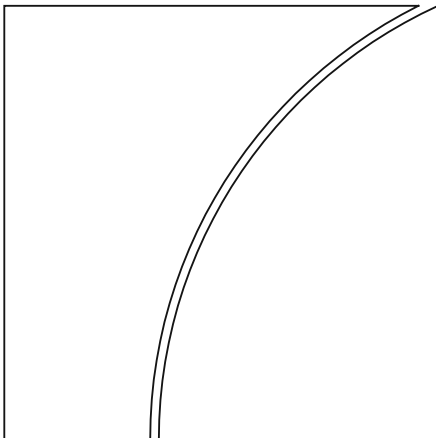


Basel Committee on Banking Supervision



Basel III Monitoring Report

December 2017

Results of the cumulative
quantitative impact study



BANK FOR INTERNATIONAL SETTLEMENTS

Queries regarding this document should be addressed to the Secretariat of the Basel Committee on Banking Supervision (e-mail: qis@bis.org).

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Highlights of the cumulative quantitative impact study	1
Detailed results of the cumulative quantitative impact study.....	3
1. General remarks	3
1.1 Scope of the cumulative quantitative impact study	4
1.2 Sample of participating banks.....	5
1.3 Methodology.....	5
1.4 Data quality and interpretation of results.....	7
2. Overview of results.....	8
2.1 Changes in minimum required capital.....	8
2.2 Impact on capital ratios and capital shortfalls	12
2.3 Interactions between risk-based, output floor and leverage ratio capital requirements	14
2.4 Main drivers of the impact.....	15
2.5 Impact on modelling and RWA variability for credit risk.....	16
3. Credit risk.....	22
3.1 Revised internal ratings-based approach	22
3.2 Revised standardised approach.....	23
4. Operational risk	26
5. Leverage ratio.....	27
5.1 Revisions to the Basel III leverage ratio exposure measure.....	27
5.2 Additional requirements for G-SIBs	28

Annexes

Annex A: Basel III phase-in arrangements.....	29
Annex B: Statistical Annex.....	31
Previous monitoring reports published by the Basel Committee.....	41

Conventions used in this report

billion thousand million
trillion thousand billion

Group 1 banks are those that have Tier 1 capital of more than €3 billion and are internationally active. All other banks are considered Group 2 banks.

Components may not sum to totals because of rounding.

The term "country" as used in this publication also covers territorial entities that are not states as understood by international law and practice but for which data are separately and independently maintained.

All data, including for previous reporting dates, reflect revisions received up to 8 December 2016.

Highlights of the cumulative quantitative impact study

Finalisation of Basel III results in no significant increase in overall capital requirements

The Basel III framework is a central element of the Basel Committee's response to the global financial crisis. It addresses a number of shortcomings with the pre-crisis regulatory framework, also based on the lessons learnt during the crisis, and provides a regulatory foundation for a resilient banking system that supports the real economy. The Committee's finalisation of the Basel III reforms¹ complements the improvements made to the global regulatory framework from the initial phase of the Basel III framework. The revisions seek to restore credibility in the calculation of risk-weighted assets (RWA) and capital ratios of banks.

This report summarises the aggregate cumulative quantitative impact study (QIS) results using data as of 31 December 2015. The Committee believes that the information contained in the report will provide relevant stakeholders with a useful benchmark for analysis as well as provide an estimated impact of the recently agreed upon reforms.

Information considered for this report was obtained by voluntary and confidential data submissions from individual banks and their national supervisors. Data were provided for a total of 248 banks, including 96 large internationally active ("Group 1") banks and 152 other ("Group 2") banks.² Of these banks, 71 Group 1 banks and 42 Group 2 banks provided sufficient data to be included in the overall impact analysis, while other banks were only included in the analyses for some of the policy topics. Members' coverage of their banking sector is very high for Group 1 banks, reaching 100% coverage for some countries, while coverage is lower for Group 2 banks and varies by country.

Note that this report does not take into account any transitional arrangements such as phase-in of deductions and grandfathering arrangements. Rather, the estimates presented generally assume full implementation of the final Basel III requirements based on data as of 31 December 2015. No assumptions have been made about banks' profitability or behavioural responses, such as changes in bank capital or balance sheet composition, either since this date or in the future. Data were provided by banks on a best-efforts basis and in accordance with the instructions prepared by the Committee in January and April 2016. In some cases where precise data were unavailable in their systems banks may have made conservative assumptions. These factors may result in overstating the actual impact. Based on these data, analyses have been adjusted to estimate, to the extent possible, the effects of the final standards.³

¹ Basel Committee on Banking Supervision, *High-level summary of Basel III reforms*, December 2017, www.bis.org/bcbs/publ/d424_hlsummary.pdf; Basel Committee on Banking Supervision, *Basel III: Finalising post-crisis reforms*, December 2017, www.bis.org/bcbs/publ/d424.htm.

² Group 1 banks are those that have Tier 1 capital of more than €3 billion and are internationally active. All other banks are considered Group 2 banks. Not all banks provided data relating to all parts of the Basel III framework.

³ See Section 1.4 for further details on the assumptions and caveats of the analysis.

Furthermore, the report does not reflect any additional capital requirements under Pillar 2 of the Basel II framework, any higher loss absorbency requirements for domestic systemically important banks, nor does it reflect any countercyclical capital buffer requirements.

On average, minimum required Tier 1 capital at the target level (Tier 1 MRC)⁴ decreases by 0.5% for Group 1 banks and increases by 3.8% for Group 2 banks (see also Table 1). Average risk-based capital ratios will increase by 0.2 percentage points for Group 1 banks and by 0.1 percentage points for Group 2 banks, relative to the current national implementation of the Basel III framework as agreed up to January 2016.⁵ The Group 1 and Group 2 bank samples are not directly comparable due to different business models and different regional distribution of the samples, and hence the impacts on them are not uniform.

However, effects vary across banks. Some banks will face increased capital requirements. Among Group 1 banks the aggregate shortfall is €27.6 billion in CET1 capital and €90.7 billion in total capital. The predominant part of these shortfalls comes from G-SIBs. To put these shortfall numbers in perspective: profit after tax for the same sample of banks in the concerned six-month reporting period (H2 2015) amounted to €198.3 billion for Group 1 banks.⁶ Overall, the shortfall of the Group 2 banks in the sample will be slightly reduced compared to current levels under fully phased-in national implementation of the Basel III framework as agreed up to January 2016.

The analysis also shows some evidence for a reduction in risk-weighted asset variability among the Group 1 banks in the sample.

Overview of results					Table 1		
	Number of banks	Change in Tier 1 MRC at the target level (%) ¹		Change in CET1 capital ratio (percentage points)	Capital shortfalls combined (€ billions)		
		All	of which: risk-based		CET1	Tier 1	Total
Group 1 banks	71	-0.5	0.2	0.2	27.6	56.4	90.7
Of which: G-SIBs	27	-1.4	-0.9	0.3	27.6	55.4	85.7
Group 2 banks	42	3.8	0.9	0.1	0.3	0.8	1.4

¹ As a percentage of overall basis MRC at the target level, ie combining risk-based as well as leverage ratio capital requirements and including capital conservation buffers and G-SIB surcharges where respectively applicable.

Source: Basel Committee on Banking Supervision.

⁴ Minimum required Tier 1 capital at the target level combines risk-based as well as leverage ratio capital requirements and includes capital conservation buffers and G-SIB surcharges where applicable.

⁵ In particular, changes due to the revised minimum capital requirements for market risk are already considered part of the current framework, subject to data availability. See Section 1.3.2 for details.

⁶ It is important to note, though, that future profits will only reduce shortfalls to the extent they are generated by shortfall banks.

Detailed results of the cumulative quantitative impact study

1. General remarks

The Basel III framework is a central element of the Basel Committee's response to the global financial crisis. It addresses a number of shortcomings with the pre-crisis regulatory framework and provides a regulatory foundation for a resilient banking system that supports the real economy.

The Committee's finalisation of the Basel III reforms¹ complements the improvements made to the global regulatory framework from the initial phase of the Basel III framework. The revisions seek to restore credibility in the calculation of risk-weighted assets (RWA) and therefore also capital ratios by:

- enhancing the robustness and risk sensitivity of the standardised approaches for credit risk and operational risk, which will help facilitate the comparability of banks' capital ratios;
- constraining the use of internally modelled approaches, by placing limits on certain inputs used to calculate RWA under the internal ratings-based (IRB) approach for credit risk and by removing the use of the modelled approach for operational risk;
- finalising the leverage ratio, which now includes a buffer to further limit the leverage of global systemically important banks (G-SIBs); and
- replacing the existing Basel I-based floor with a robust aggregate 72.5% output floor based on the Committee's revised standardised approaches.

In order to analyse the impact of the revised standards, the Committee conducted an ad hoc Basel III monitoring exercise with the data collection starting in April 2016, in addition to its regular Basel III monitoring exercise² and the data collection exercise from regulatory reporting systems. This report summarises the aggregate cumulative quantitative impact study results using data jointly from all three exercises. The Committee believes that the information contained in the report will provide relevant stakeholders with a useful benchmark for analysis as well as provide an estimated impact of the recently agreed upon reforms.

¹ Basel Committee on Banking Supervision, *High-level summary of Basel III reforms*, December 2017, www.bis.org/bcbs/publ/d424_hlsummary.pdf; Basel Committee on Banking Supervision, *Basel III: Finalising post-crisis reforms*, December 2017, www.bis.org/bcbs/publ/d424.htm.

² The 10th publication of results from the periodic Basel III monitoring exercise on 31 December 2015 data has been published separately in September 2016. A list of previous publications is included in the Annex.

In general the data are reported on a consolidated³ group basis and generally as of 31 December 2015.⁴ The data collection exercises underlying these analyses were conducted on a best-efforts basis by participating banks.

1.1 Scope of the cumulative quantitative impact study

In addition to components of eligible capital, the calculation of risk-weighted assets (RWA) and the Basel III leverage ratio under the current regime, the Committee collected data to allow for an assessment of the impact on participating banks of the standards set out in the proposals:

- to reducing variation in credit risk-weighted assets;⁵
- for a new standardised approach to credit risk;⁶
- for the new standardised approach for operational risk;⁷ and
- for revisions to the Basel III leverage ratio framework, including the introduction of a G-SIB buffer.⁸

This report reflects the impact of the final Basel III framework as published in December 2017.⁹ However, changes due to the revised securitisation framework¹⁰ as well as the review of the credit valuation adjustment risk framework¹¹ are not reflected in this report. These items together represent around 3.4% and 1.6% of total minimum required capital according to current national implementation of the Basel III framework as agreed up to January 2016 for Group 1 and Group 2 banks, respectively.

The estimates presented are based on data submitted by participating banks and their national supervisors in reporting questionnaires on voluntary and best effort basis and in accordance with the instructions prepared by the Committee in January and April 2016.¹² The final data were submitted to the

³ This refers to the consolidation for regulatory rather than accounting purposes.

⁴ The data for Japan are as of 30 September 2015, as banks in that country report on a biannual basis as of the end of March and the end of September to correspond to their fiscal year-end period. Further, the data for Canada reflect a reporting date of 31 October 2015, which corresponds to Canadian banks' fiscal year-end.

⁵ Basel Committee on Banking Supervision, *Reducing variation in credit risk-weighted assets – constraints on the use of internal model approaches*, March 2016, www.bis.org/bcbs/publ/d362.htm.

⁶ Basel Committee on Banking Supervision, *Revisions to the Standardised Approach for credit risk – second consultative document*, December 2015, www.bis.org/bcbs/publ/d347.htm.

⁷ Basel Committee on Banking Supervision, *Standardised Measurement Approach for operational risk – consultative document*, March 2016, www.bis.org/bcbs/publ/d355.htm.

⁸ Basel Committee on Banking Supervision, *Revisions to the Basel III leverage ratio framework – consultative document*, April 2016, www.bis.org/bcbs/publ/d365.htm.

⁹ Basel Committee on Banking Supervision, *High-level summary of Basel III reforms*, December 2017, www.bis.org/bcbs/publ/d424_hlsummary.pdf; Basel Committee on Banking Supervision, *Basel III: Finalising post-crisis reforms*, December 2017, www.bis.org/bcbs/publ/d424.htm.

¹⁰ Basel Committee on Banking Supervision, *Revisions to the securitisation framework*, July 2016, www.bis.org/bcbs/publ/d374.htm.

¹¹ Basel Committee on Banking Supervision, *Basel III: Finalising post-crisis reforms*, December 2017, www.bis.org/bcbs/publ/d424.htm.

¹² See Basel Committee on Banking Supervision, *Instructions for Basel III implementation monitoring*, January 2016; Basel Committee on Banking Supervision, *Instructions for Basel III monitoring ad hoc exercise*, April 2016. Both documents are available at www.bis.org/bcbs/qis/.

Secretariat of the Committee by 8 December 2016. Based on these data, analyses have been adjusted to estimate, to the extent possible, the effects of the final standards.¹³

1.2 Sample of participating banks

All but four of the 27 Committee member countries participated in the Basel III monitoring exercise as of 31 December 2015 and the related ad hoc data collection exercise. Furthermore, the Philippines and Poland participated in the exercise on the revised standardised approach for credit risk.

Data were provided for a total of 248 banks, including 96 large internationally active (“Group 1”) banks (among them all 30 G-SIBs according to the list of banks published by the Financial Stability Board in November 2015¹⁴) and 152 other (“Group 2”) banks.¹⁵ Of these banks, 71 Group 1 banks (among them 27 G-SIBs) and 42 Group 2 banks provided sufficient data to be included in the overall impact analysis, while other banks were only included in the analyses for some of the policy topics.¹⁶ Members’ coverage of their banking sector is very high for Group 1 banks, reaching 100% coverage for some countries, while coverage is lower for Group 2 banks and varies by country. Given their heterogeneity, the impact for Group 2 banks may sometimes be dominated by large, non-internationally active banks.

The Committee appreciates the significant efforts contributed by both banks and national supervisors to this data collection exercise.

1.3 Methodology

1.3.1 Aggregation

Reported average amounts in this report have been calculated by creating a composite bank at a total sample level, which effectively means that the total sample averages are weighted. For example, the average common equity Tier 1 capital ratio is the sum of all banks’ common equity Tier 1 (CET1) capital for the total sample divided by the sum of all banks’ RWA for the total sample. Similarly, the average fully phased-in Basel III Tier 1 leverage ratio is the sum of all banks’ fully phased-in Tier 1 capital for the total sample divided by the sum of all banks’ Basel III leverage ratio exposures for the total sample.

1.3.2 Impact metrics

Throughout the report, the effect of the reforms is shown in terms of: (i) changes in minimum required capital (MRC); (ii) percentage point changes in CET1; and (iii) estimated capital shortfalls. MRC and shortfalls are computed on banks’ target requirement levels. While the *minimum* levels reflect a risk-based 4.5% CET1, a 6% Tier 1 and an 8% total capital requirement as well as a 3% requirement for the Basel III leverage ratio, the *target* level also accounts for the capital conservation buffer (ie resulting in a 7% CET1, an 8.5% Tier 1 and a 10.5% total capital requirement), as well as any applicable G-SIB surcharge (both for risk-based and Basel III leverage ratio frameworks).

