

# AD HOC CUMULATIVE IMPACT ASSESSMENT OF THE BASEL REFORM PACKAGE

20 December 2017



**EBA**

EUROPEAN  
BANKING  
AUTHORITY

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## Abbreviations

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<b>A-IRB</b>	advanced internal ratings-based
<b>AMA</b>	advanced measurement approach
<b>ASA</b>	alternative standardised approach
<b>BCBS</b>	Basel Committee on Banking Supervision
<b>BIA</b>	basic indicator approach
<b>CCB</b>	capital conservation buffer
<b>CCF</b>	credit conversion factor
<b>CET1</b>	common equity tier 1
<b>CR</b>	credit risk
<b>CRR</b>	Capital Requirements Regulation
<b>EBA</b>	European Banking Authority
<b>F-IRB</b>	foundation internal ratings-based
<b>FRTB</b>	Fundamental Review of the Trading Book
<b>G-SII</b>	global systemically important institution
<b>ILM</b>	Internal Loss Multiplier
<b>IPRE</b>	income-producing real estate
<b>IRB</b>	internal ratings-based
<b>LGD</b>	loss given default
<b>LR</b>	leverage ratio
<b>MRC</b>	minimum required capital
<b>OpR</b>	operational risk
<b>O-SII</b>	other systemically important institution
<b>RRE</b>	residential real estate
<b>RWA</b>	risk-weighted assets
<b>SA</b>	standardised approach
<b>SL</b>	specialised lending
<b>SMA</b>	standardised measurement approach
<b>SRT</b>	significant risk transfer
<b>T1 MRC</b>	minimum Tier 1 capital requirements

## Executive summary

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The finalisation of post-crisis reforms of the Basel Committee on Banking Supervision (BCBS), as endorsed by the Group of central bank governors and heads of supervision (GHoS) and published by the BIS on 7 December 2017<sup>1</sup>, complements the Basel III supervisory framework and assists supervisors world-wide to maintain financial stability. The present report assesses the impact of the final revisions to credit and operational risk, as well as the leverage ratio framework, on EU banks.

Aligning with the BCBS, the EBA conducted an interim ad hoc monitoring exercise to assess the impact of the Basel reform package on EU banks. Data refer to December 2015 for a total of 149 banks from 17 EU countries, including 44 Group 1 and 105 Group 2 banks<sup>2</sup>. The sample of banks that provided sufficient data to be included in the overall analysis consists of 36 Group 1 banks and 52 Group 2 banks (88 in total). Only banks which submitted data for at least one of the credit risk components (IRBA or SA) and the leverage ratio were included in the sample of the cumulative analysis. For banks not having submitted data for the remaining parts of the exercise it is assumed that they are not affected by the revisions in the particular parts.

The data collection refers to the *initial proposals of the Basel Committee on Banking Supervision (BCBS)*. Based on this set of data, the EBA assessed, on a best effort basis, the changes introduced by the *final Basel reform package* by adjusting the initially submitted data. However, due to the lack of appropriate data or data of adequate granularity, the adjustments were not always feasible without making simplistic assumptions. Hence, some of the reforms, which would affect the impact downwards, were not included in the impact assessment (see Table 14). Also, the impact assessment does not account for the capital increases that took place between the reference (December 2015) and publication (December 2017) dates. To this end, the results presented in the ad hoc cumulative impact assessment are expected to *overestimate significantly the actual impact* that EU banks will eventually face.

In order to assess the *combined* impact on the minimum risk-based Tier 1 capital requirement<sup>3</sup> and the minimum leverage ratio (LR) Tier 1 capital requirement, the analysis uses the measure of combined “T1 MRC”, i.e. the Tier 1 minimum required capital (MRC) that fulfills both requirements under the current and revised frameworks. The report assumes the full implementation of Basel reforms based on a static balance sheet as of December 2015.

On the other hand, the report does not incorporate any Pillar II requirements, estimated under the currently applied supervisory framework, any higher loss absorbency requirements for other (domestic) systemically important institutions (O-SIIs), nor considers any countercyclical capital buffer requirements.

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<sup>1</sup> BCBS (December 2017), Finalising Basel III: An overview of post-crisis reforms; BCBS (December 2017), Basel III: Finalising post-crisis reforms.

<sup>2</sup> Group 1 banks are banks with Tier 1 capital in excess of EUR 3 billion and which are internationally active. All other banks are labelled as Group 2 banks.

<sup>3</sup> Including the capital conservation buffer (CCB) and the G-SIIs surcharge, where applicable. For details on the methodology see Section 1.3 and Annex 6.1.

As shown in Table 1, the total change in T1 MRC is 12.9% for all 88 banks, 14.1% for the large and internationally active banks (“Group 1”) and 3.9% for the other banks (“Group 2”). For Group 1 banks, the overall increase in Tier 1 minimum capital requirements consists of a 6.0% increase stemming from the credit risk components, a 2.7% increase stemming from operational risk reforms and 6.9% attributed to the output floor. The total impact of the reforms on all banks by the risk-based elements (14.5%) is partially offset by the negative impact of the leverage ratio (-1.6%) which under the reform package become less binding than it is under the current framework. The inclusion of the “Basel I floor”, as a RWA add-on in the current baseline to align with the Basel methodology, reduces the overall impact of all factors to an increase of 11.4% in T1 MRC.

**Table 1: Change in total T1 MRC as percentage of the overall base MRC (in %)**

	Total		Credit risk		OpR	Output floor	LR
	All factors	of which: risk-based	IRB	SA			
All banks	12.9	14.5	4.3	1.0	2.5	6.6	-1.6
Group 1	14.1	15.6	4.5	1.5	2.7	6.9	-1.6
G-SIIs	15.2	14.1	5.1	1.6	2.9	4.5	1.1
Group 2	3.9	5.3	2.7	-2.4	0.8	4.2	-1.3

The EBA will conduct additional impact assessment exercises relating to the impact of final Basel reforms in order to (i) include the remaining reforms for which there were no available data as of December 2015, (ii) use more recent data to better estimate the current impact, and (iii) allow banks to provide more representative data, as the results shown in this report are based on data provided by banks on a best-effort basis, according to their knowledge and understanding of the proposals as of April 2016.

