Section 13 allowances

The Term Sheet sets out two allowances that may affect G-SIBs in certain jurisdictions.[6] Exhibit 2 shows the impact of these allowances (i.e., an amount equivalent to 2.5% RWAs) on the TLAC risk-based ratios and the TLAC leverage ratios in Case 1.[7]

The sample consists only of G-SIBs headquartered in jurisdictions that could apply these allowances, and the analysis does not consider the impact of a higher 3.5% RWA allowance for the minimum TLAC requirement that will apply from 1 January 2022 under the final TLAC standard (the higher of 18% RWA or 6.75% EM).

[5] With the exception of the aggregate shortfall numbers under Case 1, where the sample size is 30 G-SIBs, and the final three rows where emerging market G-SIBs are explicitly excluded.

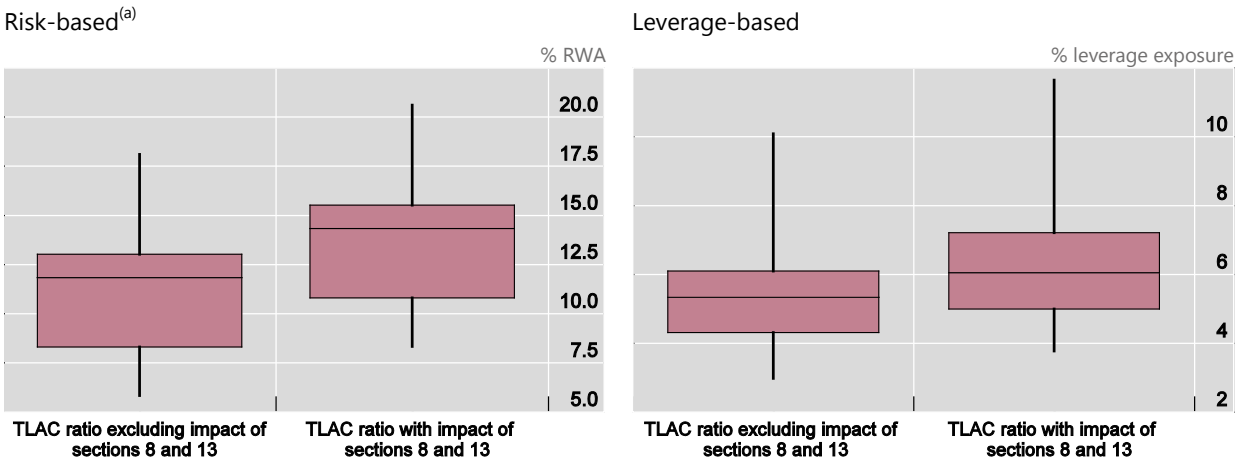
[6] Refer to the last paragraph in Sections 8 and 13 of the Term Sheet.

[7] The exemption to the subordination requirement set out in Section 13 of the Term Sheet is not relevant for Cases 3 and 4 which do not require the subordination criterion. Case 2 shows similar outcomes to Case 1 and is therefore not included.

The Exhibit shows that the median external TLAC risk-based ratio is still below 16% even with the additional 2.5% RWAs. On the other hand, the median external TLAC leverage ratio increases by 0.7% due to the allowances, which brings the median ratio slightly over 6%.

Impact of Section 8 and the last paragraph of Section 13 allowances (Case 1)

External TLAC ratio with Section 8 and 13 allowances fully incorporated Exhibit 2



[a] The CET1 for external TLAC risk-based ratios does not include CET1 used to meet buffers (i.e., capital conservation buffer and G-SIB surcharge applicable to each G-SIB). This is the same treatment as previous graphs.

Sample size: 17 G-SIBs.

Source: Basel Committee on Banking Supervision.

2.2 Internal TLAC – current levels and shortfalls

The QIS collected data on internal TLAC of material subsidiaries for both SPE and MPE G-SIBs. Material subsidiaries were identified in accordance with the criteria listed in Section 21 of the Term Sheet.

G-SIBs reported between zero and eight material subsidiaries (eight G-SIBs reported zero material subsidiaries). The low numbers may be explained by certain factors. First, material subsidiaries located in the same jurisdiction as the resolution entity were not included per the Term Sheet's criteria. Second, as CMGs have yet to identify material subsidiaries for each G-SIB, subsidiaries that do not meet the quantitative thresholds of the Term Sheet but which may otherwise be considered material by the CMG were not included. Third, G-SIBs considered only "regulated operating entities" that form part of the regulatory consolidated banking group. The final version of the TLAC term sheet published in November 2015 defines a material sub-group as an entity or group of entities that need to hold internal TLAC. However, no data is available to estimate the shortfalls of material sub-groups since the QIS data was collected before this change.

For this low number of material subsidiaries, aggregate shortfalls of internal TLAC are generally much smaller than those of external TLAC. Exhibit 3 summarises the aggregate internal TLAC ratios and shortfalls. It should be noted that there is some variation in shortfalls across material subsidiaries located in different jurisdictions.

Average internal TLAC ratios and aggregate internal TLAC shortfalls Exhibit 3

Internal TLAC ratios (sub-consolidated)	Case 1	Case 3	Case 4
Average internal TLAC risk-based ratios	17.5%	27.2%	47.9%
Average internal TLAC leverage ratios	6.8%	10.5%	18.5%

Internal TLAC shortfalls (sub-consolidated)	Case 1	Case 3	Case 4
75% of 16% RWA requirement	€7bn	€6bn	€0bn
90% of 20% RWA requirement	€54bn	€31bn	€2bn
75% of 2*3% LR requirement	€6bn	€3bn	€0bn
90% of 2*3% LR requirement	€19bn	€9bn	€2bn

Source: Basel Committee on Banking Supervision.

2.3 Maturity analysis

There are 22 G-SIBs, excluding emerging market G-SIBs, that have TLAC shortfalls under Case 1 (based on the 16% RWA or 6% EM calibration). Analysis of the maturity structures of Case 3 liabilities shows that nine of these G-SIBs would meet the 16% RWA or 6% EM minimum TLAC requirement if they were able to replace all of their Case 3 senior liabilities that mature in the next five years with eligible TLAC, under the assumption that non-subordinated debt is fully substitutable with eligible TLAC over time.

Similarly, the vast majority of the 17 G-SIBs that have no shortfall under Case 4, but a shortfall under Case 1, could meet the 16% RWA or 6% EM minimum TLAC requirement if they are able to replace their Case 4 liabilities that mature in the next five years with eligible TLAC. Whether such replacement is economically feasible will depend on market absorption capacities.