¹³ See Section 1.4 for further details on the assumptions and caveats of the analysis.

¹⁴ See Financial Stability Board, *2015 list of global systemically important banks (G-SIBs)*, 3 November 2015, www.fsb.org/wp-content/uploads/2015-update-of-list-of-global-systemically-important-banks-G-SIBs.pdf.

¹⁵ Group 1 banks are those that have Tier 1 capital of more than €3 billion and are internationally active. All other banks are considered Group 2 banks.

¹⁶ See also Table B.1 and Table B.2 in the Statistical Annex.

Reference point

Unless noted otherwise, the impact assessment was carried out by comparing banks' capital positions under fully phased-in Basel III to the Basel III framework as implemented by the national supervisor at the reporting date. Therefore, *current* RWA and MRC amounts as well as capital ratios are based on *the countries' national implementations of the Basel III framework*, while revised RWA, MRC and capital ratios are based on the final Basel III framework.

Current RWA and current MRC as well as all ratios are adjusted for the impact of phasing-out of transitional arrangements related to the Basel III definition of capital, the revised minimum capital requirements for market risk,¹⁷ the final standards on equity investments in funds,¹⁸ the final standard on capital requirements for bank exposures to central counterparties¹⁹ and the standardised approach for measuring counterparty credit risk²⁰ exposures, subject to data availability. Therefore, the *changes* in MRC and capital ratios do *not* include changes due to the revised minimum capital requirements for market risk, the final standards on equity investments in funds and the standardised approach for measuring counterparty credit risk. Separate and isolated analysis on the revised minimum capital requirements for market risk was however provided as a special feature to the February and September 2017 Basel III monitoring reports,²¹ following the Committee's commitment set out in the revised minimum capital requirements for market risk to continue monitoring the impact of the capital requirements for market risk on banks as they move towards implementation.

Minimum required capital

Because the suite of post-crisis reforms includes revisions to RWA, expected loss (EL) amounts and the Basel III leverage ratio framework, the analysis mainly focuses on MRC as a broad and integrated capital impact measure to aggregate the results. At the bank level, MRC is defined in this report as the sum of:

- the relevant target capital ratio level based on the Basel requirements times RWA, after consideration of all relevant floors;
- any capital effects from the treatment of EL amounts for credit risk and provisions at the relevant tier of capital;
- any capital effects from deductions which are an alternative to a 1,250% risk weighting treatment in certain national implementations of the Basel framework; and
- any incremental capital requirement (over and above the risk-based requirements including any floors) resulting from the Basel III leverage ratio.

This calculation is conducted for both the current *basis* and the *revised* regimes. Changes in MRC are hence calculated as follows:

$$\% \Delta MRC = \frac{MRC_{revised} - MRC_{basis}}{MRC_{basis}}$$

¹⁷ Basel Committee on Banking Supervision, *Minimum capital requirements for market risk*, January 2016, www.bis.org/bcbs/publ/d352.htm.

¹⁸ Basel Committee on Banking Supervision, *Capital requirements for banks' equity investments in funds*, December 2013, www.bis.org/publ/bcbs266.htm.

¹⁹ See Basel Committee on Banking Supervision, *Capital requirements for bank exposures to central counterparties – final standard*, April 2014, www.bis.org/publ/bcbs282.htm.

²⁰ Basel Committee on Banking Supervision, *The standardised approach for measuring counterparty credit risk*, April 2014, www.bis.org/publ/bcbs279.htm.

²¹ Basel Committee on Banking Supervision, *Basel III monitoring report*, February 2017, p 37, www.bis.org/bcbs/publ/d397.htm; Basel Committee on Banking Supervision, *Basel III monitoring report*, September 2017, p 57, www.bis.org/bcbs/publ/d416.htm.

Therefore, this formula reflects, among other elements:

- changes to the calculation of RWA (at the portfolio or risk type level RWA before output floors);
- changes to capital resulting from changes in the calculation of EL amounts for credit risk and the treatment of provisions;
- changes resulting from the move from the national implementation of the transitional Basel I-based floor (as collected through supervisory reported systems) to the aggregate output floor under the final Basel III framework; and
- changes to the definition of the Basel III leverage ratio exposure measure for all banks, and to its level for G-SIBs.

Capital ratios

The impact of the reforms set out in Section 1.1 are also expressed in terms of percentage point changes in CET1 ratios reflecting changes due to the reforms in both the numerator (through any effects on the treatment of EL amounts and provisions) and the denominator (through changes in RWA).

Combined shortfall analysis

In addition, a combined shortfall analysis at the three tiers of the Basel III capital ratios is conducted at the target level. The combined net shortfall at any capital tier is calculated as the difference (where positive) between the total required capital (accounting for both the risk-based requirements and the Basel III leverage ratio) at a given capital tier and the actual capital of the same tier held, net of any shortfall stemming from higher capital tiers. The last term is included since any higher tier capital (eg CET1) raised to meet a specific higher tier capital shortfall (eg CET1 shortfall) can also be used to meet any possible specific shortfall of a lower tier capital (eg any *additional* Tier 1 shortfall caused by risk-based and/or Basel III leverage ratio Tier 1 capital requirements).

1.3.3 Presentation

To preserve confidentiality, some of the results shown in this report are presented using box plot graphs. The median value is represented by a horizontal line, with 50% of the values falling in the 25th to 75th percentile range shown by the box. The upper and lower end points of the thin vertical lines show the range of the entire sample, unless noted otherwise. Finally, weighted averages are represented by dots.

1.4 Data quality and interpretation of results

For the cumulative quantitative impact study, participating banks were requested to submit comprehensive and detailed non-public data on a voluntary and best-efforts basis. As with the previous studies, national supervisors worked extensively with banks to validate data quality, completeness and consistency with the published reporting instructions to the maximum degree possible. Also particular attention has been paid on the reconciliation of reported data with existing data from supervisory reporting systems. Banks are included in the various analyses below only to the extent that they were able to provide data of sufficient quality to complete the analyses.

The following caveats apply to the interpretation of results shown in this report:

- The actual impact of the new requirements will almost certainly be less than shown in this report given the phased-in implementation of the standards until 1 January 2027 and interim adjustments made by the banking sector to changing economic conditions and the regulatory environment.²² For example, the results do not consider bank profitability, changes in capital or

²² See Basel III phase-in arrangements in the Annex.

portfolio composition, or other management responses to the policy changes since 31 December 2015 or in the future. Furthermore, previous QIS exercises (eg the 2010 exercise on the original Basel III framework) suggest that post-implementation impact was significantly lower than the impact estimated ex ante.

- The Basel III capital amounts shown in this report assume that all common equity deductions are fully phased in and all non-qualifying capital instruments are fully phased out (ie it is assumed that none of these capital instruments will be replaced by eligible instruments). As such, these amounts underestimate the amount of Tier 1 and Tier 2 capital held by a bank as they do not give any recognition for non-qualifying instruments that will actually be phased out over six years.
- The treatment of deductions and non-qualifying capital instruments also affects figures reported in the section on the Basel III leverage ratio. The assumption that none of these capital instruments will be replaced by eligible instruments will become less of an issue as the implementation date of the Basel III leverage ratio nears.
- Where data on the proposed capital requirements for operational risk or on the impact of the revised minimum capital requirements for market risk were not available, the analysis assumes that operational risk and market risk capital requirements would remain unchanged. Therefore the estimated impact may differ from the final change in requirements.
- Changes due to the revised securitisation framework and the review of the credit valuation adjustment risk framework are not reflected in this report.
- The Basel III monitoring templates for the end-December 2015 reporting date were based on the data specifications for assessing the impact from the proposals in the consultation documents. In some instances these data specifications differ from the specifications needed for assessing the impact of the final Basel III framework. Therefore, in some instances approximations had to be made for the final assessment (eg loan splitting for residential real estate exposures under the standardised approach for credit risk; treatment of the internal loss multiplier under the standardised approach for operational risk), while in other instances the final standard could not be fully reflected due to data limitations (eg increase in the mid-sized corporate threshold for the use of the advanced IRB approach for credit risk from €200m to €500m; reductions in the LGD parameter values under the foundation and advanced IRB approaches).
- In some cases, existing Pillar 2 requirements seek to reflect some of the shortcomings which the Committee's (Pillar 1) revisions seek to address. As such, some Pillar 2 requirements could offset the impact of any increase in Pillar 1 requirements. This is not reflected in the quantitative estimates.

Besides the caveats resulting from assumptions made when analysing the data, in some cases data submitted may be biased upwards by banks making conservative assumptions when precise data are unavailable in their current systems (eg use by IRB banks of exposure amounts *gross* of specific provisions when calculating RWAs for the standardised approach for credit risk). This may result in overstating the actual impact.

2. Overview of results

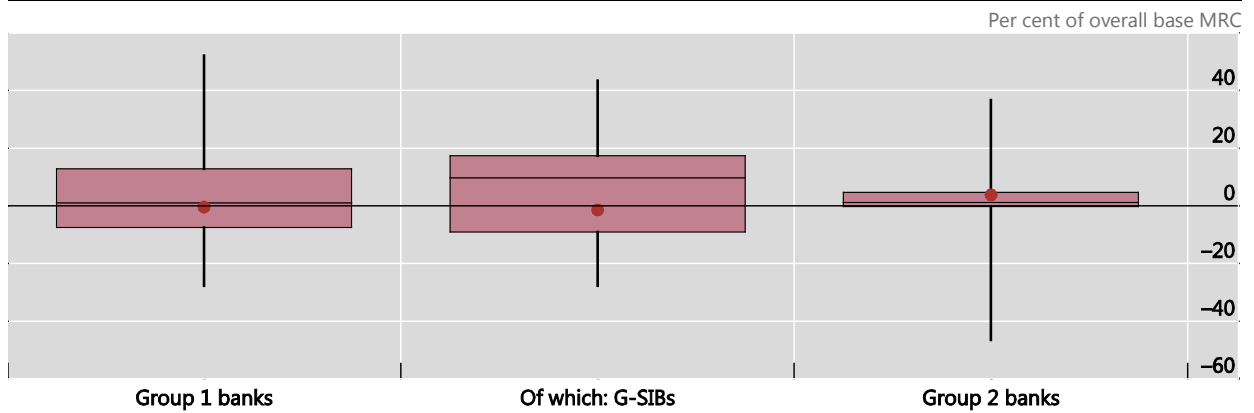
2.1 Changes in minimum required capital

On average, the total change in Tier 1 MRC at the target level is -0.5% for Group 1 banks, -1.4% for G-SIBs and +3.8% for Group 2 banks. Graph 1 shows the dispersion of changes in MRC across the Group 1 banks, G-SIBs and Group 2 banks in the sample. The change in MRC for 50% of the Group 1 banks is between -7.5% and 12.9%, with a median of 1.0%. The distribution for G-SIBs is wider with a higher median

of 9.7%, while the median Group 2 bank shows a 1.2% increase with 50% of the banks in a rather narrow interval from almost no change (-0.3%) to a 4.7% increase in Tier 1 MRC.

Total change in Tier 1 MRC at the target level¹

Graph 1



¹ The median value is represented by a horizontal line, with 50% of the values falling in the 25th to 75th percentile range shown by the box. The upper and lower end points of the vertical lines generally show the range of the entire sample. The dots represent weighted averages.

Source: Basel Committee on Banking Supervision. See also Table B.3.

The results are summarised in Table 2 and Graph 2 which include the following columns to provide an additional breakdown of the total change in MRC:

- *Total* shows overall changes in Tier 1 MRC, including the risk-based requirements (ie including output floors) and the Basel III leverage ratio.
- *Total: risk-based capital requirements* shows changes to the risk-based Tier 1 MRC (ie excluding the Basel III leverage ratio).
- *Credit risk* shows the change in Tier 1 MRC due to the revisions to the standardised and IRB approaches for credit risk, including the effect from migration of approaches.²³
- *Operational risk* shows the change in Tier 1 MRC due to the revisions to the operational risk standards.
- *Output floor* presents the change in the level of Tier 1 MRC due to the aggregate output floor when the total RWA fall below the threshold level of 72.5%. The impact is measured relative to the current national implementation of the Basel I-based transitional floor set out in the Basel II framework, as reported by member countries.
- *Leverage ratio* shows the change in Tier 1 MRC resulting from the changes to the Basel III leverage ratio framework. This captures the change in the definition of the Basel III leverage ratio exposure measure and the introduction of a G-SIB buffer on top of a 3% leverage ratio minimum which amounts to 50% of the surcharge on risk-based capital requirements. Note that increases to risk-based Tier 1 MRC and leverage ratio Tier 1 MRC do not add up, since the total MRC increases only to the extent the risk-based or leverage ratio requirement exceeds the other capital measure. Therefore, the leverage ratio column is adjusted to capture this effect (which can be positive or negative, even where the leverage ratio Tier 1 MRC remains unchanged). This results in an overall *incremental* leverage ratio change in MRC which can be either positive or negative. This mechanism is described in the following box.

²³ Migration of approaches refers to the application of a different approach for determining risk weights than the one currently used, as a consequence of the revisions which remove certain modelling approaches for selected (sub-)asset classes.

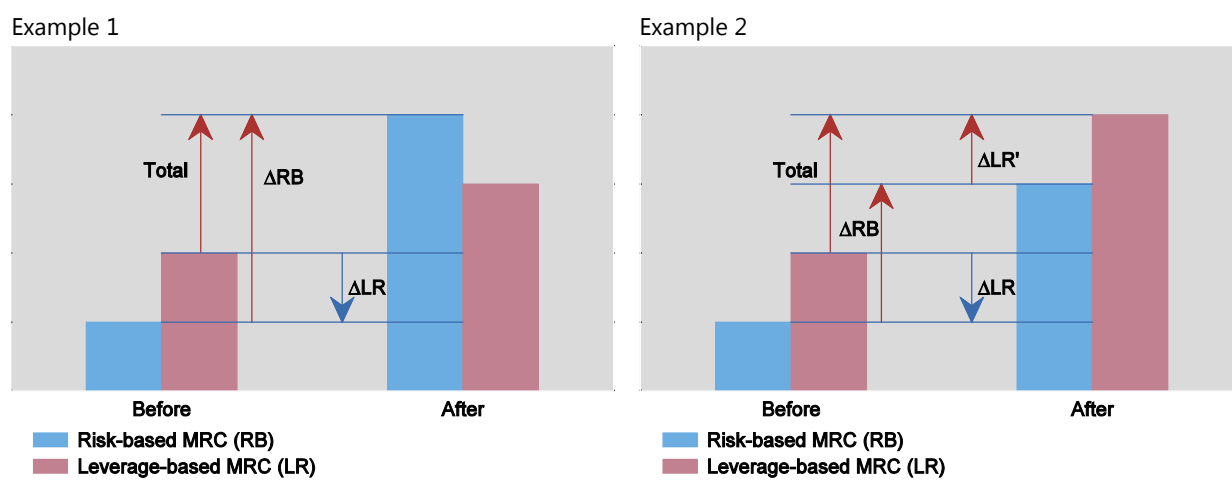
Aggregation of changes in risk-based and leverage ratio MRC

Example 1 shows an illustrative bank that is currently constrained^① by the Basel III leverage ratio. This additional Tier 1 MRC currently imposed by the Basel III leverage ratio requirement is instead “charged” by the risk-based Tier 1 MRC under the revised framework with the total change indicated by ΔRB . This replacement effect is represented as a negative effect in leverage ratio Tier 1 MRC to avoid double-counting, as shown with the blue arrow (ΔLR) in the diagram. Example 2 shows an alternative case where the bank is still constrained by the Basel III leverage ratio effect after the reforms. In this case, the contribution of leverage ratio Tier 1 MRC is the net of (i) the additional leverage ratio Tier 1 MRC in the revised framework ($\Delta LR'$); and (ii) the replacement effect captured by the risk-based Tier 1 MRC (ΔLR), which may be positive or negative

^① A requirement is called *constraining* if it imposes the largest amount of MRC among the requirements under consideration (here risk-based and leverage ratio). A requirement is *binding* on a bank if the resulting MRC are higher than a bank’s corresponding actual Basel III capital amounts.