# 1. Introduction

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The ad hoc impact assessment report presents the estimated impact of the Basel reform package on European banks as of December 2015, as a result of the finalised Basel reform package. The assessment of the final package includes the revisions to the internal ratings-based approach (IRBA)<sup>4</sup>, standardised approach for credit risk (SA)<sup>5</sup>, the standardised approach to operational risk<sup>6</sup>, as well as the revisions to the Basel III leverage ratio framework<sup>7</sup>, as endorsed by the Group of central bank governors and heads of supervision (GHoS) at its meeting on 7 December 2017. However, the report does not include changes resulting from the revised securitisation framework<sup>8</sup> as well as the revision of the credit valuation adjustment (CVA) risk framework<sup>9</sup>.

## 1.1 Data and sampling

The data submitted for the ad hoc cumulative impact assessment, as of December 2015, consists of a total of 149 banks from 17 EEA countries, including 44 Group 1 and 105 Group 2 banks. Only banks which submitted data for at least one of the credit risk components (IRBA or SA) and the leverage ratio were included in the sample of the cumulative analysis. Following this criterion, only 88 of the 149 banks provided sufficient data to be included in the cumulative analysis, of which 36 Group 1 banks and 52 Group 2 banks (see Table 2).

Consequently, the sample used for analysing the impact of Basel revisions on individual risk categories is larger than the sample used for the overall cumulative analysis. Thus, the results relating to credit risk, operational risk, and the leverage ratio may differ from the results attributed to the respective category in the overall cumulative analysis (see shaded column in Table 2).

The report presents the impact, predominantly, in terms of changes in Tier 1 minimum required capital and, where explicitly indicated, provides evidence on the impact on other metrics. It is noteworthy that LR requirements have been accounted for the formulation of both the current and revised T1 MRC.

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<sup>4</sup> See BCBS (2016), Reducing variation in credit risk-weighted assets – constraints on the use of internal model approaches, March 2016; BCBS (2017), Finalising Basel III: An overview of post-crisis reforms; BCBS (2017), Basel III: Finalising post-crisis reforms.

<sup>5</sup> See BCBS (2015), Second Consultative document – Standards – Revisions to the Standardised Approach for credit risk; BCBS (2017), Finalising Basel III: An overview of post-crisis reforms; BCBS (2017), Basel III: Finalising post-crisis reforms.

<sup>6</sup> See BCBS (2016), Standardised Measurement Approach for operational risk - consultative document; BCBS (2017), Finalising Basel III: An overview of post-crisis reforms; BCBS (2017), Basel III: Finalising post-crisis reforms.

<sup>7</sup> See BCBS (2016), Revisions to the Basel III leverage ratio framework - consultative document.

<sup>8</sup> See BCBS (2016), Revision to the securitisation framework.

<sup>9</sup> See BCBS (2017), Basel III: Finalising post-crisis reforms.



**Table 2: Number of banks which provided data (shaded column: number of banks included in the overall cumulative analysis), per country**

Country	Overall analysis of the impact on MRC	Credit risk				
		IRB	SA	OpR	Market risk	LR
Austria	2	3	3	–	–	3
Belgium	3	4	4	3	2	4
Denmark	8	5	9	1	2	8
France	5	6	7	7	6	7
Germany	16	18	50	42	8	50
Greece	4	2	4	4	3	4
Hungary	2	–	2	2	–	2
Ireland	3	3	3	3	–	3
Italy	10	6	15	15	6	15
Malta	1	–	2	2	–	2
Netherlands	7	6	11	3	4	11
Norway	3	5	5	–	–	4
Poland	5	–	5	3	2	5
Portugal	2	1	5	5	–	4
Spain	7	7	8	8	2	8
Sweden	4	7	7	5	3	5
United Kingdom	6	8	9	10	4	6
<b>Total</b>	<b>88</b>	<b>81</b>	<b>149</b>	<b>113</b>	<b>42</b>	<b>141</b>
<b>Group 1</b>	<b>36</b>	<b>40</b>	<b>44</b>	<b>41</b>	<b>25</b>	<b>44</b>
<b>Group 2</b>	<b>52</b>	<b>41</b>	<b>105</b>	<b>72</b>	<b>17</b>	<b>97</b>

## 1.2 Scope of impact assessment

The data collection, on which this report is based, relied on the various consultative documents published by the Basel Committee on Banking Supervision (BCBS) up to April 2016. Given that the agreement on Thursday 7 December has significantly revised the original proposals, the EBA has made a number of assumptions and methodological adjustments, on a best-effort basis, to approximate the impact of the final reforms where possible. These adjustments aim at ensuring consistency with the methodologies followed by the BCBS quantitative impact study report.

### 1.2.1 Revised proposals included in the impact analysis

The assumptions and adjustments made to approximate the impact of the revisions generally relate to the following<sup>10</sup>:

- **Standardised approach for credit risk:** Reductions in risk weights and CCFs of certain exposures, which apply to the SA for credit risk and the indirect impact on the A-IRB RWA migrating to SA;

<sup>10</sup> The set of revisions laid out in this Section consists of only the major changes; the report addressed all the revisions agreed on 7 December 2017 except for those laid out in the Table 14.

- **Revisions to the IRB framework:** The removal of the 1.06 scaling factor from the A-IRB RWA and the migration to F-IRB rather than to the SA for certain exposures (banks and large corporates);
- **Operational risk:** The assumption that the EU will apply the jurisdictional discretion to set the “Internal Loss Multiplier” (ILM) component equal to one (ILM=1)<sup>11</sup>;
- **Leverage ratio:** An add-on to the minimum leverage ratio requirement which equals half of the current G-SII surcharge applicable in the calculation of minimum capital requirements under the risk-based framework;

The abovementioned adjustments intended to ensure consistency with the methodology used by the BCBS. For instance, the EU legislative framework may still choose to not apply the jurisdictional discretion of setting the ILM equal to 1 under the operational risk framework. However, for the purposes of the impact assessment, the analysis adopted the assumption of ILM=1, which is deemed the closest to the impact measured by the BCBS for the EU countries in the global quantitative impact study.