There are five G-SIBs (including emerging market G-SIBs) that have shortfalls over €1bn under Case 4. For these G-SIBs, even if they are able to replace all of their maturing Case 4 liabilities with eligible TLAC, they would still have a shortfall.

2.4 Holdings of TLAC within the system

The QIS also gathered information on holdings of TLAC instruments by G-SIBs and non-G-SIBs. A sample of 134 banks responded. In general terms, neither G-SIBs nor non-G-SIBs hold very significant amounts of G-SIB-issued TLAC. This is partly because few instruments other than regulatory capital instruments currently meet the Term Sheet criteria. However, even when moving to the wider definitions to include other senior unsecured instruments, the majority of G-SIBs do not currently hold significant amounts of each other's liabilities. However, there is considerable variation between different banks and different geographic regions, with some notable outliers. In the case of the widest definition (Case 4), G-SIB cross-holdings range from €0.2bn to €31bn and TLAC holdings by non-G-SIBs range from zero to €40bn (compared to medians of €5.8bn for G-SIBs and zero for non-G-SIBs).

3. Market Capacity Findings

3.1 Market size

To put the TLAC shortfall numbers into perspective, Exhibit 4 shows the TLAC shortfalls in relation to estimated market volumes for debt securities. This analysis should be treated as illustrative, as issuance by G-SIBs to meet minimum TLAC requirements should involve, to a large degree, substitution of one bond for another with different characteristics and not net new issuance of the full shortfall amount (i.e., if G-SIBs were able to use this substitution to meet their entire shortfall, the overall volume of bank bonds would (ceteris paribus) remain constant).

Across 29 G-SIBs, including emerging market G-SIBs, the total amount of outstanding G-SIB debt security issuance as of end-2014 is €4,527bn. The average issuance is €156bn, of which 81% matures within the next five years, although the amounts vary considerably across G-SIBs. The Case 1 shortfalls represent 16.9% and 30.7% of this market for the 16% RWA or 6% EM and 20% RWA or 6% EM calibrations, respectively. The corresponding amounts for Case 3 are 11.6% and 22.6%, respectively.

The Case 1 shortfalls represent 1.0% and 1.7% of the broader €80 trillion market for all debt security types for the 16% RWA or 6% EM and 20% RWA or 6% EM calibrations, respectively. The corresponding amounts for Case 3 are 0.7% and 1.3%, respectively.

Some of the market figures should be treated with caution. Multiple data sources were used for various markets and classes of instruments, and data sources may have gaps in coverage. It should also be noted that there may be constraints on investment mandates as well as differences in absorption capacity across geographic markets and proportions of G-SIB securities that will roll off by 2019.

TLAC shortfalls

Percentage of estimated market volume

Exhibit 4

	Outstanding amounts	% of outstanding amounts			
		Case 1 shortfall[d]		Case 3 shortfall[d]	
	€bn	16%-6%	20%-6%	16%-6%	20%-6%
Including emerging market G-SIBs					
Total global debt securities[a]	80,307	1.0%	1.7%	0.7%	1.3%
of which financial corporations[a]	32,304	2.4%	4.3%	1.6%	3.2%
G-SIBs – unsecured debt securities[b]	4,527	16.9%	30.7%	11.6%	22.6%
of which: senior unsecured[b],[c]	4,262	18.0%	32.6%	12.3%	24.0%
subordinated[b],[c]	265	n/a	n/a	n/a	n/a
Excluding emerging market G-SIBs					
G-SIBs – unsecured debt securities[b]	4,458	11.2%	21.3%	5.8%	13.2%
of which: senior unsecured[b],[c]	4,248	11.7%	22.3%	6.1%	13.8%
subordinated[b],[c]	210	n/a	n/a	n/a	n/a

a) Source: BIS Quarterly Review September 2015, Graph C.1. Reference date is 2014 Q4. All instrument types including secured debt, certificates of deposits and commercial papers. Converted in EUR using an exchange rate of 0.8262 EUR per US$ (as at 31.12.2014). See: http://www.bis.org/statistics/r_qt1509_stats.zip.

b) Source: BCBS QIS study, based on Case 4. Regulatory capital instruments are excluded. Reference date: end-2014.

c) Subordinated debt does not include structurally-subordinated holding company-issued senior unsecured debt issued by G-SIBs. These are included as senior unsecured debt.

d) Shortfalls are based on 16% RWA or 2×3% leverage (16%-6%); and 20% RWA or 2×3% leverage (20%-6%).

3.2 TLAC Market Survey findings

The FSB surveyed G-SIBs, other market participants (including asset managers) and credit rating agencies in the first half of 2015. The surveys were designed to assess the potential impact of minimum TLAC requirements on pricing of TLAC-eligible G-SIB liabilities, investor behaviour and market capacity. The main findings are summarised below. The data and information described in this section should be treated with caution. Due to the qualitative nature of the surveys, many responses were subjective. There were small sample sizes for some questions, and certain categories of market participants were under-represented.

i. Investor classes

Asset managers are the largest investor class of G-SIB liabilities, followed by insurers and broker-dealers, amongst the market participant respondents. On a typical operating day in 2014, surveyed asset managers held, on average, €385 million in AT1 instruments, €1,376 million in T2 debt instruments, and €14,016 million in senior unsecured G-SIB debt.

Asset manager respondents generally selected credit ratings and issuer concentration rather than subordination as impacting their investment exposure to G-SIBs. Respondents

considered 'lack of clarity of regulatory treatment in resolution', 'lack of balance sheet transparency', and 'fundamental balance sheet improvement' more important in pricing G-SIB senior liabilities than the other listed factors, including 'credit ratings.'

ii. G-SIB issuance strategies

According to the results of the survey, most G-SIBs do not plan to replace existing ineligible TLAC liabilities prior to maturity. When asked for their plans in satisfying TLAC shortfalls, most reported that significant amounts of their TLAC-ineligible debt will mature by 2019. They noted that this would allow them to rollover a large percentage of the ineligible debt into TLAC-eligible liabilities by that time, albeit at a higher cost of funding. Some respondents were, however, concerned about decreases in investor demand in certain regional markets following high profile natural disasters and the introduction of new banking regulations.

iii. Impact on pricing

Market participants expected average spread movements due to implementation of minimum TLAC requirements for AT1, T2 and holding company-issued senior unsecured debt of 26bps, 19bps and 35bps, respectively. Expected spread movements were approximately the same for both structural and contractual subordination, most likely because these classes of instruments are subordinated already. That said, for liabilities issued by parent and other operating companies there was an appreciable difference between the expected impact of structural (18bps) and contractual subordination (25bps). These spread movements are narrower than the expected spread movements of holding company-issued senior unsecured debt. However, it should be noted that these responses are subject to uncertainty. In particular, some responses referred instead to the expected spread between TLAC eligible instruments and comparable ineligible instruments in steady state (i.e., after implementation of minimum TLAC requirements).