Aggregation of changes in risk-based and leverage ratio MRC

Graph A



For Group 1 banks, the overall 0.5% decrease in Tier 1 MRC is composed of a 0.2% increase for the risk-based components combined, driven by the positive contribution of credit risk and output floor components at 1.4% and 1.9%, respectively, as well as a reduction in operational risk requirements of 3.0%. This increase is offset by a 0.7% reduction in leverage ratio Tier 1 MRC. This reduction reflects the fact that the Basel III leverage ratio is becoming relatively less constraining for many banks in the sample in the presence of an output floor.

The results are different for the subset of G-SIBs with the credit risk component contributing more and the output floor component contributing less to the overall change as compared to the Group 1 banks as a whole; this also results in a smaller offset (reduction) through the leverage ratio component. Also, G-SIBs experience a larger decrease from operational risk.

For Group 2 banks, the overall 3.8% increase in Tier 1 MRC is driven by an increase in both the risk-based and the leverage ratio measures, the latter partially offsetting a reduction in output floor requirements.

The Group 1 and Group 2 bank samples are not directly comparable due to different business models and different regional distribution of the samples. For the subset of banks from countries providing data for both Group 1 and Group 2 banks, Tier 1 MRC for 46 Group 1 banks increases by 14.4% compared to the 3.8% increase for Group 2 banks.

Changes in Tier 1 MRC at the target level

As a percentage of overall basis MRC at the target level

Table 2

	Number of banks	Total	Risk-based capital requirements				Leverage ratio
			Total	Of which:			
				Credit risk ¹	Operational risk ²	Output floor ³	
Group 1 banks	71	-0.5	0.2	1.4	-3.0	1.9	-0.7
Of which: G-SIBs	27	-1.4	-0.9	1.8	-4.1	1.3	-0.4
Group 2 banks	42	3.8	0.9	2.2	0.6	-1.9	2.9

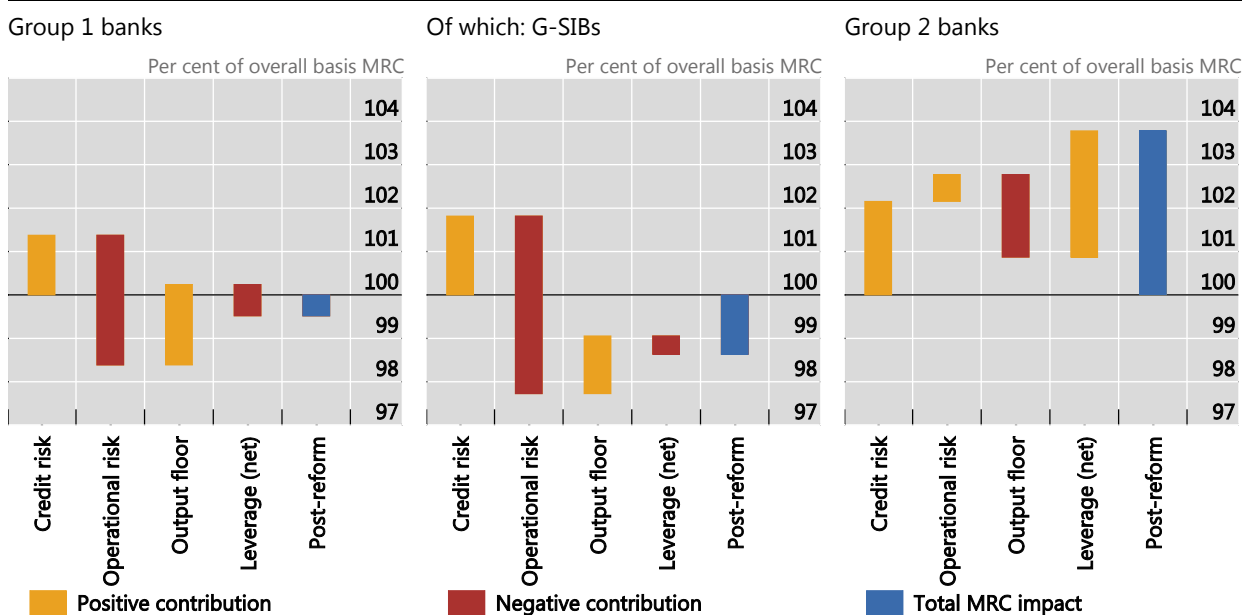
¹ Change in MRC due to the revised standardised and IRB approaches, excluding securitisation. ² Change in MRC due to revised operational risk framework. Figures may not show supervisor-imposed capital add-ons. Therefore, changes in MRC may be overestimated. ³ Net of existing Basel I-based floor according to national implementation of the Basel II framework.

Source: Basel Committee on Banking Supervision.

Graph 2 displays the contributions of each MRC component relative to the current basis for Group 1 banks, G-SIBs and Group 2 banks, respectively. While the orange (red) bars highlight the positive (negative) contributions induced by the different parts of the final Basel III framework, the blue bars represent the total MRC impact for the concerned bank group.

Changes in Tier 1 MRC at the target level

Graph 2



Credit risk shows change in MRC due to revised standardised and IRB approaches. It excludes securitisation. Operational risk figures may not show supervisor-imposed capital add-ons. Therefore, changes in MRC may be overestimated. Output floor results are net of the existing Basel I-based floor according to national implementation of the Basel II framework.

Source: Basel Committee on Banking Supervision.

2.2 Impact on capital ratios and capital shortfalls

Table 3 outlines the estimated impact on risk-based CET1 capital ratios,²⁴ Basel III Tier 1 leverage ratios and capital shortfalls for Group 1 banks, G-SIBs and Group 2 banks, respectively. The *Tier 1 leverage ratio surplus* shows the percentage point Tier 1 capital held in excess of the Basel III leverage ratio standalone requirement (ie in isolation from the risk-based standards) at the revised target level, including the G-SIB surcharge where applicable, as a percentage of the Basel III leverage ratio exposure. Finally, the last panel of the table shows the capital shortfalls at the target level after the revisions. The shortfalls are presented for *CET1* capital (which is unaffected by the Basel III leverage ratio), for *Tier 1* capital (ie reflecting both the target Basel III leverage ratio and risk-based requirements) and for *Total* capital.

Overall, CET1 capital ratios are expected to increase by 0.2 percentage points for Group 1 banks, increase by 0.3 percentage points for the subset of G-SIBs and increase by 0.1 percentage points for Group 2 banks. As mentioned above, the two bank samples are not directly comparable due to different business models and different regional distribution of the samples, and hence the impacts on them are not uniform.

Considering only the changes to the Basel III leverage ratio exposure measure, the Basel III Tier 1 leverage ratios will remain almost stable at the current levels of 5.5% for the Group 1 banks in the sample and 5.0% for the Group 2 banks in the sample, although there will be a minor increase from 5.6% to 5.7% for the G-SIBs in the sample. The surpluses above the revised target, including the G-SIB surcharges, are 2.0 percentage points for Group 1 banks and 1.9 percentage points for G-SIBs, reflecting the higher weighted average capital requirement at the target level in the latter subsample. For the Group 2 banks, the surplus is 2.0 percentage points given their target is always the same as the minimum requirement.

For Group 1 banks, the revisions to the risk-based capital requirements result in CET1 capital shortfalls at the target level of €27.6 billion. Also taking additional Tier 1 risk-based capital requirements and the leverage ratio requirements into account, the shortfall increases to €56.4 billion. The revisions will also require an additional €34.3 billion of Tier 2 capital from Group 1 banks. The G-SIBs in the sample account for all of the CET1 capital shortfall and 98.2% of the combined Tier 1 capital shortfall of Group 1 banks.

The shortfalls for the sample of Group 2 banks is €0.3 billion of CET1 and €0.8 billion of Tier 1 capital combined. Given the risk-based capital requirements are the main drivers of the shortfalls, total capital shortfalls show the same trends as the Tier 1 capital shortfalls. Group 2 banks will require an additional €0.6 billion of Tier 2 capital.

To put these shortfall numbers in perspective: profit after tax for the same sample of banks in the concerned six-month reporting period (H2 2015) amounted to €198.3 billion for Group 1 banks and €7.1 billion for Group 2 banks.²⁵

²⁴ Note that given the changes in MRC presented above are more comprehensive than the changes in the risk-based capital ratios, the changes in these two measures do not necessarily show the opposite sign for individual banks or on aggregate.

²⁵ It is important to note, though, that future profits will only reduce shortfalls to the extent they are generated by shortfall banks.

Risk-based capital ratios, leverage ratios and target level capital shortfalls

In per cent

Table 3

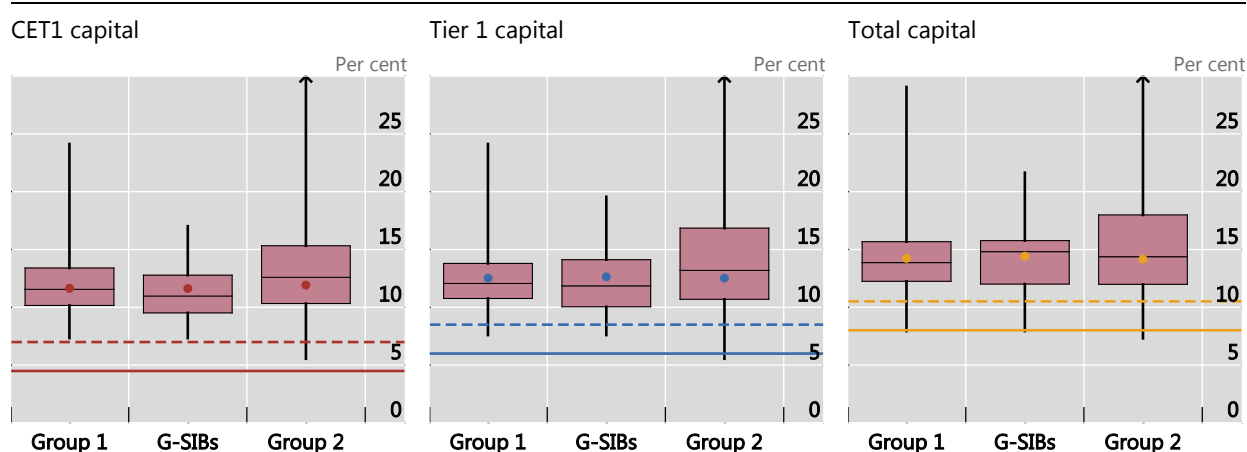
	Number of banks	Risk-weighted framework CET1 capital ratio			Tier 1 leverage ratio			Capital shortfalls combined (€ billions)		
		Current	Final	Diff.	Current	Final	Surplus rev. target	CET1	Tier 1	Total
Group 1 banks	71	11.5	11.6	0.2	5.5	5.5	2.0	27.6	56.4	90.7
Of which: G-SIBs	27	11.3	11.6	0.3	5.6	5.7	1.9	27.6	55.4	85.7
Group 2 banks	42	11.8	11.9	0.1	5.0	5.0	2.0	0.3	0.8	1.4

Source: Basel Committee on Banking Supervision.

Graph 3 shows the distribution of CET1, Tier 1 and total capital ratios under the final Basel III framework for the Group 1 banks, G-SIBs and Group 2 banks in the sample. All banks meet the CET1 minimum capital requirements. One Group 2 bank fails to meet the Tier 1 minimum capital requirements, while one bank in each group fails to meet the total capital requirements. At the target level, some banks in both groups will have to either raise some additional capital to meet CET1, Tier 1 and total capital requirements or to revise their business plans accordingly.

Capital ratios under the final Basel III framework¹

Graph 3



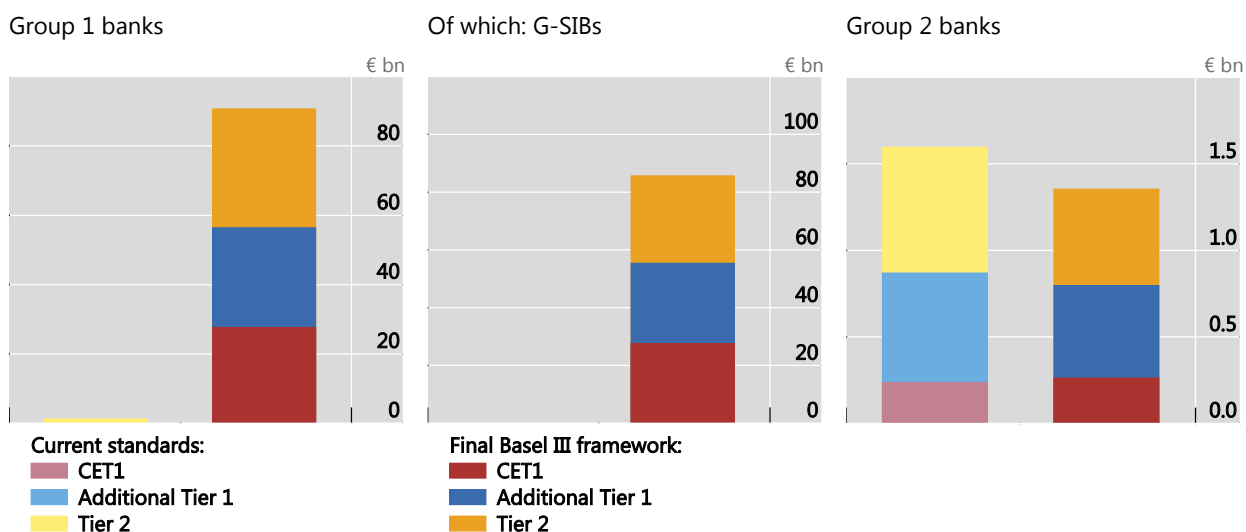
¹ The median value is represented by a horizontal line, with 50% of the values falling in the 25th to 75th percentile range shown by the box. The upper and lower end points of the vertical lines generally show the range of the entire sample. The dots represent weighted averages. The solid horizontal line represents the relevant minimum requirement, the dotted horizontal line represents the relevant target (excluding any bank-specific G-SIB surcharges).

Source: Basel Committee on Banking Supervision. See also Table B.4.