### 1.2.2 Revised proposals not included in the impact analysis

As mentioned above, it was not possible to quantify the impact of several amendments of the original proposals. Given that the introduction of these revisions would lead to a reduction of the capital impact, the current results is expected to overestimate the capital impact, on an aggregate basis. Table 14 shows the full list of revisions, not addressed by the ad hoc impact assessment report. The most notable are the following:

**Standardised approach for credit risk:** The impact of aligning the definition of residential income producing real estate exposures under the SA with the IRB approach definition, i.e. the application of the national discretion to apply a maximum number of housing limits under the standardised approach;

#### **Revisions to the IRB framework:**

- The full impact from raising the threshold for A-IRB approach modelling of mid-sized corporate sales from EUR 200 million to EUR 500 million, on consolidated basis. Due to data unavailability, the analysis only shows the impact from increasing the threshold for fully modelled mid-sized general corporate exposures to EUR 300 million on consolidated basis;
- The impact of the reduction of supervisory LGD for senior unsecured corporate exposures under the F-IRB approach from 45% to 40%; and,
- The impact of the reduction of LGD input floor for residential mortgages to 5% (instead of 10%) (applied at the exposure level rather than at portfolio level as per current rules).

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<sup>11</sup> It is noteworthy that the application of ILM = 1 negatively impact some banks whose actual ILM is lower than one.

**Leverage ratio:** The impact of allowing discretion to temporarily exempt central bank reserves from the calculation of total leverage ratio exposures.

## 1.3 Methodology for the estimation of the impact

### 1.3.1 Calculation of minimum required capital (MRC) and differences to the methodology used on BCBS level

The vast majority of the analysis quantifies the impact on current minimum Tier 1 capital requirements (T1 MRC) assuming full implementation of the Basel reforms. The estimation of the current RWA, which is the basis for the estimation of risk-based T1 MRC, does not include the so-called “Basel I floor” as an RWA add-on, but rather as an additional own-funds add-on (see Article 500 of the CRR). However, to render the results comparable with those of the BCBS, Table 3 only shows the impact of the inclusion of “Basel I floor” as an RWA add-on in the baseline. Furthermore, to ensure alignment with the BCBS, the methodology assumes that the Fundamental Review of the Trading Book (FRTB) has already been implemented in the current framework.

As to the revised framework, the exercise assumes full implementation of the output floor calibrated at 72.5% on the RWA estimated under the revised framework, while the minimum required leverage ratio Tier 1 capital comprises of the existing minimum threshold (3%) plus a G-SIIs surcharge, equal to 50% of the risk-based G-SIIs surcharge<sup>12</sup>, where applicable.

Both the current and revised T1 MRC include the capital conservation buffer (CCB), as well as the G-SIIs surcharge<sup>13</sup> on RWA and half of the G-SIIs surcharge on minimum required T1 leverage ratio, where applicable. All in all, the report takes into account the highest of the risk-based T1 MRC and the leverage ratio T1 MRC as the baseline for the estimation of the combined T1 MRC under both the current and revised frameworks.

The analysis adopts the BCBS methodology as to how the leverage ratio impact is estimated (see Annex of this report and *“Basel III monitoring report December 2017: Results of the cumulative quantitative impact study”*: page 10). This methodology quantifies the impact of the leverage ratio as the change in the additional capital that the revised LR framework implies, compared to the additional capital imposed by the current LR framework. The new leverage ratio impact would be positive if the additional Tier 1 capital attributed to LR were higher than the current LR add-on. On the other hand, the leverage ratio impact would be negative if the additional Tier 1 capital attributed to LR were lower than the current LR add-on. The assessment does not include the impact of Pillar II capital requirements.

The average impact has been calculated by creating an “EU-composite” bank, i.e. all EU averages are weighted according to the relevant impact factor. For example, the calculation of the EU-wide

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<sup>12</sup> For example, for a bank with a G-SIIs buffer of 1% the minimum LR T1 MRC would be 3.5% X total exposure measure.

<sup>13</sup> See also BCBS: Global systemically important banks – updated assessment methodology and the higher loss absorbency requirement (2013), EBA: Final draft RTS on the methodology for the identification of global systemically important institutions (2014) and FSB: 2015 update of list of G-SIBs (Nov 2015).

Tier 1 ratio is the ratio of the sum of Tier 1 capital of all participating banks divided by the sum of RWA of all participating banks.

### 1.3.2 Description of the main variables used in the analysis

The following variables are the most frequently used in the analysis below:

- *Total: all factors* shows the overall changes in T1 MRC, including the risk-based capital requirements (i.e. including the 72.5% output floor) and the revised Basel III LR.
- *Total: risk-based* shows changes to the risk-based T1 MRC, i.e. excluding the impact of revised Basel LR T1 MRC.
- *Credit risk* shows the change in T1 MRC due to the revisions to the SA and IRB approach for credit risk, including the effect of migration between the A-IRB and F-IRB.
- *Operational risk* shows the change in T1 MRC after exercising the discretion of ILM = 1 at EU level.
- *Output floor* presents the change in the level of T1 MRC due to the application of an output floor on the total RWA. The output floor impact is the maximum between the actual RWA estimations including internal models and the 72.5% of the SA-equivalent RWA for the same exposures<sup>14</sup>.
- *Leverage ratio* shows the change in T1 MRC due to the implementation of the revised LR framework.

## 1.4 Box plots illustrating the distribution of results

To present more detailed results while at the same time ensuring data confidentiality, some charts show box plots that give an indication of the distribution of the results among the participating banks. Those box plots are defined as follows:

Solid red line	Respective minimum requirement
Dashed red line	Respective minimum requirement plus the CCB
Thin line crossing the rectangle boxes	Median value (50% of the observations are below this value, 50% are above this value)
'x'	Weighted average
Rectangular boxes	The concentration in interquartile ranges, i.e. the values between the 25th and 75th percentile. A percentile is the value of a variable below which a certain percentage of observations fall. For example, the 25th percentile is the value below which 25% of the observations are found
Upper and lower horizontal lines	The upper end point represents the 95th percentile value; the lower end point represents the 5th percentile value

<sup>14</sup> The impact is measured without considering the current national implementation of the Basel I-based transitional floors set out in the Basel II framework.