When asked how incremental market issuance to meet minimum TLAC requirements could impact spreads of senior unsecured liabilities, 62% of respondents expected spreads to narrow, remain stable, or widen slightly; versus 38% who expected spreads to either widen moderately or substantially. For subordinated liabilities, the expectation of widening spreads increased with 54% expecting moderate or substantial widening, versus 46% expecting spreads to either remain stable or widen slightly. Respondents expected structural subordination to be less costly than or to have the same risk premium as either contractual or statutory subordination.

iv. Distortion factors and stress periods

A significant number of market participants consider current unconventional monetary policies to be distorting yield curves at historically low levels across all assets classes. They believe this environment is causing investors to search for yields, making market conditions attractive for G-SIBs as issuers. On the other hand, increasing nominal spreads are generally expected by most who responded, particularly considering perceived uncertainty over potential future regulatory requirements for G-SIBs that could depress demand.

Market participant respondents generally believe G-SIBs would have significant problems issuing TLAC-eligible instruments in a cyclical downturn or a financial crisis.[8] The majority of these respondents expressed reservations about the ability of G-SIBs to issue TLAC-eligible debt even in a cyclical downturn. In a financial crisis, three quarters of respondents believe G-SIBs would be unable to issue.

v. Additional management buffer

Most market participant respondents expect that G-SIBs are likely to hold TLAC buffers above the minimum requirements. These respondents expect that G-SIBs are likely to hold an additional buffer, on average, of 1.8% RWA.

vi. Emerging market economy (EME) issuance

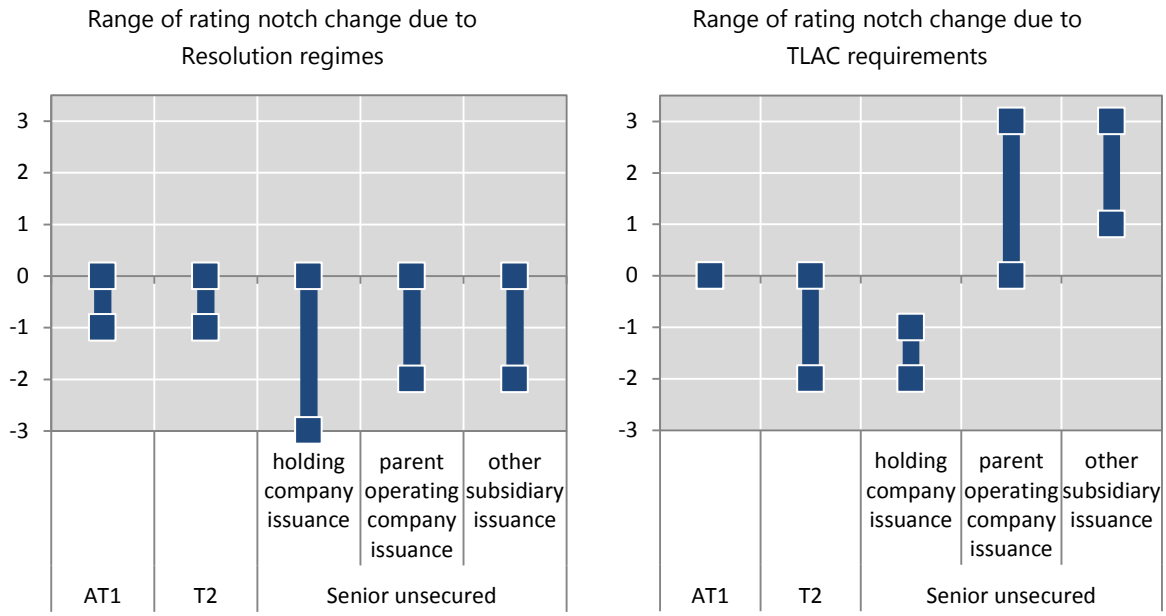
Few comments were made about issuing in EMEs, but several MPE subsidiaries expressed concerns with issuing in emerging economies that lack developed local bond markets.

3.3 Credit rating agency findings

As a result of reforms to resolution regimes, credit rating agencies are in the process of removing sovereign support assumptions. Rating changes vary depending on the home jurisdiction's resolution regime and are summarised in the table below. Rating agencies generally expect rating downgrades for all G-SIB debt as resolution regimes become operational. Once minimum TLAC requirements are in place, they expect rating uplifts for senior unsecured debt issued by operating companies and other subsidiaries, and rating downgrades for senior unsecured debt issued by non-operating holding companies.

[8] A cyclical downturn is associated with below average global GDP growth, a few G-SIB economies in recession, zero average G-SIB profit and heightened risk aversion. A financial crisis is considered as similar in severity to the 2008 crisis, with most G-SIBs making losses, a few banks close to or in resolution and severely heightened risk aversion.

Expected rating changes due to resolution regimes and TLAC requirements Exhibit 5



4. Estimates of Costs of Meeting Shortfalls[9]

The cost of meeting shortfalls depends on both the size of the shortfall and G-SIBs' strategies to eliminate it. The estimates of the cost of meeting the minimum TLAC requirement are based on the idea that G-SIBs will have to replace existing liabilities with more expensive TLAC-eligible liabilities until they fill their shortfall.

The shortfall calculations consider those liabilities reported by G-SIBs under Case 1 in the BCBS QIS as available TLAC resources, and the analysis imposes the condition that fully phased-in Basel III requirements are met.[10]

Average and aggregate shortfalls

Assuming Basel III requirements are fully met Exhibit 6

	16% of RWA plus applicable buffers		20% of RWA plus applicable buffers	
6% of EM	Average Shortfall:	€25.6bn	Average Shortfall:	€46.3bn
	Aggregate Shortfall:	€767bn	Aggregate Shortfall:	€1,388bn
10% of EM	Average Shortfall:	€45.5bn	Average Shortfall:	€58.5bn
	Aggregate Shortfall:	€1,365bn	Aggregate Shortfall:	€1,755bn

Source: Economic Impact Assessment estimates.

[9] The micro- and macroeconomic analyses includes emerging market G-SIBs, where feasible.

[10] For G-SIBs that do not meet the fully phased-in requirements, non-capital liabilities are converted into regulatory capital in order to eliminate any shortfalls vis-à-vis these requirements.

Exhibit 6 shows summary statistics for the shortfall figures used in the analysis. The aggregate shortfall figures are consistent with those presented in the QIS report and in Exhibit 1 of this Report. Depending on the calibration of the minimum TLAC requirement, the average shortfall across the G-SIBs for this analysis ranges from €26bn to €59bn.