Graph 4 shows the combined shortfalls at the target levels for Group 1 banks, G-SIBs and Group 2 banks, respectively. It compares the target capital shortfall columns in Table 3 with the shortfalls under the current basis, both fully phased-in. Group 1 banks' total capital shortfalls increase from €1.3 billion to €90.7 billion between the current basis and the revised framework. Conversely, the €1.4 billion total capital shortfall for the Group 2 banks in the sample is slightly lower than the already existing shortfall under the current basis. Table B.5 in the Statistical Annex also provides the results at the minimum level.

Target level capital shortfalls under the current standards and the final Basel III framework

Graph 4



Group 1 banks do not have any CET1 and additional Tier 1 shortfalls under the current standards. Therefore, the related bars are not shown in the graphs.

Source: Basel Committee on Banking Supervision. See also Table B.5.

2.3 Interactions between risk-based, output floor and leverage ratio capital requirements

This section discusses the interaction between risk-based, output floor and Basel III leverage ratio capital requirements. The purpose of this analysis is to gain deeper insight into which capital requirement component of the framework is constraining for the banks in the sample. The *constraining* requirement in this analysis refers to the requirement that imposes the largest amount of Tier 1 MRC among the three requirements mentioned above. Accordingly, the Tier 1 MRC for a bank is determined as the highest of the requirement under the risk-based framework, the requirement using the output floors and the requirement measured using the Basel III leverage ratio. Note that in contrast to the analyses presented in Section 2.1 and Section 2.2, the risk-based capital requirements here denote the risk-based capital framework *prior* to the application of any output floor.

Graph 5 shows which of the three parts is constraining under both the current standard and the final Basel III framework. For Group 2 banks, results are presented separately for IRB banks and banks only using the standardised approach for credit risk ("pure SA").²⁶

Under the current framework 25.4% of Group 1 banks are constrained by the Basel III leverage ratio while 19.7% are constrained by the transitional Basel I-based floor. With the introduction of the somewhat stricter and more consistent output floor under the revised framework, 32.4% of Group 1 banks will be constrained by the floor while 21.1% will be constrained by the Basel III leverage ratio. The share of Group 1 banks constrained by risk-based capital requirements before application of the respective output floor will decrease from 54.9% to 46.5%.

For the subset of G-SIBs, the Basel III leverage ratio is currently constraining for a smaller share of banks (14.8%) as compared to Group 1 banks as a whole while the transitional Basel I-based floor

²⁶ Graph 5 does not distinguish between IRB and "pure SA" Group 1 banks as out of the 71 Group 1 banks in the sample only seven are "pure SA" banks.

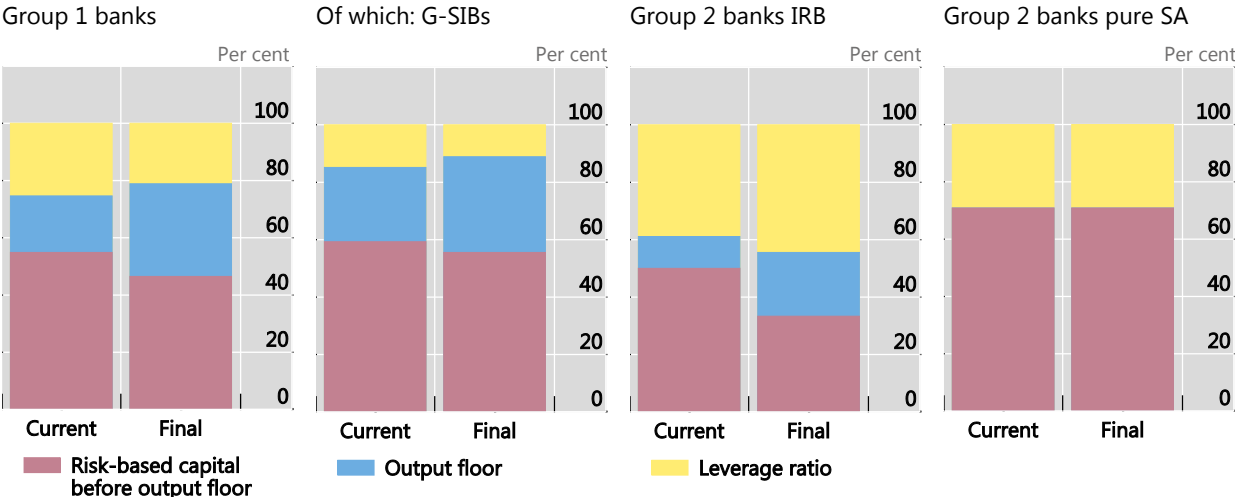
constrain a slightly larger share of banks (25.9%). The remaining 59.3% of G-SIBs are constrained by the risk-based measure before application of the output floors. Under the revised framework, 33.3% of G-SIBs will be constrained by the output floor while the Basel III leverage ratio will only be constraining for 11.1% of the G-SIB. The remaining 55.6% of G-SIBs will be constrained by the risk-based capital requirements before application of the output floor.

Of the Group 2 IRB banks in the sample, 38.9% are currently constrained by the Basel III leverage ratio while 11.1% are constrained by the transitional Basel I-based floor. The share of Group 2 banks constrained by risk-based capital requirements before application of the output floors under the current regime is 50.0% and somewhat lower than the share among Group 1 banks and G-SIBs. The share of Group 2 banks constrained by the risk-based capital requirements before application of the output floor under the revised regime will be one third, which is lower than for Group 1 banks and G-SIBs. The Basel III leverage ratio will be constraining on 44.4% of Group 2 banks while the share of Group 2 banks constrained by the output floor will increase to 22.2%.

For the Group 2 banks only using the standardised approach for credit risk, risk-based capital requirements before application of the respective output floors are and remain constraining for 70.8% of the banks. The Basel III leverage ratio is and remains constraining for 29.2% of these banks. The output floor will not become constraining for any of these banks, reflecting the fact that the share of RWA from market risk or counterparty credit risk is low for banks using the standardised approach for credit risk.

Percentage of banks constrained by different parts of the framework

Graph 5



Source: Basel Committee on Banking Supervision. See also Table B.6.

2.4 Main drivers of the impact

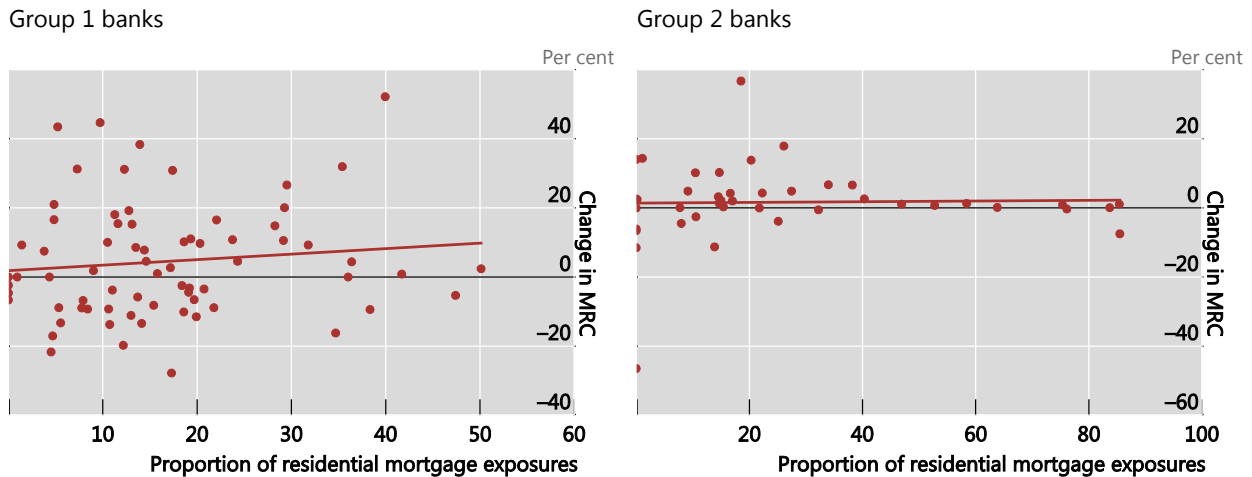
The analysis of the main drivers of the estimated impact for affected banks shows that no single element of the reforms – credit risk, operational risk, output floor or leverage ratio – can be said to have a consistent effect on the banks which contribute most to the global change in MRC. For the top and bottom Group 1 banks which are individually most affected by the revisions in terms of changes in MRC, credit risk is a material contributor but operational risk and output floor contributions vary widely. For the top and bottom Group 2 banks, contributions of all three components vary widely.

The Committee has also investigated whether the percentage change in MRC of each bank can be explained by business model and balance sheet metrics. For example, Graph 6 plots each bank’s change in MRC versus the proportion of residential mortgage exposures in its portfolio. The results suggest no

significant correlation between the two. Only 1.3% of the variability in MRC can be explained by the proportion of residential mortgage exposures in Group 1 banks' portfolios. The number is virtually zero for Group 2 banks. Focusing on the most impacted banks, a similar result is observed: while the most impacted bank in the sample has a considerable proportion of residential mortgage exposures (about 40%), the proportion is small for the other most impacted banks.

Change in MRC versus proportion of residential mortgage exposures¹

Graph 6



¹ $R^2=0.0129$ for Group 1 banks and 0.0005 for Group 2 banks.

Source: Basel Committee on Banking Supervision

Similar analysis has also been conducted for changes in MRC versus the ratio of current Tier 1 MRC and leverage ratio exposures. The results suggest negative correlation between the two metrics for Group 1 banks. Hence, banks which are highly leveraged tend to be the ones with the highest increase in MRC. In addition, no significant relationship was found between the change in MRC and (i) profits; (ii) the proportion of exposures to large and mid-sized corporates, specialised lending exposures, banks and financial institutions; (iii) the share of market risk exposures; and (iv) current CET1 ratios.

2.5 Impact on modelling and RWA variability for credit risk

This section discusses the reforms' impact on the proportion of modelled credit risk exposures and the gap in risk weights between the IRB approach and the standardised approach across asset classes. The reforms were undertaken in order to materially decrease risk weight variability in low-default portfolios (defined as portfolios with low number of observations for a reliable modelling of probability of default (PD) and loss given default (LGD)) by removing or constraining the modelling approaches available for those exposures.

2.5.1 IRB versus final standardised approach

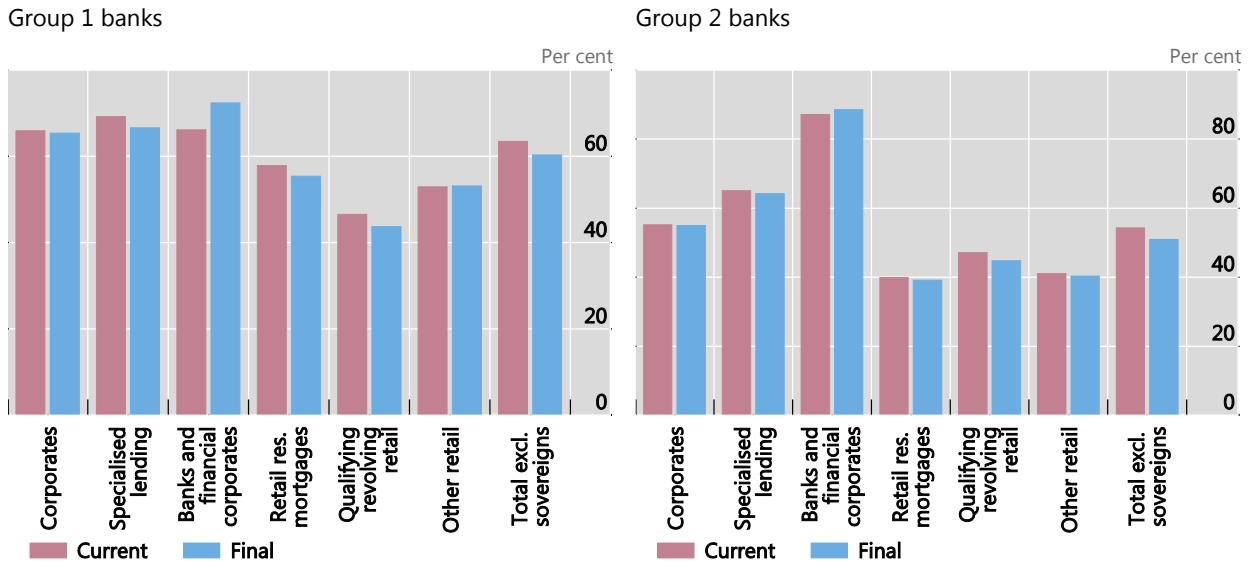
The gap between the average risk weights under the final standardised and IRB approaches for each asset class was analysed by calculating the ratio of the average IRB risk weight (for both performing and non-performing loans) to the corresponding average standardised approach risk weight. A ratio less than 100% indicates that the average risk weight is lower under the IRB approach than under the standardised approach. For example, a ratio of 66.7% means that the average risk weights under the standardised approach are 50% higher than the average risk weights under the IRB approach.

Graph 7 shows this ratio for each asset class under the current standard and the final Basel III framework. Overall the gap between risk weights under the standardised approach and those under the

IRB approach is stable as a result of the revisions. For those (sub-)asset classes for which modelling has been restricted ratios move closer to 100%. This is not the case for those (sub-)asset classes for which the advanced IRB approach continues to be available.²⁷

Ratio of current and final IRB risk weights to final standardised approach

Graph 7



Note that the final standardised approach also assumes that only non-modelled approaches are used for counterparty credit risk.

Source: Basel Committee on Banking Supervision. See also Table B.7.

Table 4 for Group 1 banks and Table 5 for Group 2 banks show statistics on the distribution of ratios of final IRB risk weights to final standardised approach risk weights, assuming that no output floor is applied to the IRB approach. For Group 1 banks the weighted average capital benefit provided to IRB banks if no output floor were applied would be around 30% for wholesale (ie general corporates, specialised lending and banks and financial institutions) exposures, around 50% for retail exposures, and 40% across all exposures. For Group 2 banks it would be between 10% and 45% for wholesale exposures, around 60% for retail exposures and close to 50% across all exposures. The tables also show that the capital benefit obtained from using internal models relative to the relevant standardised approaches varies considerably across banks.

²⁷ Note that IRB risk weights do not take into account the effect of the introduction of the output floor.

Ratio of final IRB risk weights to final standardised approach risk weights

Group 1 banks

Table 4

	Corporates	Specialised lending	Banks and financial corporates	Retail residential mortgages	Other retail	QRRE	Total excl. sovereigns
Max	0.99	2.19	3.72	1.43	1.45	1.29	1.01
95th percentile	0.86	1.20	1.92	1.17	0.96	0.90	0.82
75th percentile	0.70	0.92	0.93	0.67	0.71	0.53	0.63
Median	0.62	0.71	0.76	0.40	0.53	0.42	0.56
25th percentile	0.51	0.49	0.59	0.33	0.38	0.31	0.48
5th percentile	0.43	0.33	0.44	0.20	0.23	0.16	0.42
Min	0.31	0.22	0.29	0.14	0.12	0.08	0.28
Weighted average	0.65	0.67	0.72	0.55	0.53	0.44	0.60

Source: Basel Committee on Banking Supervision.