## 2. Overview of results

### 2.1 Changes in minimum required capital

Figure 1 shows the distribution of T1 MRC across all banks, Group 1, Group 2 and G-SIIs. The changes in T1 MRC for the 50% of Group 1 banks that belongs to the centre of the distribution (interquartile range) spans between 0.0% and 15.1%, with a median of 7.4%. The range of the distribution of changes attributed to G-SIIs is slightly narrower than Group 1 and it exhibits a higher median (14.2%). Respectively, the interquartile range of Group 2 is between -3.2% and 9.6%, while the median is 0.0%.

**Figure 1: Distribution of changes in total T1 MRC as percentage of the combined current T1 MRC**

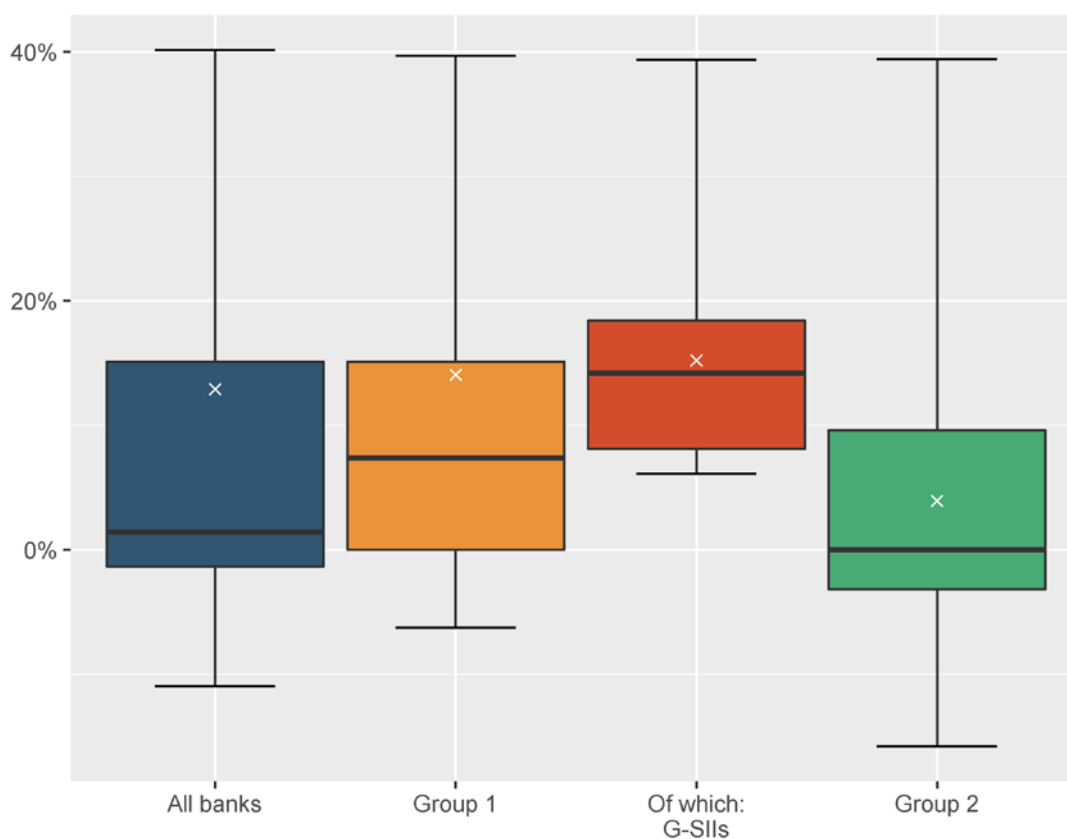


Figure 2 shows the impact of the Basel reforms, considering that the FRTB is included in the baseline while the 'Basel I floor' has not been included as an RWA add-on.

On average, the total increase in T1 MRC, after including the CCB and G-SIIs surcharge, is 12.9% for all banks, 14.1% for Group 1 banks, 3.9% for Group 2 banks and 15.2% for G-SIIs. For Group 1 banks, the overall increase in T1 MRC consists of a 15.6% increase in the risk-based components, mainly driven by the output floor (6.9%). The impact of the risk-based components on T1 MRC is partially offset by a 1.6% reduction in the add-on attributed to leverage ratio T1 MRC. This reduction reflects that the revised Basel LR becomes relatively less binding, in the presence of the output floor on RWA, which increases the risk-based T1 MRC. The results are similar for the G-SIIs sample.

For Group 2 banks, the overall 3.9% increase in T1 MRC is again driven by the 5.3% increase in the risk-based measure, consisting of an increase of 2.7% due to IRB credit risk revisions, 4.2% due to the introduction of output floor, and a lower increase attributed to the operational risk (0.8%). This increase is partially offset by a 2.4% reduction in the SA T1 MRC and a 1.3% reduction in the leverage ratio impact.