The G-SIBs' shortfall amounts are put into perspective when they are compared to the total size of the G-SIBs' liabilities that meet some but not all the TLAC eligibility criteria. This comparison also provides a gauge of the resources that G-SIBs can convert to meet the requirement. Only a handful of G-SIBs exceed the 100% threshold in Calibration 1 (a 100% ratio indicates a shortfall that is exactly matched by liabilities that meet some but not all the TLAC eligibility criteria). However, many more G-SIBs have ratios higher than this number in the other calibrations. The median ratios for Calibrations 1, 2, 3, and 4 are 45%, 84%, 112%, and 146% respectively.

4.1 Estimates of the cost of eliminating the shortfall

Mindful of jurisdictional differences in G-SIBs' approaches to meeting minimum TLAC requirements, the EIA analysed the costs on the basis of a 'least cost' approach but allowing for some variation across jurisdictions. The basic principle is that G-SIBs replace their most expensive non-TLAC liabilities with TLAC-eligible ones first, and proceed with the next most expensive (implying a higher conversion cost) until they eliminate the shortfall. G-SIBs are assumed to maintain the current distribution of issuance across jurisdictions as well as their current debt maturity profile. In applying those principles, the EIA ended up with approaches that are common in spirit, but specific by G-SIB and jurisdiction.

The statistics of the increases in the weighted average cost of funding across the 30 G-SIBs and for the four calibrations (Exhibit 7) point to contained microeconomic costs for the large majority of G-SIBs. For many G-SIBs, the conversion of non-eligible to TLAC-eligible liabilities would result in a rise of the weighted average cost of debt for the classes of liabilities involved in the conversion, with the median increase estimated to be between 43bps (Calibration 1) and 115bps (Calibration 4).

The change in the weighted-average funding costs and the amount of liabilities converted together produce a total cost to the G-SIB of becoming TLAC compliant. The cost for the median G-SIB is €195 million for Calibration 1 and €950 million for Calibration 4. In all calibrations, there is considerable dispersion across G-SIBs.

These calculations are based on fairly conservative assumptions including a restrictive assumption about the available resources to meet minimum TLAC requirements and generally high estimates of the conversion costs of non-eligible liabilities to TLAC-eligible ones.

Change in weighted average cost of TLAC-eligible and non-eligible liabilities

In basis points — Exhibit 7

	16% of RWA		20% of RWA	
6% of EM	Low quartile:	0.8	Low quartile:	16.7
	Median:	42.7	Median:	81.8
	High quartile:	94.3	High quartile:	124.8
	Median cost	€195 million	Median cost	€511 million
10% of EM	Low quartile:	25.5	Low quartile:	43.8
	Median:	99.5	Median:	114.9
	High quartile:	173.1	High quartile:	173.1
	Median cost	€850 million	Median cost	€950 million

The figures represent descriptive statistics for the difference between G-SIBs' volume-weighted average cost of liabilities, before and after converting existing liabilities to meet TLAC requirements. They represent an increase in funding costs per unit of liability. A figure of 40 means that after conversion funding costs will increase by €4 for each €1,000 in liabilities. The computation encompasses only the liability classes that are involved in the conversion (i.e. it excludes deposits and other operational liabilities as well as equity).

Source: Economic Impact Assessment estimates.

4.2 Robustness calculation: a supply surge may increase TLAC spreads[11]

A surge in TLAC-eligible debt issuance by G-SIBs will test the absorption capacity of the market and may lead to an increase in related spreads. Two approaches are used to calculate this effect, focusing on the four major markets where G-SIBs have issued liabilities (U.S., Euro-area, UK and Japan).

The first approach applies a flat 30bps increase to the spreads of TLAC-eligible liabilities in all jurisdictions, using analysis from the TLAC Market Survey that market participants expect a possible increase in spreads for TLAC-eligible liabilities of about 30bps after the requirements are implemented. This is defined as the "integrated markets" approach.

The second approach uses elasticity estimates to assess spread responses locally, assuming that G-SIBs maintain the end-2014 geographical issuance pattern and that bond markets are segmented geographically. This is defined as the "segmented markets" approach.

The supply surge is measured by the ratio of aggregate shortfalls to the current size of the market, using data from the QIS. This results in a conservative estimate of market size because it only accounts for issuance by the G-SIBs themselves (i.e., it ignores the volume of similar debt issued by other banks or financial companies). The estimated supply shock is small for the two largest markets in the U.S. and Europe (with an increase of 2% to 30% depending on calibration), moderate for the UK market (increases of 15% to 51%), and large for the Japanese market (volume increases of 70% to 200%).

[11] In contrast to the rest of the micro- and macroeconomic analysis and due to lack of sufficient data, this robustness calculation excludes emerging market G-SIBs.

Estimates of the additional per G-SIB funding cost from this robustness calculation show that the impact is very concentrated on those G-SIBs with large shortfalls (and hence large issuance needs) that also issue in thin market segments. For the lowest calibrations (16% RWA or 6% EM and 20% RWA or 6% EM) only a handful of G-SIBs need to issue much more than the estimated market capacity. All G-SIBs from one jurisdiction belong to this group, but the other G-SIBs in this category are rather dispersed geographically. About half of the G-SIBs have a zero or negligible increase in their net new issuance.

Exhibit 8 presents the estimated funding cost increases for the two approaches described here and the baseline case from Section 4.1. Compared to the baseline estimate of €8.2bn, the aggregate funding cost increase for the integrated market approach (€9.7bn) is lower than for the segmented market approach (€11.8bn). But the increases in costs are more evenly distributed under that the integrated market approach, as shown by the median cost figures.

Cost of TLAC compliance for 16% RWA or 6% EM calibration: three alternatives

In € million — Exhibit 8

	Baseline	Integrated markets	Segmented markets
Aggregate (excluding emerging market G-SIBs)	8,236	9,730	11,775
G-SIB at median	117	165	128

Baseline refers to the funding cost estimates in Section 4.1 of this Report. However, the figures are not directly comparable because the analysis in this Section excludes emerging market G-SIBs.

Source: Economic Impact Assessment estimates.

The robustness calculations in this section have to be considered with some caution. Besides using a very conservative estimate of the market size, they probably underestimate the flexibility of some local markets. For instance, when two G-SIBs issued low-trigger contingent convertible instruments (CoCos) in a non-existent CoCos market, demand proved very elastic and able to absorb the sizeable volumes of these new instruments (totaling roughly €25bn) at reasonable spreads (in the 150-200bps range over senior unsecured debt).