Ratio of final IRB risk weights to final standardised approach risk weights

Group 2 banks

Table 5

	Corporates	Specialised lending	Banks and financial corporates	Retail residential mortgages	Other retail	QRRE	Total excl. sovereigns
Max	1.31	1.81	2.56	1.14	0.97	0.73	0.93
95th percentile	1.03	1.53	2.50	0.87	0.96	0.68	0.83
75th percentile	0.81	0.94	1.44	0.63	0.70	0.59	0.63
Median	0.62	0.79	0.87	0.44	0.61	0.41	0.53
25th percentile	0.52	0.66	0.69	0.36	0.38	0.31	0.40
5th percentile	0.36	0.45	0.52	0.18	0.23	0.21	0.22
Min	0.24	0.28	0.51	0.17	0.20	0.19	0.18
Weighted average	0.55	0.64	0.89	0.39	0.40	0.45	0.51

Source: Basel Committee on Banking Supervision.

2.5.2 Distribution of exposure at default and risk-weighted assets across approaches

The left panel of Graph 8 shows the distribution of exposure at default (EAD) under different modelling and non-modelling approaches for exposures which are currently subject to the IRB approach (ie excluding exposures currently under the standardised approach for credit risk following the partial use provisions). For the purpose of this section, specialised lending refers to the EAD that would be subject to the supervisory slotting criteria approach. For Group 1 banks overall modelling according to the advanced IRB approach available to banks that currently stands at 76.6% of IRB EAD would be reduced by 18.8 percentage points to the level of 57.8% of IRB EAD. Exposures migrating to the standardised approach which mainly concerns equity exposures are expected to represent only 0.9% of total current IRB EAD, while exposures under the foundation IRB approach are expected to represent 40.1% of total IRB EAD. The use of the AIRB approach for Group 2 banks would be reduced by 4.3 percentage points from the current 81.3% of IRB EAD to 77.0%. Exposures under the standardised approach would be 0.5% of total IRB EAD, while exposures under the foundation IRB approach would represent 20.2% of total IRB EAD.

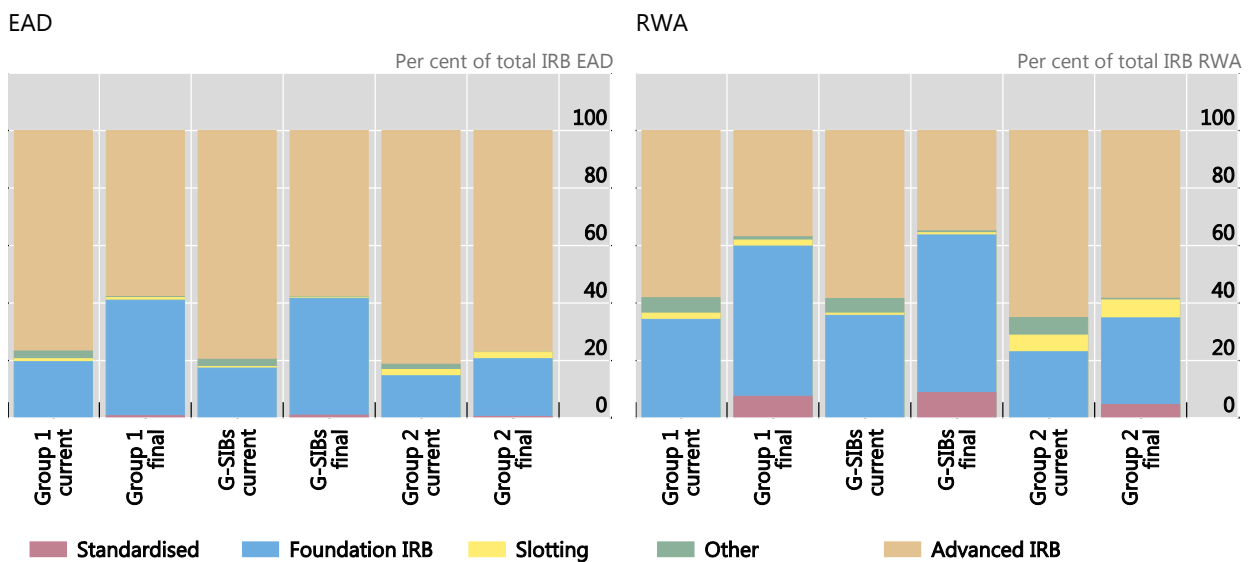
The right panel of Graph 8 replicates the exercise for the distribution of RWA, again for exposures which are currently subject to the IRB approach. For Group 1 banks, RWA under the advanced IRB approach would be reduced by 21.3 percentage points to 36.9%. RWA under the standardised approach for Group 1 banks would make up 7.6% of total IRB RWA, while RWA under the foundation IRB approach would make up 52.2%. For Group 2 banks, RWA under the advanced IRB approach would be reduced by 6.7 percentage points to 58.3%. RWA under the standardised approach for Group 2 banks would make up 4.7% of total IRB RWA, while RWA under the foundation IRB approach would make up 30.1%.

It should be noted that the impact of modelling and RWA variability is not symmetrical between Group 1 and Group 2 banks. For example, while the final Basel III framework leads to 42.0% of exposures being treated under the standardised, supervisory slotting criteria or foundation IRB approaches for Group 1 banks, it is only 23.0% for Group 2 banks.

Distribution of EAD and RWA by approach under the current standard and the final Basel III framework

Exposures currently subject to the IRB approach

Graph 8



Source: Basel Committee on Banking Supervision. See also Table B.8 and Table B.9.

Additional constraints to modelling will apply due to the introduction of risk parameter floors. The risk parameter floors introduce a 5 basis points PD floor,²⁸ which will be binding for some IRB exposures. Furthermore, some exposures subject to the advanced IRB approach will be bound by the risk parameter floors on LGD and EAD. These risk parameter floors together with the output floor further reduce the shares of EAD and RWA which are effectively subject to unconstrained modelling; these effects are however not shown in the graphs above.

2.5.3 Impact on variability of risk-weighted assets

Assessing the extent to which variability in banks' RWA is "excessive" is an inherently difficult exercise. It requires judgment about the extent to which a bank's internally-modelled risk weight reflects the "true risk" of a given exposure. For the purposes of the cumulative QIS, the Committee has considered different proxies which seek to measure the degree of RWA variability. Each of these proxies is subject to shortcomings and inherent biases. However, collectively, and when combined with supervisory judgment,

²⁸ The PD floor will be 10 basis points for certain qualifying revolving retail (QRRE) exposures.

the analysis shows some evidence for a reduction in RWA variability among the Group 1 banks in the sample.

The left panel of Graph 9 shows the distribution of Group 1 banks' current average risk weights compared to their average risk weights as a result of the revisions discussed above. It suggests that the Committee's reforms will compress this distribution by cutting off the left tail, which in some cases may reflect aggressive modelling behaviour.

The right panel of Graph 9 plots the percentage change in Group 1 banks' average IRB risk weights compared to the ratio of banks' internally-modelled average risk weights to their average risk weights under the revised standardised approach (ie the latter assumes that a bank uses the revised standardised approach for its actual portfolios). Under the assumption that the revised standardised approach provides a reasonable level of risk sensitivity, the analysis suggests that those banks with the biggest change in average risk weights are precisely those with the biggest deviation from revised standardised approach risk weights, consistent with the policy objective of the Committee's reforms.

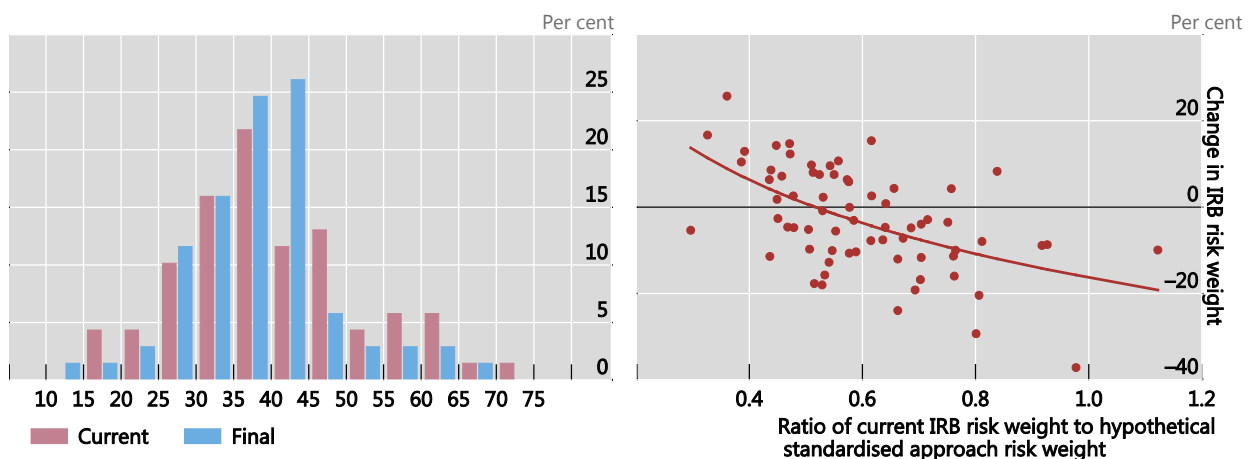
Changes in average risk weights

Group 1 banks, total credit risk excluding sovereigns

Graph 9

Distribution of risk weights

Change in risk weights and relationship with hypothetical revised standardised approach risk weights



Source: Basel Committee on Banking Supervision. See also Table B.10.

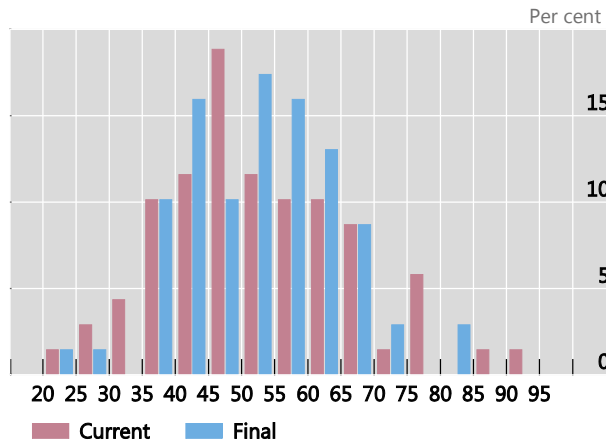
Graph 10 focuses on Group 1 banks' corporate portfolios and shows a compression of the distribution which indicates a reduction in overall RWA variability. In addition to a limited decrease of the weighted average risk weight (from 57.2% to 56.7%), a reduction is observed in standard deviation given by a decrease of the extreme values in the right hand tail (see Table B.10 in the Statistical Annex). Furthermore, a negative nonlinear relationship between the IRB risk weight change and the ratio measure is observed. Group 1 banks with an IRB to standardised approach risk weight ratio above 0.7 experience very little change in IRB risk weights, while banks with a bigger gap experience increasingly higher increases in IRB risk weights.

Changes in average risk weights

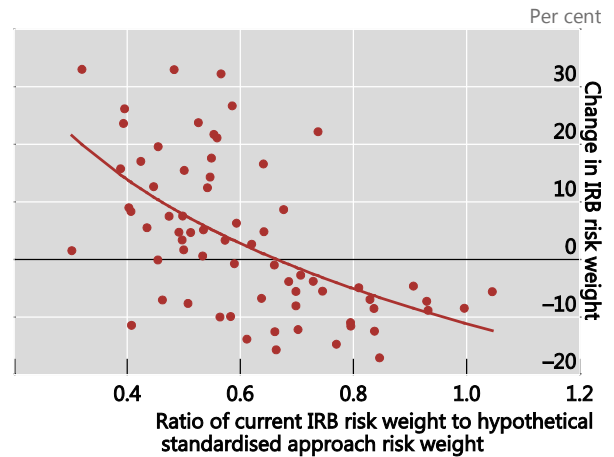
Group 1 banks, exposures to corporates

Graph 10

Distribution of risk weights



Change in risk weights and relationship with hypothetical standardised approach risk weights



Source: Basel Committee on Banking Supervision. See also Table B.10.

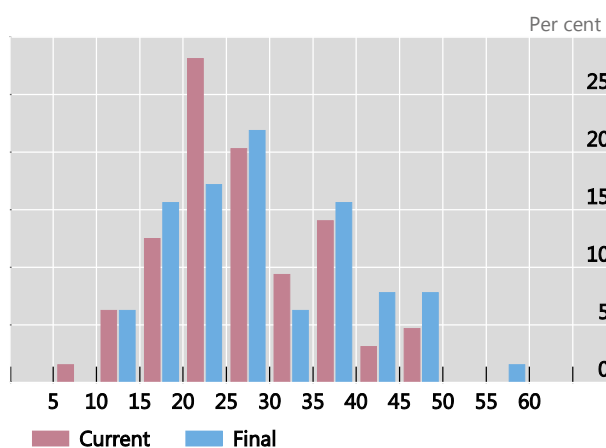
Graph 11 shows a shift towards higher risk weights under the revised framework for Group 1 banks' exposures to banks and financial corporates. The weighted average and the standard deviation of the distribution increase by 2.9 and 1.8 percentage points, respectively. The increase in the standard deviation is driven by a higher number of observations of risk weights at the high end of the distribution. There is no strong relationship between the IRB to standardised approach risk weight ratio and the change in IRB risk weights.

Changes in average risk weights

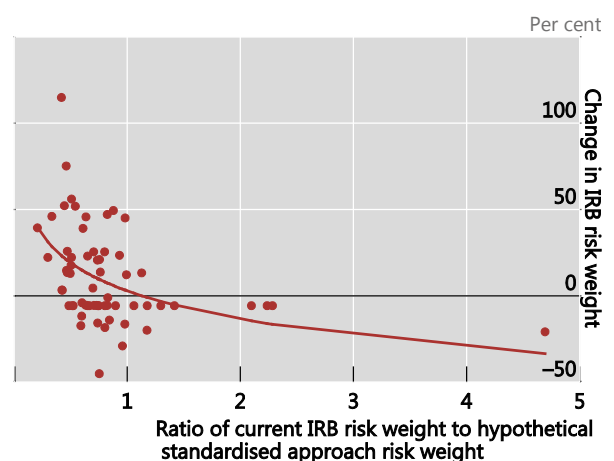
Group 1 banks, exposures to banks and financial corporates

Graph 11

Distribution of risk weights



Change in risk weights and relationship with hypothetical standardised approach risk weights



Source: Basel Committee on Banking Supervision. See also Table B.10.

Similar analysis has been produced for the Group 2 banks but no conclusive relationship was found between the change in risk weights and the IRB to standardised approach risk weight ratio.