**Figure 2: Incremental changes by T1 MRC component – FRTB included in the baseline**

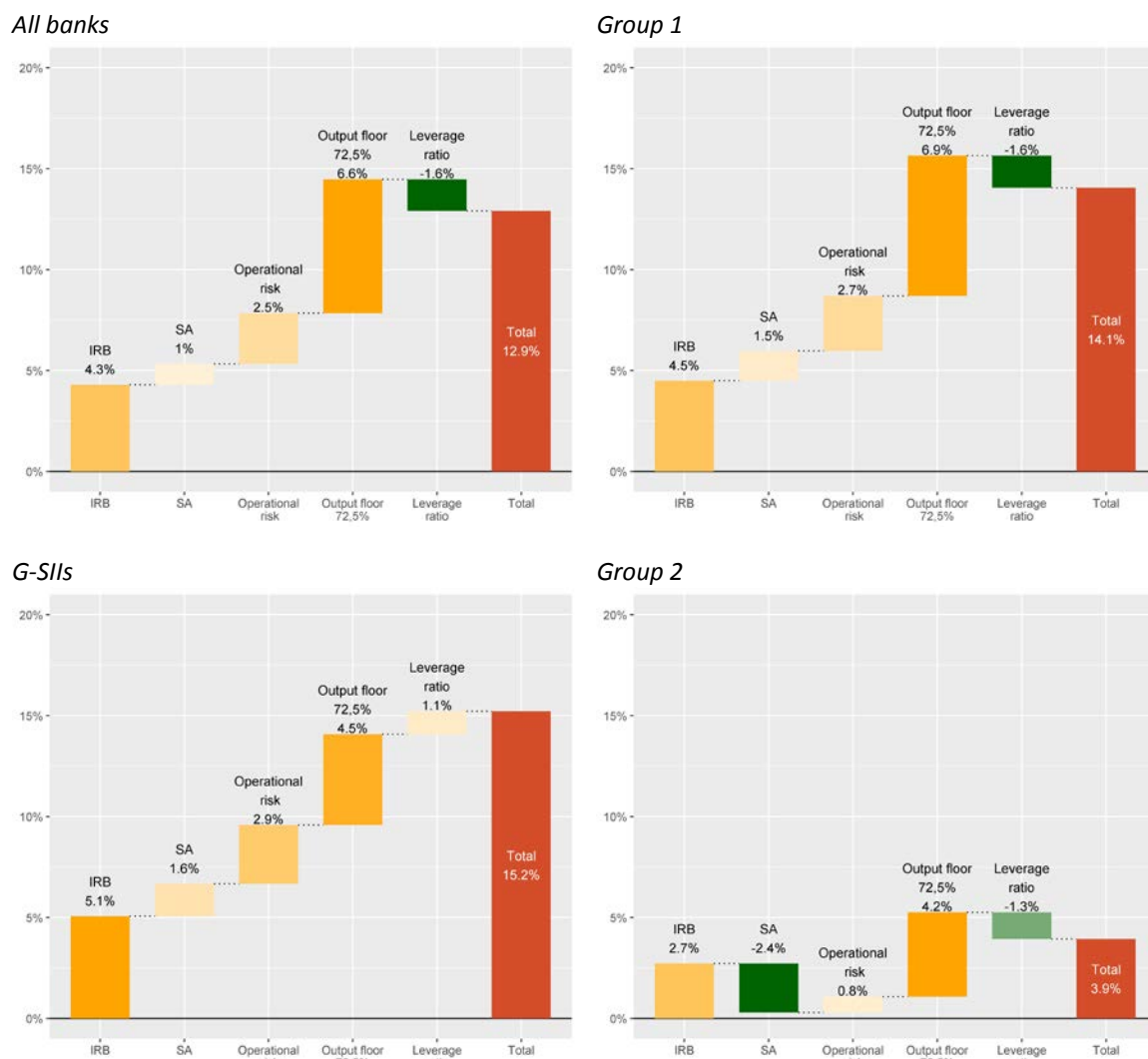


Table 3 exhibits the impact of the Basel reform package assuming the inclusion of the “Basel I floor” as an RWA add-on in the current baseline. This would result in moving from the national implementation of the transitional Basel I floor, given that in December 2015 some of the EU countries did not treat Basel I floor as an RWA add-on, but they instead included it in the own fund requirement (see Article 500 of the CRR). If the Basel I floor is included in the baseline RWA, the overall impact drops to 11.4%, mainly due to the reduced impact of the Basel III output floor.

**Table 3: Incremental changes by MRC T1 component including the "Basel I floor" as an RWA add-on in the baseline**

	Total		Credit risk		OpR	Net output floor impact (including Basel I floor)	LR
	All factors	Of which: risk-based	IRB	SA			
<b>All banks</b>	11.4	12.0	4.2	1.0	2.5	4.1	-0.6
<b>Group 1</b>	12.4	13.1	4.4	1.5	2.7	4.4	-0.7
<b>G-SIIs</b>	12.9	11.5	5.0	1.6	2.9	2.1	1.4
<b>Group 2</b>	3.5	3.3	2.7	-2.4	0.8	2.1	-1.0

Figure 3 shows the distribution of the revised CET1, Tier 1 and total capital ratios for all banks, Group 1 banks, their subset of G-SIIs and Group 2 banks in the sample. All banks meet the CET1 minimum capital requirements, including CCB and G-SIIs surcharge. Some Group 2 banks fail to meet the Tier 1 minimum capital requirements and total capital requirements, including the CCB. All banks are compliant with the minimum required capital excluding the CCB.