4.3 Impact on G-SIBs' lending rates

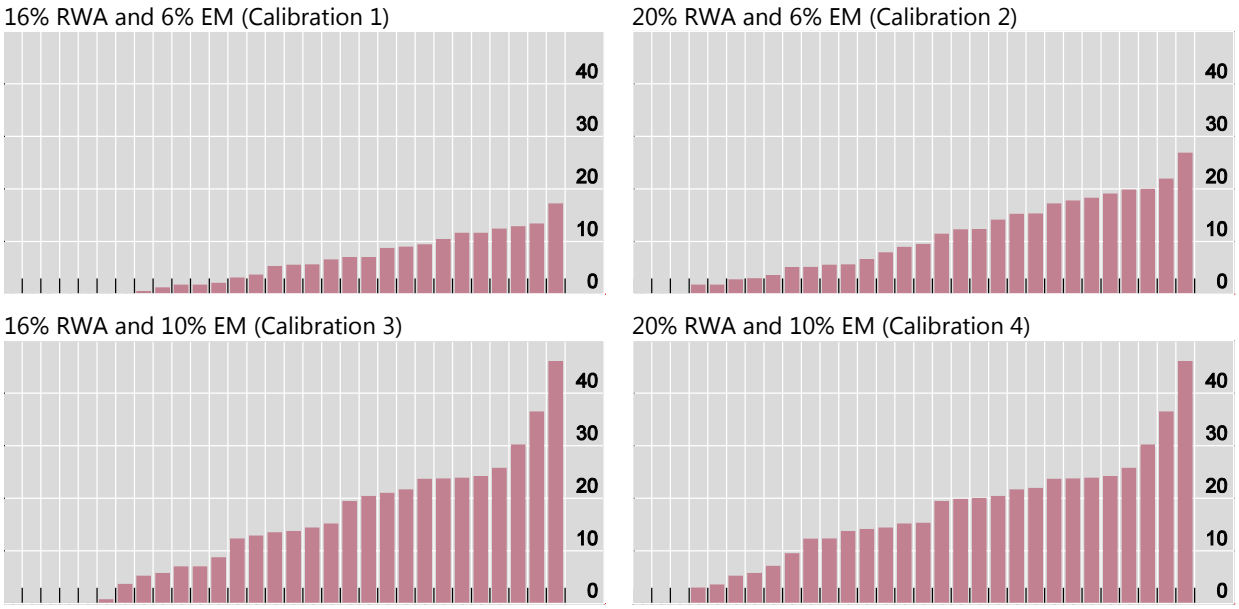
The increase in the funding cost of G-SIBs is translated into economy wide costs by determining the corresponding increase in lending rates that would be necessary to keep G-SIBs' net interest income (and therefore return on equity) constant.

The results for the four calibrations are plotted in the Exhibit 9 below. The size of the impact on lending rates is directly linked to the relationship between the cost of eliminating the shortfall and the size of the loan book of the G-SIB, since this is the only source of revenue that is assumed to be impacted.

Increase in lending rates to cover for higher funding costs

In basis points

Exhibit 9



Note: Bars depict the relevant statistics for each G-SIB, ranked in increasing order. Individual G-SIBs may rank differently across panels in a single graph and across graphs.

Source: Economic Impact Assessment estimates.

For Calibration 1 the resulting median lending rate increase to recoup the higher cost of funding is 5.4bps and no G-SIB needs to increase rates by more than 20bps (Exhibit 9, top left panel). For Calibration 2 the median lending rate increases to 9.2bps and only two G-SIBs require an increase in excess of 20bps (top right panel). For Calibrations 3 and 4 the increases in rates are higher: the median estimates being 13.6bps and 15.2bps, respectively, and implying that four G-SIBs may require increases above 25bps.

5. Macroeconomic Impact

5.1 Macro costs analysis

The macroeconomic costs of TLAC are computed by translating the microeconomic impact of higher costs of credit to G-SIB clients into lower levels of annual GDP. The calculation uses three inputs: estimated increases in lending rates, the market shares of affected institutions, and the "multipliers", namely the estimated negative impact on GDP corresponding to an increase in lending rates. The methodology mirrors that used in the BCBS-FSB Macroeconomic Assessment Group for Basel III (MAG) study.[12] The baseline calculation

[12] The MAG study analysed the GDP effect of higher capital and liquidity requirements in Basel III. See http://www.bis.org/publ/othp12.pdf

uses the increase in the lending rate for the median G-SIB in each of the calibrations (as described in Section 4.3).

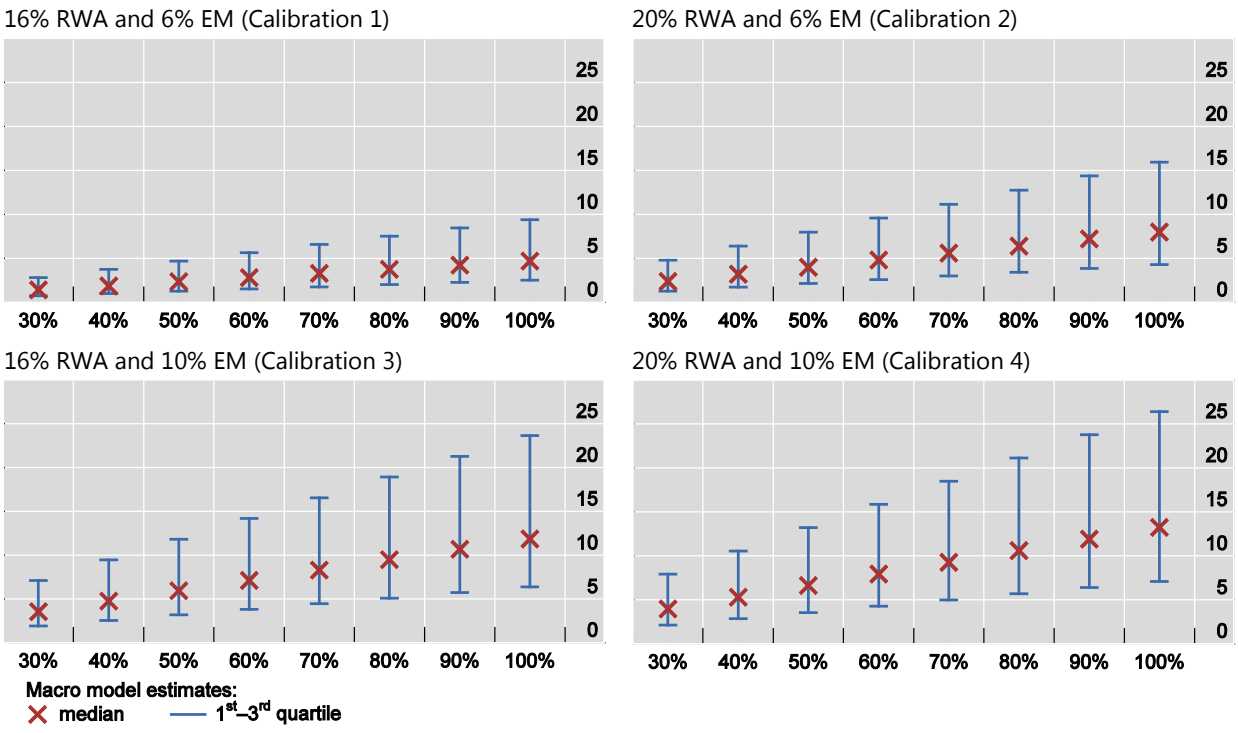
As the TLAC standard applies only to G-SIBs, the average borrower in the economy will pay a rate that reflects the market power of these banks. For the purposes of this study a 40% G-SIB market share (which is the average observed for different jurisdictions) is used as baseline. However, a variety of assumptions about the G-SIB market share are used to capture in a parsimonious way the potential impact of other factors that have a similar effect on GDP. For instance, G-SIBs may be market leaders and thus trigger a generalised increase in the price of credit even by non-G-SIB banks not subject to TLAC.