3. Credit risk

3.1 Revised internal ratings-based approach

The change in MRC due to the IRB revisions outlined below reflects to the extent possible the adjustments to the consultative document outlined in the final Basel III framework.²⁹ The key changes with respect to the proposals in the consultative document include:

- removing the advanced IRB approach but retaining the foundation IRB approach for exposures to large corporates, banks and financial institutions;
- removing the 1.06 scaling factor to RWA under the IRB approach;
- keeping the advanced and foundation IRB approaches for specialised lending exposures;
- increasing the revenues-based threshold for the use of the advanced IRB approach for mid-sized corporates from €200m to €500m;
- reducing the floors for the secured LGD parameters under the advanced IRB; and
- reducing the supervisory LGD parameter for unsecured corporate exposures from 45% to 40% under the foundation IRB approach.³⁰

Graph 12 summarises the change in Tier 1 MRC due to the IRB revisions. The sample of banks included in this section differs from the sample of IRB banks in the previous sections. Moreover, changes in Tier 1 MRC in this section are calculated as a percentage of current Tier 1 MRC associated with exposures under the IRB approach only. The average overall impact of such revisions corresponds to a 2.0%, 3.4% and 6.7% increase in overall Tier 1 MRC for Group 1 banks, G-SIBs and Group 2 banks, respectively. The impact varies widely across banks. Banks using the advanced IRB approach are on average significantly more impacted by the revisions than banks using the foundation IRB approach, which on average experience a decline in Tier 1 MRC due to IRB exposures. This is likely the result of

- the recalibration of the foundation IRB approach (which tends to lower capital requirements); and
- the fact that banks using the foundation IRB approach do not experience the material shift of exposures into more constrained approaches as banks using the advanced IRB approach do (eg removal of the advanced IRB approach for mid-sized corporates with revenues above €200m).

The effect is however heterogeneous across the sample and some banks using the foundation IRB approach experience a greater increase in MRC than some banks using the advanced IRB approach.

The right panel of Graph 12 breaks down the impact by asset class. For Group 1 banks, the corporate asset class contributes 0.9% to the 1.8% overall increase in MRC,³¹ while exposures to banks and financial corporates contribute 0.7%. This is mainly due to the removal of the advanced IRB approach for these asset classes. The reductions are mainly driven by the removal of the 1.06 multiplier for IRB RWA and by stricter national implementation in the current framework in some jurisdictions. While the Group 2 banks in the sample show an increase rather than a decrease in MRC for small and medium-sized

²⁹ Basel Committee on Banking Supervision, *Basel III: Finalising post-crisis reforms*, December 2017, www.bis.org/bcbs/publ/d424.htm.

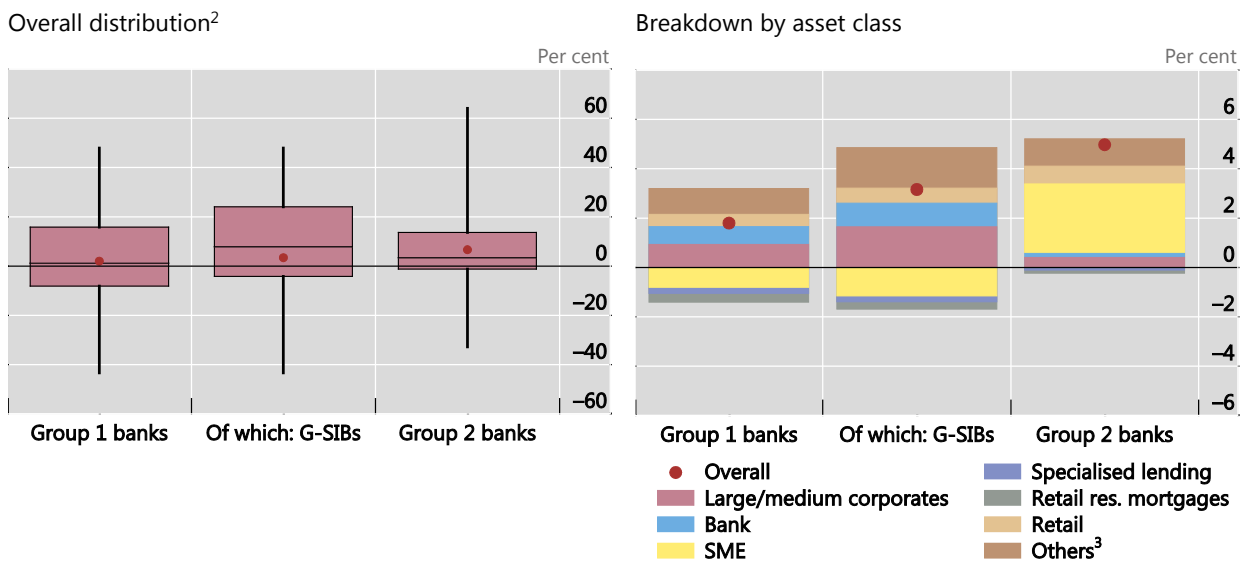
³⁰ Because of data limitations, it is not possible to reflect the impact of increasing the mid-sized corporate threshold and the revised LGD parameter values under the foundation and advanced IRB approaches in this analysis. The analysis therefore relies on the €200m revenues threshold and LGD parameter values proposed in the consultative document, most likely leading to an overstatement of the impact.

³¹ The cumulative impact when summing over all asset classes is 1.8% for Group 1 and 5.0% Group 2 banks which is slightly different from the overall impact reported above (2.0% and 6.7% respectively). The reason is that when summing over all asset classes it is assumed that provisions are asset class-specific, whereas in the overall impact calculation a shortfall in provisions in one asset class may be compensated by excess provisions in another asset class.

enterprise (SME) exposures, this difference is driven by geographical differences in the sample composition.

Changes in Tier 1 MRC for exposures subject to the IRB approach for credit risk¹

Graph 12



¹ The change is calculated as a percentage of current Tier 1 MRC across all IRB exposures. ² The median value is represented by a horizontal line, with 50% of the values falling in the 25th to 75th percentile range shown by the box. The upper and lower end points of the vertical lines show the range of the entire sample. The dots represent weighted averages. ³ "Others" include exposures to sovereigns, equity exposures and equity investments in funds.

Source: Basel Committee on Banking Supervision. See also Table B.11 and Table B.12.

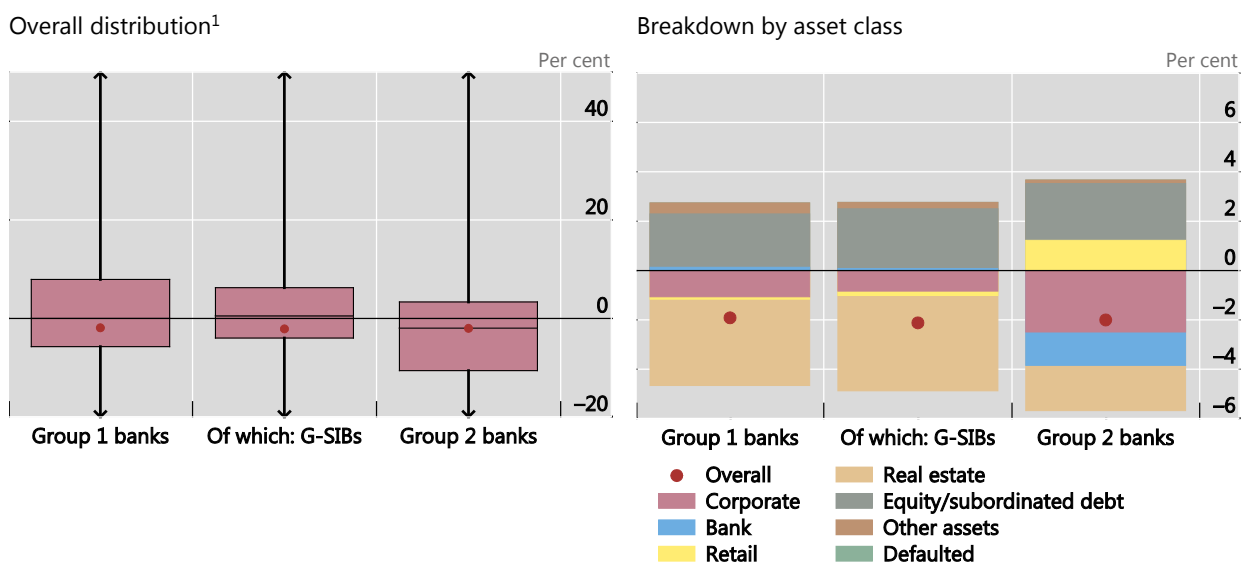
3.2 Revised standardised approach

The revised standardised approach for credit risk results in a slight decrease in MRC of 1.9% for Group 1 banks and of 2.0% for Group 2 banks. These data include exposures of banks subject to the standardised approach for credit risk as well as exposures of banks using the IRB approach for credit risk to the extent that they are subject to partial use provisions. Sovereign exposures as well as exposures to public sector entities (PSEs) and multilateral development banks (MDBs) are excluded from this analysis given their risk weighting treatment has not been revised. The left panel of Graph 13 provides further detail on the dispersion of results as a percentage of current MRC under the standardised approach for credit risk. Under the dispersion, outliers with a large increase in MRC arose mainly due to differences between the current risk weights applied by the bank and the risk weights under the standardised approach in the final Basel III framework.

The right panel of Graph 13 provides a breakdown by asset class. For the Group 1 banks in the sample, the main contributors to the overall change in MRC are a decrease in MRC for real estate exposures (-3.5%) and an increase in MRC for equity and subordinated debt exposures (2.2%). MRC for other retail and bank exposures are largely flat while MRC for corporate exposures decrease by 1.1%. For Group 2 banks, equity and subordinated debt exposures contribute a similar 2.3% to the overall change in MRC. However, the contribution of retail exposures is also positive at 1.2%, while there is a reduction in MRC for corporate (-2.5%), bank (-1.4%) and real estate (-1.8) exposures.

Changes in Tier 1 MRC for exposures subject to the standardised approach for credit risk

Graph 13



Data exclude exposures to sovereigns, PSEs, PSEs treated as sovereigns and MDBs. Data generally include banks subject to the standardised approach for credit risk and exposures subject to partial use of banks using the IRB approach for credit risk. ¹ The median value is represented by a horizontal line, with 50% of the values falling in the 25th to 75th percentile range shown by the box. The upper and lower end points of the vertical lines generally show the range of the entire sample. In some cases, arrows at the top of the vertical line indicate banks with capital ratios outside the range shown in the graph. The dots represent weighted averages.

Source: Basel Committee on Banking Supervision. See also Table B.13 and Table B.14.

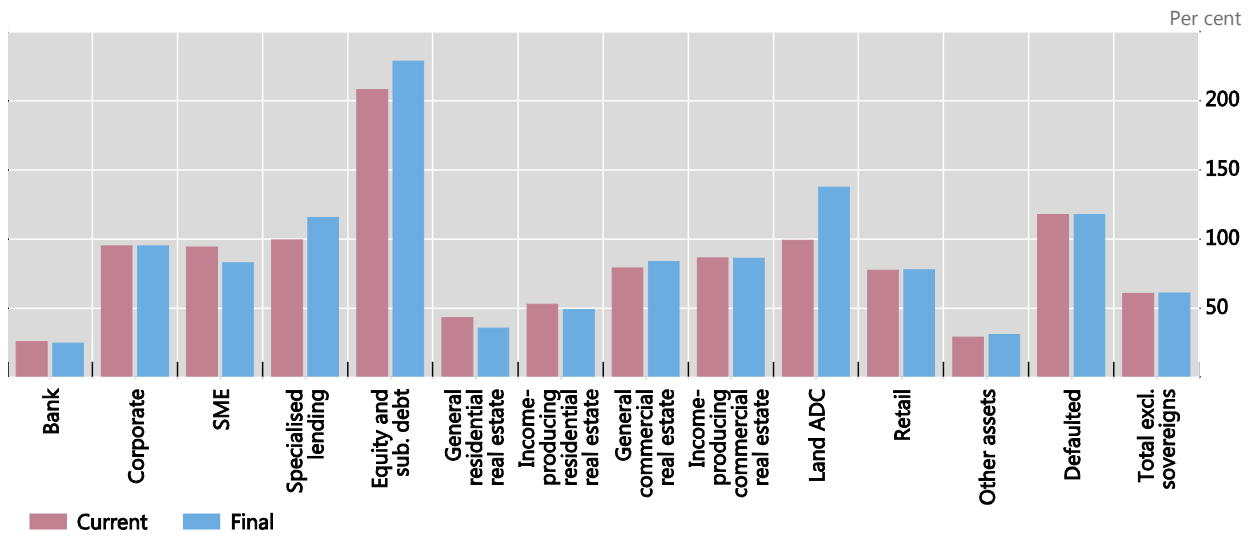
Graph 14 and Graph 15 provide additional detail on the current and revised average risk weights by asset class for Group 1 and Group 2 banks, respectively. Overall, when the outcome of the recalibration is compared to the current standardised approach, risk weights increase for some of the new categories or (sub-)asset classes (specialised lending and land ADC) which were introduced to incorporate greater risk-sensitivity within the standardised approach framework. Correspondingly, the risk weights for the original asset classes (corporate and general residential real estate) will decrease.

Furthermore, average risk weights for equity and subordinated debt exposures generally increase. This increase in risk weights and MRC should however be considered in the light of the current exemption set out under the Basel II framework that applies to some equity holdings of IRB banks. Under the exemption, the relevant equity holdings covered by the transitional provisions are subject to the capital requirements of the current standardised approach ("equity grandfathering"). With the exemption period of ten years expiring shortly, such exposures would become subject to the IRB risk weights which are higher than the risk weights under the revised standardised approach. This effect is not reflected in the QIS data leading to an overestimation of the impact compared to the actual situation at the date of implementation of the revised framework.

Average risk weights by asset class under the current standard and the revised Basel III framework

Group 1 banks

Graph 14

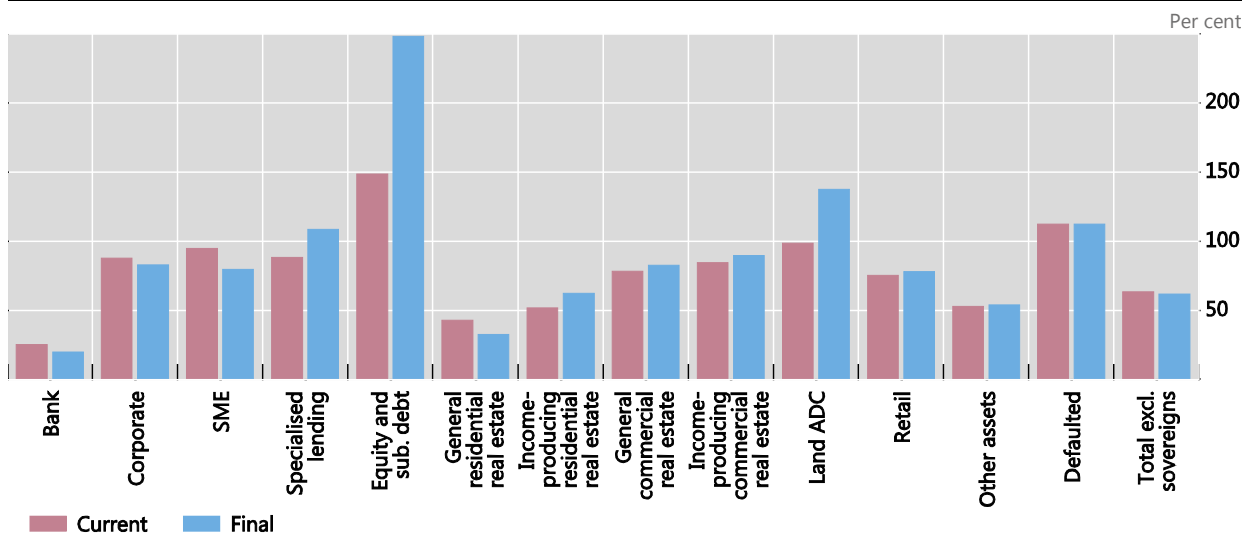


Source: Basel Committee on Banking Supervision. See also Table B.15.