**Figure 3: Distribution of the revised capital ratios (in %)**

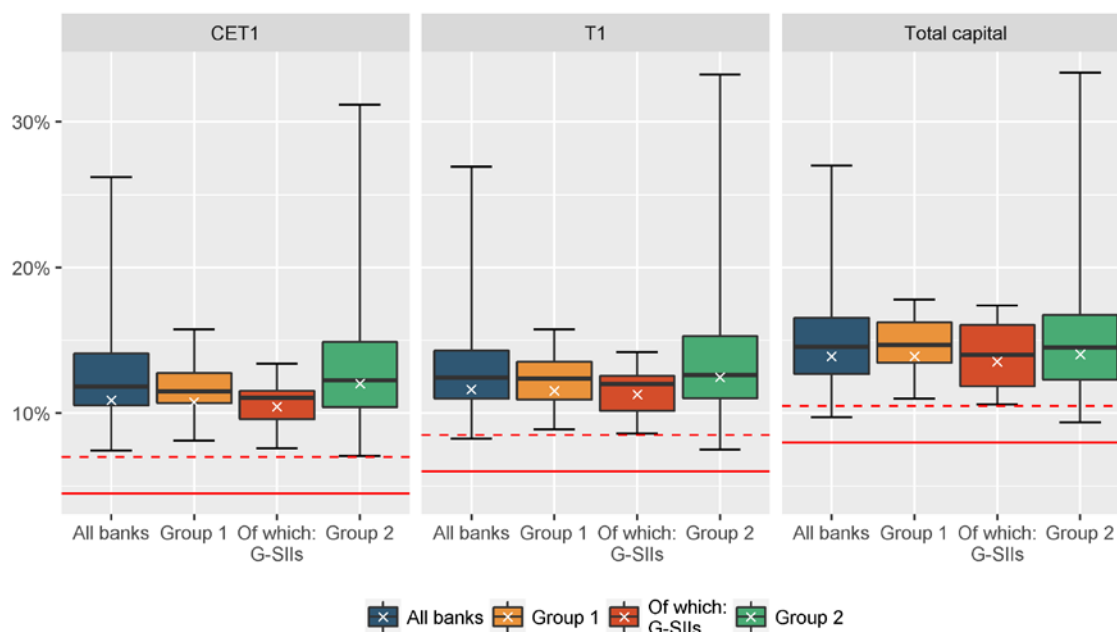


Table 4 shows the level of capital ratios at the start of the implementation period (2022) as well as the capital shortfalls at the full implementation date (2027). The risk-based ratios at the full implementation date incorporate the output floor of 72.5%. On average, the risk-based CET1 capital ratio for all banks drops to 11.6% at the start of the output floor phase-in period (2022), while at the full implementation date it becomes 10.9%. The fully implemented combined Tier 1 capital shortfalls, for all banks, Group 1 banks, their subset of G-SIIs, and Group 2 banks amounts to EUR 34.4 billion, EUR 32.0 billion, EUR 30.0 billion, EUR 2.4 billion respectively. The capital shortfall compares the current (December 2015) level of capital (CET1, Tier 1 and total capital) with the fully implemented MRC, augmented by the CCB and G-SIBs surcharge, where applicable. This metric

takes into account the deficit of capital on individual basis without it being offset by the surpluses of other banks.

**Table 4: Risk-based capital ratios, leverage ratios and capital shortfalls**

	Risk-weighted CET1 capital ratio (%)			Tier 1 leverage ratio (%)		Capital shortfalls as of 2027 incl. the CCB (EUR billion)			
	Current (2015)	Revised (2022)	Revised (2027)	Current (2015)	Revised (from 2022)	CET1 risk-based	Tier 1 risk-based	Tier 1 combined	Total capital
<b>All banks</b>	12.3	11.6	10.9	4.8	4.8	17.5	34.2	34.4	39.7
<b>Group 1</b>	12.2	11.5	10.8	4.7	4.8	16.4	32.0	32.0	36.7
<b>G-SIIs</b>	11.7	10.9	10.5	4.5	4.5	16.4	30.0	30.0	36.7
<b>Group 2</b>	12.5	12.6	12.0	5.3	5.3	1.1	2.2	2.4	3.0

Overall, the CET1 capital ratio of Group 1 banks drops by 0.7 percentage points (rounding, not inferred by Table 4) at the start of the phase-in period (2022) and by 1.4 percentage points at the full implementation date (2027). Group 2 banks show an increase in their ratio by 0.2 (rounding, not inferred by Table 4) percentage points at 2022, while at the full implementation date the CET1 ratio decreases by 0.5 percentage points.

Focusing only on the changes to the Basel III LR exposure measure, the Tier 1 LR will remain almost stable for all bank categories in the sample. The revisions to the risk-based capital requirements result in a CET1 capital shortfall of EUR 17.5 billion. When considering the combined Tier 1 risk-based and LR requirements, this shortfall almost doubles to EUR 34.4 billion.

## 2.2 Interactions between risk-based output floor and leverage ratio capital requirements

This section discusses the interaction between RWA without the output floor, RWA with a 72.5% output floor, and Basel III leverage ratio capital requirements. The purpose of this analysis is to provide insights about the three potentially binding components of capital requirements, i.e. the risk-weighted requirements, the output floor requirements and the leverage ratio requirements. A component is flagged as *binding* when its implementation introduces additional capital in relation to the other two components.

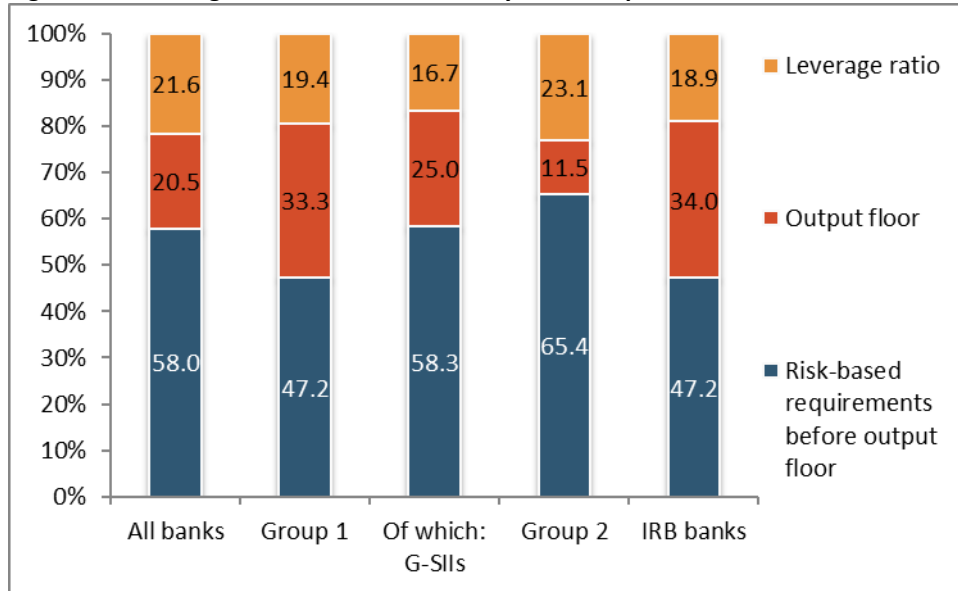
The majority of all EU banks (58.0%) will be constrained by the revised risk-based requirements (without the output floor), 21.6% of the banks by the new Basel leverage ratio capital requirements and another 20.5% by the new output floor (Figure 4). The relevant percentages when assessing only IRB banks are 47.2%, 18.9% and 34.0%, respectively.

The share of Group 1 banks constrained by risk-based capital requirements, before the output floor, is 47.2% under the revised framework, somewhat lower than the respective share of the entire sample. The Basel III leverage ratio is binding for 19.4% of the Group 1 sample while the remaining 33.3% of the sample is bound by the 72.5% output floor. The respective figures for Group 2 banks



are 65.4%, 23.1% and 11.5%. The lower portion of Group 2 banks affected by the output floor is attributed to the fact that fewer Group 2 banks use IRB approaches.