The multipliers in these models suggest that a 10bps increase in lending spreads would lead to a drop in the benchmark long-run GDP of between 5bps to 17bps, with the median model resulting in a reduction in long-run GDP of about 9bps.

Exhibit 10 below shows the range of long-run macroeconomic effects for each calibration of the minimum TLAC requirement. The estimated costs are generally small. For Calibration 1, the baseline median GDP impact is less than 2bps, as denoted by the red cross in the 40% market share column of the top left panel. For all G-SIB market share levels and the range of model-implied multipliers, the cost in terms of the reduction in long-run annual GDP relative to benchmark is less than 10bps, as denoted by the top of the blue line in the 100% market share bar of the top left panel. For Calibration 2, the baseline median GDP impact is 3bps, rising to 8bps as G-SIB market share increases.

Range of macro cost estimates for different market shares of G-SIBs

Impact on annual GDP (in basis points) Exhibit 10



The panel that corresponds to each calibration shows a range of the estimated reduction in annual GDP for a variety of underlying parameters. The horizontal axis measures different assumed market shares of G-SIBs. The weighted average market share is about 40% and corresponds to the second bar from the left in each panel. A share of 100% implies that all banks in the economy move their lending rates in lockstep with G-SIBs. For each assumed share (horizontal axis) the blue bars represent the impact on annual GDP based on a range of estimates from the macroeconomic models used in MAG. The blue bar captures the inter-quartile range (i.e. from the lowest 25% to the highest 75%) of the estimated reduction in annual GDP from a 1 ppt increase in the lending rate. The estimates are multiplied by the median lending rate increase necessary to recoup the higher costs of G-SIB funding due to TLAC. The red cross depicts the same calculation based on the median estimated GDP response.

Source: Economic Impact Assessment estimates.

For Calibrations 3 and 4, the costs are higher but not excessively so. The baseline figures for both Calibrations 3 and 4 are around 5bps. Even for the most extreme combination of market share and interest rate sensitivity, the reduction in annual GDP is around 25bps.

5.2 Robustness calculation: GDP impact from widening of TLAC spreads[13]

The robustness calculations for the microeconomic impact in Section 4.2 considered a generalised increase in the cost of TLAC-eligible liabilities and, thus, higher funding costs for G-SIBs. This section follows up on that exercise by estimating the resulting impact on GDP.

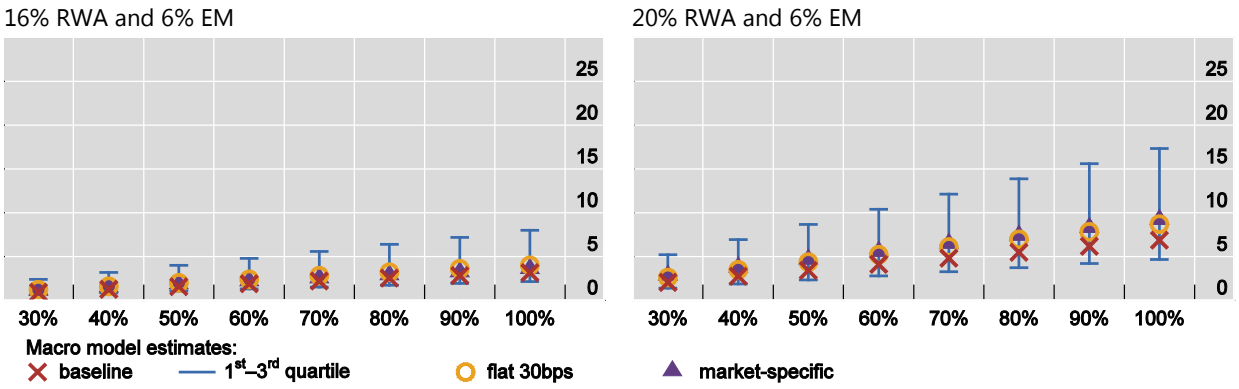
The two panels of Exhibit 11 show the range of GDP estimates for Calibrations 1 and 2 (i.e., those based on 6% of the EM). The red cross corresponds to the median estimate using the baseline calculation from Exhibit 10 in Section 5.1 above. The yellow circle denotes the

[13] In contrast to the rest of the micro- and macroeconomic analysis and due to lack of sufficient data, this robustness calculation excludes emerging market G-SIBs.

median estimate for the integrated markets approach (i.e., the flat 30bps increase) and the purple triangle denotes the median estimate for the segmented markets approach.

Range of macro cost estimates: robustness calculations

Impact on annual GDP (in basis points) Exhibit 11



The panel that corresponds to each calibration shows a range of the estimated reduction in annual GDP for a variety of underlying parameters. The horizontal axis measures different assumed market shares of G-SIBs. The weighted average market share is about 40% and corresponds to the second bar from the left in each panel. A share of 100% implies that all banks in the economy move their lending rates in lockstep with G-SIBs. For each assumed share (horizontal axis), the blue bars represent the impact on annual GDP based on a range of estimates from the macroeconomic models used in MAG. The blue bar captures the inter-quartile range (i.e., from the lowest 25% to the highest 75%) of the estimated reduction in annual GDP from a 1 ppt increase in the lending rate. The estimates are multiplied by the median lending rate increase necessary to recoup the higher costs of G-SIB funding due to TLAC. The red cross depicts the same calculation based on the median estimated GDP response.

Source: Economic Impact Assessment estimates.