Average risk weights by asset class under the current standard and the revised Basel III framework

Group 2 banks

Graph 15



Source: Basel Committee on Banking Supervision. See also Table B.15.

4. Operational risk

The objective of the design and calibration of the revised operational risk framework is to ensure stable capital requirements that are simple to estimate, comparable while remaining risk-sensitive. The revisions aim to accomplish this objective by replacing the existing set of approaches³² used for the estimation of operational risk capital requirements with the standardised approach, which is comprised of a single non-model-based method that combines a financial statement proxy of operational risk exposure (termed the “business indicator” or BI), with bank-specific operational risk related losses (termed the “internal loss multiplier” or ILM). The following analysis applies the standardised approach to estimate the changes in operational risk MRC and evaluates the impact of the final against the existing framework. It also takes into account the national discretion to set the internal loss multiplier equal to one and hence base capital requirements for operational risk solely on the business indicator component.³³

According to Table 6, the final operational risk framework generates an aggregate decrease of operational risk MRC of approximately 25.0% for all Group 1 banks and 30.2% for G-SIBs while there is an increase of 6.9% for the Group 2 banks in the sample. It should be noted, however, that the results exclude current supervisory-imposed capital add-ons for Pillar 2 risk for certain banks in the sample which would otherwise cause the impact of the reforms to the operational risk framework on MRC to fall a further 7.2% compared to current MRC levels for the Group 1 bank sample. Given some of those additional Pillar 2 capital requirements may be removed, the size of the reduction in MRC for Group 1 banks shown in Table 6 may therefore be understated.

The increase of operational risk MRC for Group 2 banks compared to the decrease for Group 1 banks is to a significant extent driven by the different country samples for the two groups. Many countries which provided data for banks in both groups do not experience a higher increase in MRC for their Group 2 banks as compared to their Group 1 banks.

Changes in MRC for operational risk

In per cent	Table 6		
	Change in Tier 1 MRC ¹	Number of banks migrating from AMA	Number of banks migrating from other approach
Group 1 banks	-25.0	42	43
Of which: G-SIBs	-30.2	19	9
Group 2 banks	6.9	5	62

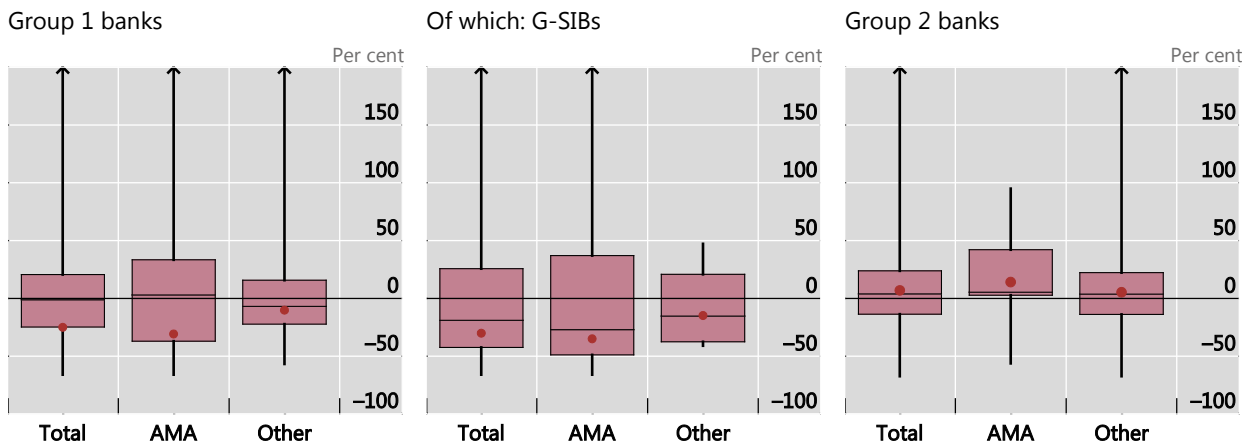
¹ Figures do not show supervisor-imposed capital add-ons. Therefore, increases in MRC may be overstated and reductions may be understated.

Source: Basel Committee on Banking Supervision.

Graph 16 depicts the distribution of changes in operational risk capital requirements for Group 1 banks, G-SIBs and Group 2 banks that calculate operational risk capital requirements using the existing set of standardised and advanced approaches in the framework.

³² Comprised of the basic indicator approach, the standardised approach and its variant the alternative standardised approach along with the internal model-based advanced measurement approach (AMA).

³³ This has been reflected in the calculation by setting the internal loss multiplier to one whenever national supervisory authorities have indicated that they will most likely apply the national discretion, or alternatively whenever it results in lower average MRC for the banks in the given jurisdiction.



¹ Figures do not show supervisor-imposed capital add-ons. Therefore, increases in MRC may be overstated and reductions may be understated. The median value is represented by a horizontal line, with 50% of the values falling in the 25th to 75th percentile range shown by the box. The upper and lower end points of the vertical lines generally show the range of the entire sample. In some cases, arrows at the top of the vertical line indicate banks with capital ratios outside the range shown in the graph. The dots represent weighted averages.

Source: Basel Committee on Banking Supervision. See also Table B.16.

5. Leverage ratio

The amendments to the design of the Basel III leverage ratio exposure measure agreed by the Committee include:

- implementation of a specific treatment to pending settlement transactions;
- clarification on cash pooling transactions and the deductions of eligible provisions as well as prudential valuation adjustments;
- deduction of specific and general provisions from the Basel III leverage ratio exposure measure;
- replacement of the current exposure method by a modified version of the standardised approach to counterparty credit risk for measuring derivative exposures;
- clarification on the treatment of credit derivatives and derivatives clearing services within multi-level client structure; and
- incorporation of identical credit conversion factors to off-balance sheet items as for the standardised approach for credit risk.

The impact of these amendments to the Basel III leverage ratio exposure measure and resultant changes to MRC is assessed in the analysis of Section 5.1. Section 5.2 provides a summary of the impact of introducing a Basel III leverage ratio G-SIB buffer.

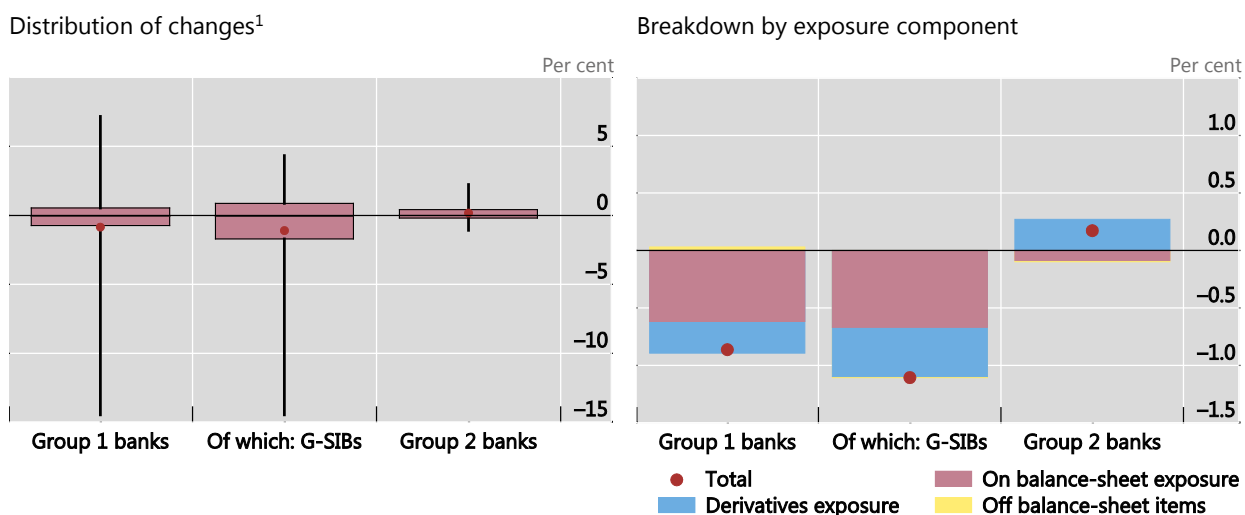
5.1 Revisions to the Basel III leverage ratio exposure measure

Graph 17 assesses, for Group 1 banks, G-SIBs and Group 2 banks, the distribution of the standalone changes in leverage ratio MRC due to the revisions to the Basel III leverage ratio *exposure measure* only,

as well as a breakdown of the mean impact by exposure type.³⁴ The standalone changes in leverage ratio MRC for Group 1 banks are on average -0.9% while there is a minor increase of 0.2% for Group 2 banks. The policy amendments related to the measurement of derivative exposures contributed -0.3% to the total decrease in Tier 1 MRC for Group 1 banks. Group 2 banks showed an average increase of 0.3%.

Changes in leverage ratio MRC due to revisions to the exposure measure

Graph 17



¹ The median value is represented by a horizontal line, with 50% of the values falling in the 25th to 75th percentile range shown by the box. The upper and lower end points of the vertical lines generally show the range of the entire sample. The dots represent weighted averages.

Source: Basel Committee on Banking Supervision. See also Table B.17 and Table B.18.

5.2 Additional requirements for G-SIBs

Under the current Basel III leverage ratio, none of the G-SIBs included in the sample are constrained or bound by the Basel III leverage ratio if no buffer for G-SIBs is applied.³⁵ The former reflects the portion of G-SIBs for which the revised Basel III leverage ratio plus the respective buffer require more capital than the revised risk-based framework plus applicable G-SIB surcharges.³⁶ The latter reflects the portion of banks with a Basel III leverage ratio shortfall. The introduction of a Basel III leverage ratio G-SIB buffer results in three banks being bound and one bank being constrained. Across the 27 G-SIBs in this sample, the aggregate standalone Tier 1 capital shortfall due to the Basel III leverage ratio increases from zero with no G-SIB surcharge to €12.4 billion after the introduction of the G-SIB buffer.

³⁴ Of note, for off-balance sheet items, the Basel III leverage ratio exposure measure assumes the credit conversion factors as applicable under the current framework instead of those under the revised framework, as the credit conversion factors in the current framework are more reflective of the final treatment in the standardised approach for credit risk than those collected through the data collection exercise. Further, where unavailable figures for the modified standardised approach to counterparty credit risk for derivative exposures have been replaced by the existing figures calculated according to the current exposure method.

³⁵ A bank is *bound* by the risk-based capital framework if it has a risk-based capital shortfall. A bank is *bound* by the leverage ratio framework if, on a standalone basis, it has a Basel III leverage ratio shortfall. Therefore, a bank can be bound by none, one or both of these frameworks. However, a bank is *constrained* by the leverage ratio if the Basel III leverage ratio requires more capital than the risk-based framework plus applicable G-SIB surcharges, so in general exactly one of the two measures is constraining.

³⁶ The sample to calculate G-SIBs constrained is limited to the 27 G-SIBs that submitted both revised risk-based and Basel III leverage ratio data. The sample to calculate G-SIBs bound includes two additional G-SIBs.

Annex A: Basel III phase-in arrangements

Original Basel III phase-in arrangements

Shading indicates transition periods – all dates are as of 1 January.

Table A.1

	2015	2016	2017	2018	As of 2019
Leverage ratio	Parallel run until 1 Jan 2017 Disclosure started 1 Jan 2015			Migration to Pillar 1	
Minimum CET1 ratio	4.5%	4.5%	4.5%	4.5%	4.5%
Capital conservation buffer		0.625%	1.25%	1.875%	2.50%
G-SIB surcharge		Phase-in			1.0%–2.5%
Minimum common equity plus capital conservation buffer	4.5%	5.125%	5.75%	6.375%	7.0%
Phase-in of deductions from CET1 (including amounts exceeding the limit for DTAs, MSRs and financials)	40%	60%	80%	100%	100%
Minimum Tier 1 capital	6.0%	6.0%	6.0%	6.0%	6.0%
Minimum total capital	8.0%	8.0%	8.0%	8.0%	8.0%
Minimum total capital plus capital conservation buffer	8.0%	8.625%	9.25%	9.875%	10.5%
Capital instruments that no longer qualify as Tier 1 capital or Tier 2 capital	Phased out over 10 year horizon beginning 2013				
Liquidity coverage ratio	60%	70%	80%	90%	100%
Net stable funding ratio				Introduce minimum standard	

Final Basel III phase-in arrangements

Shading indicates transition periods – all dates are as of 1 January.

Table A.2

	2022	2023	2024	2025	2026	2027
Revisions to the standardised and internal ratings-based approaches to credit risk	Introduce					
Revised CVA and market risk frameworks	Introduce					
Revised operational risk framework	Introduce					
Output floor	50%	55%	60%	65%	70%	72.5%
	Increase in RWA subject to 25% cap at national discretion.					
Leverage ratio exposure measure and G-SIB surcharge	Introduce					

Annex B: Statistical Annex

Number of banks for which data have been provided

Group 1 banks

Table B.1

	All	Overview MRC	Credit risk		Operational risk	Market risk	Leverage ratio
			IRB	SA			
Australia	4	2	4	4	3	1	2
Belgium	1	1	1	1	1	1	1
Brazil	2	2	0	2	2	0	2
Canada	6	6	6	6	6	2	6
China	6	6	6	6	5	0	6
France	5	4	5	5	5	5	4
Germany	7	4	5	6	6	3	5
India	4	0	0	3	2	0	0
Italy	2	2	2	2	2	2	2
Japan	14	12	11	13	11	7	14
Korea	5	0	0	4	5	0	0
Netherlands	3	3	3	3	3	2	3
Saudi Arabia	3	2	0	3	3	0	2
Singapore	3	3	3	3	2	3	3
South Africa	3	3	3	3	3	2	3
Spain	2	2	2	2	2	1	2
Sweden	4	4	4	4	4	3	4
Switzerland	2	2	2	2	1	1	2
Turkey	3	1	0	1	3	0	1
United Kingdom	5	5	5	5	5	3	5
United States	12	7	7	0	11	6	12
Total	96	71	69	78	85	42	79
Of which: G-SIBs	30	27	28	22	28	20	29

Source: Basel Committee on Banking Supervision.

Number of banks for which data have been provided

Group 2 banks

Table B.2

	All	Overview MRC	Credit risk		Operational risk	Market risk	Leverage ratio
			IRB	SA			
Australia	1	0	1	1	1	0	0
Belgium	2	2	2	2	1	1	2
Canada	2	2	0	2	1	0	2
France	2	1	0	2	2	1	2
Germany	32	12	6	24	26	3	17
India	5	0	0	3	5	0	0
Indonesia	2	0	0	2	0	0	0
Italy	12	8	3	10	11	4	10
Japan	8	2	3	8	4	0	3
Korea	3	0	0	3	2	0	0
Mexico	6	0	0	6	3	0	0
Netherlands	8	4	2	8	0	1	4
Philippines	3	0	0	3	0	0	0
Poland	5	0	0	5	0	0	0
South Africa	2	2	0	2	2	0	2
Spain	6	5	4	6	6	1	5
Sweden	4	1	3	4	0	0	1
Switzerland	5	0	0	5	1	0	0
United Kingdom	44	3	4	44	2	0	3
Total	152	42	28	140	67	11	51

Source: Basel Committee on Banking Supervision.