**Figure 4: Percentages of banks constrained by different parts of the revised framework**



## 3. Credit risk

The current section assesses the isolated impact of the Basel reforms which relate to the redesign of the SA and IRB approach. Although the present Report has included most of the revisions, some of the recent recalibrations of Basel reforms are not reflected (see Annex). Moreover, the sample of banks included in this section is broader than the sample used in the analysis of the cumulative impact in Section 2.

### 3.1 Revised internal ratings-based approach

Table 5 illustrates the distribution of changes in T1 MRC due to the implementation of the IRB revisions (see Annex for the full list of provisions not included in the impact assessment). On average, the impact on T1 MRC of both SA and IRB approach portfolios are approximately the same (3.25% and 3.26% respectively). However, the distribution of changes in T1 MRC is broader under the IRB approach.

**Table 5: Distribution of changes in T1 MRC assigned to the IRB approach only**

	All banks	Group 1	Of which: G-SIIs	Group 2
95th percentile	31.08%	13.42%	16.22%	44.62%
75th percentile	9.05%	7.34%	8.57%	19.86%
Median	3.12%	1.86%	3.50%	7.22%
25th percentile	-0.24%	-2.03%	0.82%	-0.13%
5th percentile	-4.73%	-4.69%	0.00%	-5.44%
Weighted average	3.25%	3.32%	4.43%	2.28%

### 3.2 Revised standardised approach

The Basel reforms on the SA revise the relevant consultative document published in December 2015. For the calculation of the SA credit risk MRC, the analysis estimates the impact of altering the risk weights (RW) assigned to some asset classes and credit conversion factors (CCF) of off-balance sheet exposures. The changes affect directly the credit risk capital requirements of SA banks as well as, indirectly, the credit risk capital requirements of IRB banks.<sup>15</sup>

The revised SA for credit risk results in an increase in SA credit risk MRC of 5.33% for Group 1 banks and a decrease of 5.20% for Group 2 banks (Table 6). The results include the impact on exposures of all SA portfolios, i.e. portfolios of banks which exclusively use the SA and those SA portfolios partially used by the IRB banks.

<sup>15</sup> (i) the lower CCFs apply to the exposures that migrate to F-IRB; and (ii) the revisions to the SA imply a lower hypothetical SA-equivalent RWA (which is relevant for the calculation of the floor).

**Table 6: Distribution of changes in T1 MRC assigned to SA T1 MRC for credit risk only**

	<b>All banks</b>	<b>Group 1</b>	<b>Of which: G-SIs</b>	<b>Group 2</b>
95th percentile	12.08%	4.03%	4.21%	17.48%
75th percentile	1.88%	1.94%	2.11%	1.32%
Median	0.05%	0.78%	0.78%	-0.63%
25th percentile	-2.58%	-1.84%	0.00%	-5.46%
5th percentile	-12.40%	-2.79%	-0.19%	-22.28%
Weighted average	3.26%	5.33%	5.74%	-5.20%

## 4. Operational risk

The BCBS proposals on operational risk aims at redesigning the existing framework by effectively replacing all four current approaches, i.e. the basic indicator approach (BIA), the standardised approach for operational risk (TSA), the alternative standardised approach (ASA) and the advanced measurement approach (AMA), with the new standardised measurement approach (SMA). The SMA aims at addressing the deficiencies related to the lack of transparency, comparability and simplicity of the AMA, and the lack of risk-sensitivity of the BIA/TSA/ASA.

The analysis of the current section is based on the BCBS consultative document “Standardised Measurement Approach for operational risk”, published for consultation on 3 June 2016, as amended by the revisions published on 7 December 2017.

The final BCBS agreement provides the jurisdictional discretion to apply operational risk capital charges either by selecting the actual ILM produced by the SMA formula or by setting the ILM equal to 1<sup>16</sup>. This discretion applies at *jurisdictional level*. As noted previously, the analysis assumes an ILM of one applied across all EU banks. Another major revision introduced by the newly revised operational risk framework is the allocation of business indicators into fewer buckets (from five to three) and the reduction of the marginal coefficients. The results shown below reflect these amendments.

According to Table 7, the revisions to the operational risk framework generate an aggregate increase of operational risk MRC of approximately 26.0% for Group 1 banks and 24.5% for G-SIIs, while the increase for Group 2 banks is 15.6%. The results show that, on average, the revisions of the operational risk framework affect banks migrating from AMA approach more than banks currently using other approaches.

**Table 7: Changes in T1 MRC assigned to operational risk only**

	All banks	Banks migrating from AMA	Banks migrating from other approaches
<b>All banks</b>	25.0	28.5	21.4
<b>Group 1</b>	26.0	28.7	22.7
<b>Of which: G-SIIs</b>	24.5	27.7	20.3
<b>Group 2</b>	15.6	19.0	15.1

Table 8 describes the distribution of changes in operational risk capital requirements for all banks, Group 1 banks, G-SIIs and Group 2, which provided data relating to operational risk capital requirements under the current and proposed framework.

<sup>16</sup> In the formula for the calculation of ILM, i.e.  $\ln[\exp(1)-1+(LC/BIC)^{0.8}]$ , the LC is calculated as 15 times the average losses above EUR 100,000 (with national discretion to reduce this threshold to EUR 20,000).  $BIC = 0.12 \times BI$  for  $BI \leq EUR 1$  billion,  $BIC = EUR 120$  million +  $0.15 \times (BI - EUR 1$  billion) for  $EUR 1$  billion  $< BI \leq EUR 30$  billion, and  $BIC = EUR 4470$  million +  $0.18 \times (BI - EUR 30$  billion) for  $BI > EUR 30$  billion, where  $BI = ILDC_{avg} + SC_{avg} + FC_{avg}$  and  $ILDC =$  Interest, Lease and Dividend Component,  $SC =$  Services Component,  $FC =$  Financial Component. When  $LC < BIC$ , then  $ILM < 1$ ; when  $LC > BIC$ , then  $ILM > 1$ ; when  $LC = BIC$ , then  $ILM = 1$ .