For Calibration 1, there is very little difference in macro costs between the baseline and the two alternative approaches. This is due to the small increase in funding costs in relation to G-SIBs' loan books (see Exhibit 9), which results in a small increase in loan spreads.

Calibration 2 is somewhat different, as the segmented markets approach results in higher costs than the baseline. This is because a higher calibration exacerbates the asymmetry in the cost increases across G-SIBs by putting more pressure on the G-SIBs issuing in tight markets. This non-linear effect lifts the average impact more than in the case of a flat 30bps increase. That said, and keeping in mind the conservative nature of the underlying assumptions, the annual GDP costs remain below 20bps, even under the most extreme assumptions.

5.2 Spillovers

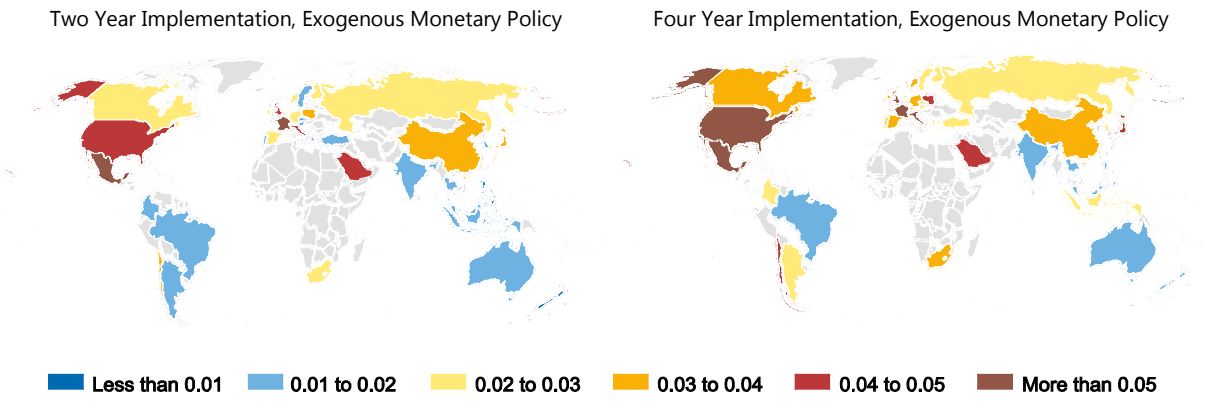
The global macroeconomic costs and spillovers from the introduction of TLAC are analysed using the IMF's Global Macrofinancial Model (GFM). Following the same methodology as in the analysis of macroeconomic costs, the analysis maps the costs of satisfying TLAC onto credit spread increases in G-SIB home and host countries. Output spillovers are transmitted across economies in the GFM via trade, financial, and commodity price linkages. For example, an interest rate spread increase in a G-SIB home country reduces private consumption and investment locally but also export demand in other countries. In addition, the interest rate spread increases in G-SIB host countries reduce aggregate demand locally.

Interest rate spread increases also partially pass through to other countries via cross-border bank lending linkages.

For G-SIB home countries, the estimated median peak output loss is 3 to 4bps depending on the length of the TLAC implementation period, of which 1bp is accounted for by spillovers. For host and other countries, the estimated median peak output loss is 2 to 3bps depending on the length of the TLAC implementation period. Exhibit 12 below illustrates the GDP impact for a range of home and host countries.

Heatmap of macro impact across home and host countries

Percentage points of annual GDP assuming exogenous monetary policy — Exhibit 12



Monetary policy is taken as exogenous and assumed not to offset the impact of TLAC on the economy until after the implementation period.

Source: Economic Impact Assessment estimates.

5.3 Benefits analysis

The benefits of TLAC (relative to bail-outs) arise mainly from lowering the likelihood of government bail-outs and thus containing risk-taking and reducing the likelihood of G-SIBs coming under stress. The analysis distinguishes between two main effects of TLAC implementation:

(i) A reduced likelihood of a crisis, which is a direct consequence of the reduction in the probability that an individual G-SIB fails (the disciplining role of bail-in-able debt).

(ii) Reduced costs of crises, stemming from the replacement of an ad hoc and uncertain process with an orderly framework based on ex ante rules. This allows governments more fiscal leeway, avoids increasing public debt levels and mitigates increases in sovereign yields that serve as the benchmark for private sector funding rates.

The analysis compares the difference between two estimates of the GDP impact of crises. The first estimate is the 'counterfactual' that assumes Basel III capital is in place but that the possibility exists that G-SIBs are bailed out. This counterfactual calculation multiplies the unconditional probability of a crisis with an estimate of the GDP cost of crises based on the

academic literature.[14] The second estimate is the same calculation assuming an effective and credible G-SIB resolution framework financed by TLAC. The likelihood of a crisis is now reduced as a result of greater discipline exerted on individual G-SIBs, while the cost of crises is reduced because of the lower costs to the government and lower benchmark interest rate.

The introduction of TLAC reduces the cost of crises by 5.4 percentage points (ppt) of GDP. This is the combined effect of: (i) the lower fiscal costs (no bail-outs) and thus greater leeway for the use of fiscal policy, accounting for 3.8 ppt; and (ii) the impact from lower sovereign yields in a crisis on credit costs of the private sector, accounting for 1.6 ppt.

Exhibit 13 shows the combined economic benefit expressed in basis points of annual GDP for a range of assumptions. The three panels correspond to three assumptions of the size of crisis costs (no permanent impact costing 19% of pre-crisis GDP, moderate permanent cost of 63% of pre-crisis GDP and permanent effects costing 158% of pre-crisis GDP), and the columns inside each panel correspond to three alternative calibrations of the disciplinary role of bail-in-able debt (weak, central or strong, corresponding to reductions in probability of default of individual G-SIBs of 20%, 30% and 40%, respectively).

Range of benefits estimates

In bps of annual GDP — Exhibit 13

G-SIB share	Low crisis cost No permanent impact (19% of GDP)			Conservative estimate Moderate permanent cost (63% of GDP)			Permanent effects of crises (158% of GDP)		
	Discipline effect			Discipline effect			Discipline effect		
	Weak	Central	Strong	Weak	Central	Strong	Weak	Central	Strong
Baseline estimate	18	21	23	37	48	58	79	106	133
Range	15-20	16-23	18-26	24-46	30-59	35-71	44-101	58-135	72-167

Source: Economic Impact Assessment estimates.

The results point to a wide range for the estimated impact, a direct consequence of the breadth of the alternative estimates for the effect of crises. But the main message is that even for the most conservative assumptions (i.e., low cost of crises, weak disciplinary impact, and low G-SIB market share), the benefits are between 15 and 20bps of annual GDP.