Changes in Tier 1 MRC at the target level

In per cent

Table B.3

	Group 1 banks	Of which: G-SIBs	Group 2 banks
Max	52.2	43.4	36.7
95th percentile	35.1	36.2	14.3
75th percentile	12.9	17.3	4.7
Median	1.0	9.7	1.2
25th percentile	-7.5	-9.1	-0.3
5th percentile	-16.6	-21.1	-11.1
Min	-27.8	-27.8	-46.5
Weighted average	-0.5	-1.4	3.8

Source: Basel Committee on Banking Supervision.

CET1, Tier 1 and total capital ratios under the final Basel III framework

In per cent

Table B.4

	Group 1 banks			Of which: G-SIBs			Group 2 banks		
	CET1	Tier 1	Total	CET1	Tier 1	Total	CET1	Tier 1	Total
Max	24.1	24.1	29.1	17.0	19.6	21.7	36.7	36.7	36.7
95th percentile	17.8	19.1	21.7	15.2	18.3	21.2	27.3	30.4	30.5
75th percentile	13.4	13.8	15.7	12.8	14.1	15.8	15.3	16.9	18.0
Median	11.5	12.1	13.9	11.0	11.8	14.8	12.6	13.2	14.4
25th percentile	10.2	10.8	12.3	9.5	10.1	12.0	10.3	10.7	12.0
5th percentile	7.7	8.6	10.3	7.4	8.3	10.2	7.3	7.8	8.9
Min	7.3	7.6	8.0	7.3	7.6	8.0	5.5	5.5	7.3
Weighted average	11.6	12.5	14.2	11.6	12.7	14.4	11.9	12.5	14.2

Source: Basel Committee on Banking Supervision.

Capital shortfalls at minimum and target levels under the current standard and the final Basel III framework

In billions of euros

Table B.5

	Group 1 banks		Of which: G-SIBs		Group 2 banks	
	Current	Final	Current	Final	Current	Final
<i>Minimum</i>						
CET1	0.0	0.0	0.0	0.0	0.0	0.0
Additional Tier 1	0.0	0.0	0.0	0.0	0.0	0.0
Tier 2	0.0	0.3	0.0	0.3	0.2	0.2
<i>Target</i>						
CET1	0.0	27.6	0.0	27.6	0.2	0.3
Additional Tier 1	0.0	28.8	0.0	27.8	0.6	0.5
Tier 2	1.3	34.3	0.0	30.3	0.7	0.6

Source: Basel Committee on Banking Supervision.

Banks constrained by different parts of the framework

In per cent

Table B.6

	Group 1 banks		Of which: G-SIBs		Group 2 banks IRB		Group 2 banks pure SA	
	Current	Final	Current	Final	Current	Final	Current	Final
Risk-based capital	54.9	46.5	59.3	55.6	50.0	33.3	70.8	70.8
Output floors	19.7	32.4	25.9	33.3	11.1	22.2	0.0	0.0
Leverage ratio	25.4	21.1	14.8	11.1	38.9	44.4	29.2	29.2

Source: Basel Committee on Banking Supervision.

Ratio of risk weights between approaches under the current standard and the final Basel III framework, by asset class

Table B.7

	Group 1 banks		Group 2 banks	
	Current	Final	Current	Final
Corporates	0.66	0.65	0.55	0.55
Specialised lending	0.69	0.67	0.65	0.64
Banks and financial corporates	0.66	0.72	0.87	0.89
Retail residential mortgages	0.58	0.55	0.40	0.39
QRRE	0.47	0.44	0.47	0.45
Other retail	0.53	0.53	0.41	0.40
Total excluding sovereign exposures	0.63	0.60	0.54	0.51

Source: Basel Committee on Banking Supervision.

Distribution of EAD by approach under the current standard and the final Basel III framework

Exposures currently subject to the IRB approach

Table B.8

	Group 1 banks		Of which: G-SIBs		Group 2 banks	
	Current	Final	Current	Final	Current	Final
Advanced IRB	76.6	57.8	79.5	57.8	81.3	77.0
Foundation IRB	19.7	40.1	17.4	40.6	14.7	20.2
Slotting	1.0	1.0	0.4	0.4	2.1	2.3
Standardised	0.0	0.9	0.0	1.1	0.0	0.5
Other	2.7	0.2	2.7	0.2	1.9	0.0

Source: Basel Committee on Banking Supervision.

Distribution of RWA by approach under the current standard and the final Basel III framework

Exposures currently subject to the IRB approach

Table B.9

	Group 1 banks		Of which: G-SIBs		Group 2 banks	
	Current	Final	Current	Final	Current	Final
Advanced IRB	58.2	36.9	58.4	34.9	65.0	58.3
Foundation IRB	34.4	52.2	35.7	54.8	23.1	30.1
Slotting	2.1	2.1	0.8	0.8	5.8	6.3
Standardised	0.0	7.6	0.0	8.9	0.0	4.7
Other	5.4	1.1	5.1	0.6	6.1	0.5

Source: Basel Committee on Banking Supervision.

Distribution of IRB risk weights

Group 1 banks, in per cent

Table B.10

	Total excluding sovereigns		Corporates		Banks and financial corporates	
	Current	Final	Current	Final	Current	Final
Max	72.3	65.9	91.3	83.3	48.2	56.6
95th percentile	61.4	57.9	76.0	70.1	43.7	48.4
75th percentile	46.4	42.4	62.2	61.5	33.3	38.0
Median	38.7	38.5	51.5	52.6	25.4	27.4
25th percentile	32.7	32.4	41.4	44.0	21.0	21.5
5th percentile	24.0	24.7	32.7	37.6	13.7	14.3
Min	15.7	14.9	21.4	21.8	8.6	11.4
Weighted average	43.9	41.8	57.2	56.7	30.5	33.4
Standard deviation	12.2	9.8	14.1	11.6	8.9	10.7
Skewness	0.4	0.5	0.4	0.0	0.4	0.4
Kurtosis	3.0	3.9	3.2	3.4	2.8	2.4

Source: Basel Committee on Banking Supervision.

Changes in Tier 1 MRC due to IRB revision

Table B.11

	Group 1	Of which: G-SIBs	Group 2
Max	47.9	47.9	64.0
95th percentile	33.1	38.2	39.8
75th percentile	15.9	24.1	13.7
Median	1.1	7.9	3.4
25th percentile	-8.1	-4.1	-1.2
5th percentile	-16.2	-18.0	-7.0
Min	-43.4	-43.4	-32.8
Weighted average	2.0	3.4	6.7

Source: Basel Committee on Banking Supervision.

Changes in Tier 1 MRC due to IRB approach revisions, by asset class

In per cent

Table B.12

	Group 1	Of which: G-SIBs	Group 2
Corporate	0.9	1.6	0.4
Banks	0.7	1.0	0.2
SME	-0.8	-1.1	2.8
Specialised lending	-0.3	-0.2	-0.1
Retail	0.5	0.6	0.7
Retail residential mortgages	-0.4	-0.3	-0.1
Others ¹	1.0	1.6	1.1
Overall	1.8	3.2	5.0

The cumulative impact when summing over all asset classes is slightly different from the overall impact reported. The reason is that when summing over all asset classes it is assumed that provisions are asset class-specific, whereas in the overall impact calculation a shortfall in provisions in one asset class may be compensated by excess provisions in another asset class. ¹ "Others" include exposures to sovereigns, equity exposures and equity investments in funds.

Source: Basel Committee on Banking Supervision.

Changes in Tier 1 MRC due to standardised approach revisions

In per cent

Table B.13

	Group 1 banks	Of which: G-SIBs	Group 2 banks
Max	199.3	52.7	533.8
95th percentile	28.1	21.9	22.0
75th percentile	7.9	6.2	3.3
Median	0.0	0.5	-1.9
25th percentile	-5.7	-4.0	-10.6
5th percentile	-17.7	-16.3	-21.0
Min	-22.1	-22.1	-42.1
Weighted average	-1.9	-2.1	-2.0

Data exclude exposures sovereigns, PSEs, PSEs treated as sovereigns and MDBs. Data generally include banks subject to the standardised approach for credit risk and exposures subject to partial use of banks using the IRB approach for credit risk.

Source: Basel Committee on Banking Supervision.

Changes in Tier 1 MRC due to standardised approach revisions, by asset class

In per cent

Table B.14

	Group 1	Of which: G-SIBs	Group 2
Bank	0.1	0.1	-1.4
Corporate	-1.1	-0.8	-2.5
Equity/subordinated debt	2.2	2.4	2.3
Real estate	-3.5	-3.9	-1.8
Retail	-0.1	-0.2	1.2
Other assets	0.4	0.3	0.1
Defaulted	0.0	0.0	0.0

Data exclude exposures sovereigns, PSEs, PSEs treated as sovereigns and MDBs. Data generally include banks subject to the standardised approach for credit risk and exposures subject to partial use of banks using the IRB approach for credit risk.

Source: Basel Committee on Banking Supervision.

Standardised approach risk weights under the current standard and the final Basel III framework, by asset class

Standardised approach banks and partial use of IRB banks

Table B.15

	Group 1 banks		Of which: G-SIBs		Group 2 banks	
	Current	Final	Current	Final	Current	Final
Bank	26.0	25.2	26.0	24.1	25.5	20.1
Corporate	95.1	95.1	96.1	96.8	88.0	82.9
SME	94.3	83.1	94.4	84.4	94.9	79.7
Specialised lending	99.6	115.8	99.8	112.9	88.3	108.7
Equity and subordinated debt	207.9	228.6	237.4	229.9	148.6	248.2
General residential real estate	43.2	35.7	40.4	35.6	43.0	32.9
Income-producing residential real estate	53.1	49.2	41.2	53.1	51.9	62.5
General commercial real estate	79.3	83.7	76.4	86.0	78.4	82.8
Income-producing commercial real estate	86.3	86.3	78.8	87.2	84.8	89.7
Land ADC	99.2	137.5	98.9	137.5	98.6	137.5
Retail	77.5	77.9	73.7	78.6	75.4	78.1
Other assets	29.2	31.2	28.1	29.4	53.2	54.0
Defaulted	117.9	117.9	117.6	117.6	112.5	112.5
Total	60.8	61.2	58.3	59.0	63.6	62.0

Source: Basel Committee on Banking Supervision.

Changes in operational risk capital requirements¹

In per cent

Table B.16

	Group 1 banks			Of which: G-SIBs			Group 2 banks		
	Migration from...			Migration from...			Migration from...		
	Total	AMA	Other	Total	AMA	Other	Total	AMA	Other
Max	296.0	222.0	296.0	222.0	222.0	47.1	238.3	95.0	238.3
95th percentile	70.4	72.2	54.1	114.2	156.3	37.6	66.3	84.4	64.5
75th percentile	20.7	33.3	15.7	25.8	37.0	21.0	23.9	42.1	22.2
Median	-1.2	2.9	-6.9	-19.0	-27.1	-15.2	3.9	5.2	3.7
25th percentile	-24.7	-37.0	-22.2	-42.3	-48.7	-37.5	-13.7	2.7	-13.8
5th percentile	-56.1	-59.2	-40.8	-58.9	-59.9	-40.0	-54.9	-44.5	-54.0
Min	-66.1	-66.1	-56.7	-66.1	-66.1	-40.9	-67.3	-56.3	-67.3
Weighted average	-25.0	-30.8	-10.1	-30.2	-34.9	-14.8	6.9	14.0	5.4

¹ Figures do not show supervisor-imposed capital add-ons. Therefore, increases in MRC may be overstated and reductions may be understated.

Source: Basel Committee on Banking Supervision.

Changes in leverage ratio MRC due to revisions to the exposure measure

In per cent

Table B.17

	Group 1	Of which: G-SIBs	Group 2
Max	7.2	4.3	2.2
95th percentile	3.5	3.2	1.4
75th percentile	0.5	0.9	0.4
Median	0.0	0.0	0.0
25th percentile	-0.7	-1.7	-0.2
5th percentile	-8.4	-10.7	-0.6
Min	-14.5	-14.5	-1.1
Weighted average	-0.9	-1.1	0.2

Source: Basel Committee on Banking Supervision.

Drivers of changes in leverage ratio MRC due to revisions to the exposure measure

In per cent

Table B.18

	Group 1	Of which: G-SIBs	Group 2
On balance-sheet exposure	-0.6	-0.7	-0.1
Derivatives exposure	-0.3	-0.4	0.3
Off balance-sheet items	0.0	0.0	0.0
Total	-0.9	-1.1	0.2

Source: Basel Committee on Banking Supervision.

Impact of revised minimum capital requirements for market risk on MRC

End-December 2015 reporting date, in per cent

Table B.19

	Change relative to total current market risk MRC			Change relative to total current MRC		
	Group 1	Of which: G-SIBs	Group 2	Group 1	Of which: G-SIBs	Group 2
Max	317.4	228.7	349.0	22.2	22.2	16.8
95th percentile	173.7	178.1	262.6	14.7	17.3	12.3
75th percentile	94.2	102.3	166.4	6.2	4.4	2.4
Median	39.6	45.3	46.8	1.7	1.8	1.3
25th percentile	0.8	15.0	4.5	0.0	0.7	0.2
5th percentile	-22.7	-23.4	-51.7	-0.9	-0.8	-1.1
Min	-36.2	-36.2	-78.0	-4.8	-1.1	-1.8
Weighted average	52.3	50.9	52.2	3.2	3.0	2.0

Source: Basel Committee on Banking Supervision.

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Previous monitoring reports published by the Basel Committee

Results of the comprehensive quantitative impact study, December 2010, www.bis.org/publ/bcbs186.htm.

Results of the Basel III monitoring exercise as of 30 June 2011, April 2012, www.bis.org/publ/bcbs217.htm.

Results of the Basel III monitoring exercise as of 31 December 2011, September 2012, www.bis.org/publ/bcbs231.htm.

Results of the Basel III monitoring exercise as of 30 June 2012, March 2013, www.bis.org/publ/bcbs243.htm.

Basel III monitoring report, September 2013, www.bis.org/publ/bcbs262.htm.

Basel III monitoring report, March 2014, www.bis.org/publ/bcbs278.htm.

Basel III monitoring report, September 2014, www.bis.org/publ/bcbs289.htm.

Basel III monitoring report, March 2015, www.bis.org/bcbs/publ/d312.htm.

Basel III monitoring report, September 2015, www.bis.org/bcbs/publ/d334.htm.

Basel III monitoring report, March 2016, www.bis.org/bcbs/publ/d354.htm.

Basel III monitoring report, September 2016, www.bis.org/bcbs/publ/d378.htm.

Basel III monitoring report, February 2017, www.bis.org/bcbs/publ/d397.htm.

Basel III monitoring report, September 2017, www.bis.org/bcbs/publ/d416.htm.