These benefits are comparable to the higher end of the range of estimated costs for the most demanding TLAC calibration, the highest sensitivity of GDP to interest rates, and a substantial market share for G-SIBs (from Exhibit 10). For other cases that are closer to the average values of market share and sensitivity of GDP to interest rates, the benefits are greater than the costs by a good margin.

[14] The unconditional probability is based on estimates by the BCBS Long Economic Impact Study of 2010. The same study summarises the academic literature on the estimate of the GDP cost of crises. See http://www.bis.org/publ/bcbs173.pdf

6. Historical Losses and Recapitalisation Needs

The FSB analysed historical losses and recapitalisation needs for a number of (near-) G-SIBs. All cases were taken from the recent global financial crisis and the Japanese banking crisis in the 1990s. Losses have been measured by total comprehensive income (TCI), corrected for regulatory adjustments in order to arrive at a measure of capital erosion. Recapitalisation includes direct public capital injections as well as asset relief measures translated into a measure of capital support.

Exhibit 14 presents the baseline results. The volumes of losses and recapitalisations vary significantly across banks. Total losses have been up to around 5% of total assets (Merrill Lynch, Wachovia) and close to 13% of RWAs (Fortis, Dexia). Losses and recapitalisation together have been up to 9% of total assets and 25% of RWAs (Fortis). The table also shows that differences across cases are significant, with interquartile ranges for losses and recapitalisation between 3 and 6% of total assets and between 6 and 15% of RWAs.[15] These differences can be seen in Exhibit 15, which shows losses and recapitalisation across the various cases.

Losses and recapitalisation

Percentage of assets — Exhibit 14

	TCI				TCI with regulatory adj.				
	Min	Interquartile range		Max	Min	Interquartile range		Max	No.
TA									
Losses	0.4%	1.7%	4.0%	4.7%	0.5%	1.1%	4.2%	5.3%	13
Recapitalisation	0.3%	1.3%	2.9%	4.5%	0.3%	1.3%	2.9%	4.5%	13
Losses + recap	1.2%	3.9%	6.1%	8.8%	1.3%	3.0%	6.1%	8.7%	13
RWA									
Losses	0.6%	3.9%	7.6%	12.8%	0.7%	2.5%	6.8%	12.6%	13
Recapitalisation	1.1%	1.8%	6.1%	12.8%	1.1%	1.8%	6.1%	12.8%	13
Losses + recap	1.7%	6.1%	15.3%	25.3%	1.8%	5.9%	11.7%	25.2%	13

TCI = Total Comprehensive Income, TA = total assets, RWA = risk-weighted assets, No. = sample size

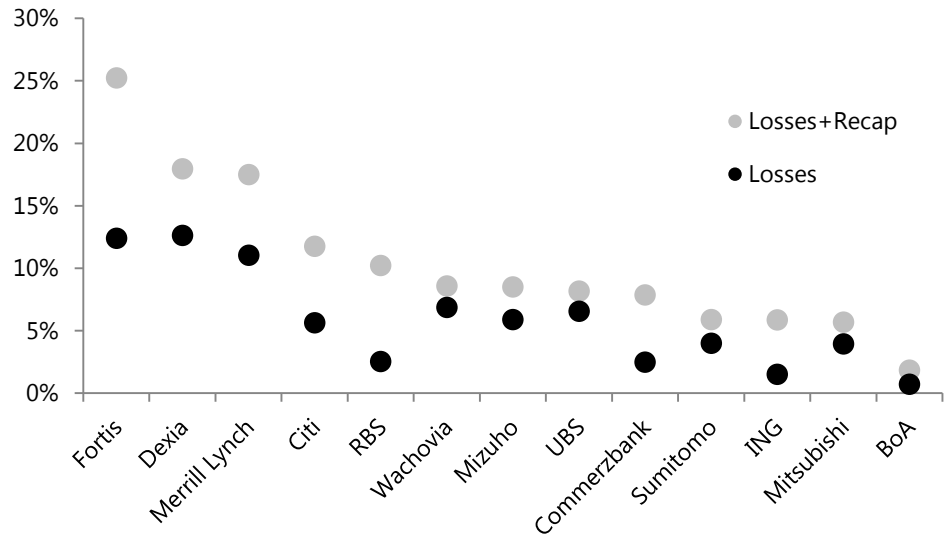
Losses are peak accumulated losses; assets measured in first year when losses occurred. If adjusted TCI and TA are not available, the unadjusted numbers are used.

Source: FSB Historical Losses and Recapitalisation Needs Findings Report.

[15] Prior to the recent crisis, risk-weights (risk-weighted assets divided by total assets) of G-SIBs have dropped significantly (see forthcoming 2015 FSB report on the impact of regulatory reforms). Under Basel III, risk weights increased compared to Basel II (see http://www.bis.org/publ/bcbs186.pdf). Note, however, that most banks in this analysis were primarily reporting under Basel I over the loss intervals considered. Focusing on the first year of losses, which is used as a denominator in loss and recapitalisation ratios, ten out of thirteen cases are based on Basel I data.

Losses and recapitalisation (risk-weighted assets)

TCI (with regulatory adj.) and total recapitalisation, percentage of RWA Exhibit 15



Risk-weighted assets are based on the first year a bank had losses. If TCI with regulatory adjustments is not available, unadjusted TCI is used.

Source: FSB Historical Losses and Recapitalisation Needs Findings Report.

Caveats in the analysis such as data gaps and the use of different definitions across jurisdictions are addressed on a best-effort basis and following a conservative approach, i.e., likely leading to underestimation rather than overestimation of losses and recapitalisation needs. However, the analysis remains subject to a number of important qualifications. Firstly, public support measures other than capital injections and asset relief measures are not included in the analysis. It is hard to quantify the impact of other public support measures such as large scale liquidity support and funding guarantees in containing bank-specific losses. Nonetheless, they are likely to have contained losses and recapitalisation needs and may not be available on a similar scale in the future.

Secondly, historical cases took place under regulatory frameworks that have changed significantly in recent years. It is difficult to assess the net impact on the estimated losses and recapitalisation needs. On the one hand banks have become better capitalised and macro-prudential tools including capital buffers have been developed, which increases banks' ability to deal with a crisis and contain losses. Moreover, increased risk weights under Basel III imply that losses and recapitalisation as a percentage of RWAs will be lower than under the old rules as applied to the historical cases in this analysis. At the same time, stricter requirements on prudent valuation in resolution imply that historical cases may underestimate losses compared to how these would be established under the current rules. The presence of bail-in instruments will also change loss patterns.

Lastly, extreme cases such as Lehman Brothers and Bear Stearns are excluded from the baseline results and a cautious approach has been followed to quantify asset relief measures.