**Table 8: Distribution of changes in T1 MRC assigned to operational risk only (in %)**

	All banks			Group 1			Of which: G-SIIs			Group 2		
	Total	AMA	Other	Total	AMA	Other	Total	AMA	Other	Total	AMA	Other
<b>95th percentile</b>	70.5	114.0	61.5	72.9	132.0	53.6	117.6	169.8	41.1	66.2	87.0	64.7
<b>75th percentile</b>	31.9	47.5	28.3	40.2	47.5	30.3	40.2	44.1	22.6	28.2	55.3	26.9
<b>Median</b>	12.9	29.1	10.2	21.0	29.1	21.0	20.7	20.7	17.4	4.8	23.7	4.1
<b>25th percentile</b>	-9.0	1.5	-9.9	5.8	2.7	6.1	0.3	-13.4	7.1	-14.3	-10.1	-14.3
<b>5th percentile</b>	-26.6	-31.6	-22.7	-15.2	-27.1	-9.3	-27.1	-27.2	-10.1	-27.1	-47.1	-25.8
<b>Weighted average</b>	25.0	28.5	21.4	26.0	28.7	22.7	24.5	27.7	20.3	15.6	19.0	15.1

## 5. Leverage ratio

The amendments to the current Basel III LR exposure measure agreed by the BCBS and expected to have the more visible impact are the following:

- implementation of a specific treatment to *pending settlement transactions*;
- clarification on *cash pooling transactions*;
- *deduction of specific and general provisions* as well as *prudential valuation adjustments* from the Basel III LR exposure measure;
- *replacement of the current exposure method* by a modified version of the SA to counterparty credit risk for measuring derivative exposures;
- clarification on the *treatment of credit derivatives and derivatives clearing services within multi-level client structure*;
- *incorporation of identical credit conversion factors to off-balance-sheet items as for the SA for credit risk*;
- *the introduction of an add-on buffer to the minimum LR requirement, calibrated at the 50% of the current G-SIIs buffer in the risk-weighted surcharge ratio.*

The impact of these amendments to Basel III LR requirement and the consequent impact on MRC are assessed in the analysis below. Table 9 presents the distribution of the standalone impact of the revisions to Basel III LR requirement for Group 1, G-SIIs and Group 2 banks. The standalone changes in LR MRC for Group 1 banks are on average 16.7%, while there is no change in Group 2 banks.

**Table 9: Distribution of changes in T1 MRC assigned to LR requirements only, including revisions of the definition of exposure measure and 50% of the G-SII surcharge ratio of the risk-based requirements (in %)**

	All banks	Group 1		Group 2
		Total	Of which: G-SIIs	
95th percentile	19.2	33.5	37.6	2.4
75th percentile	1.2	16.0	32.4	0.2
Median	0.0	0.0	17.9	0.0
25th percentile	-0.1	0.0	16.4	-0.1
5th percentile	-3.0	-6.2	11.1	-2.3
Weighted average	14.8	16.7	25.6	0.0

## 6. Annex

### 6.1 Methodology for the estimation of the impact per category

#### 6.1.1 Standardised approach for credit risk

The impact of the proposed changes on the SA for credit risk is estimated by the following formula:

$$\frac{\% \Delta T1MRC(SA) = [Prop SACR_{RWA} \times \{6.0\% + 2.5\% + 'G-SIIs' \text{ surcharge}\} - Curr SACR_{RWA} \times \{6.0\% + 2.5\% + 'G-SIIs' \text{ surcharge}\}]}{\max\{curr \text{ total risk-based T1 MRC, curr total LR T1 MRC}\}}$$

#### 6.1.2 IRB approach for credit risk

The impact of the proposed changes on the IRB is estimated by the following formula:

$$\frac{\% \Delta T1MRC(IRB) = [Prop IRBCR_{RWA} \times \{6.0\% + 2.5\% + 'G-SIIs' \text{ surcharge}\} - \min\{0, (Provisions^{IRB} - EL^{prop})\}] - Curr IRBCR_{RWA} \times \{6.0\% + 2.5\% + 'G-SIIs' \text{ surcharge}\} - \min\{0, (Provisions^{IRB} - EL^{curr})\}]}{\max\{curr \text{ total risk-based T1 MRC, curr total LR T1 MRC}\}}$$

#### 6.1.3 Operational risk

$$\frac{\% \Delta T1MRC(OpR) = [SMA_{capital} \times 12.5 \times \{6.0\% + 2.5\% + 'G-SIIs' \text{ surcharge}\} - Curr OpR_{capital} \times 12.5 \times \{6.0\% + 2.5\% + 'G-SIIs' \text{ surcharge}\}]}{\max\{curr \text{ total risk-based T1 MRC, curr total LR T1 MRC}\}}$$

#### 6.1.4 Output floor

$$\frac{\% \Delta T1MRC(OF) = \max\{0, Prop \text{ total SA-eq RWA} \times OF\% - Prop \text{ total RWA}\} \times \{6.0\% + 2.5\% + 'G-SIIs' \text{ surcharge}\}}{\max\{curr \text{ total risk-based T1 MRC, curr total LR T1 MRC}\}}$$

where

*prop total SA-eq RWA* = the total RWA assuming all exposures under internal models are exclusively calculated according to the pertinent standardised approaches under the revised BCBS package, i.e. market and credit risk; the new RWA amount is the SA-equivalent;

*prop total RWA* = the total RWA under the proposed BCBS framework, i.e. where relevant the calculation of RWA according to internal models is allowed;

$OF\%$  = a percentage (72.5%) of SA-equivalent RWA, which acts as the output floor for internal models' RWA.

### 6.1.5 Leverage ratio

$$\% \Delta T1MRC(LR) = \frac{\max\{0, (\text{prop total LR T1 MRC} - \text{prop total risk-based T1 MRC})\} - \max\{0, (\text{curr total LR T1 MRC} - \text{curr total risk-based T1 MRC})\}}{\max\{\text{curr total risk-based T1 MRC}, \text{curr total LR T1 MRC}\}}$$

where

$\text{prop total LR T1 MRC} = \text{proposed total exposures} \times (3\% + 0.5 \times \text{'G-SIIs' surcharge})$ ;

$\text{curr total LR T1 MRC} = \text{current total exposures} \times 3\%$ .

## 6.2 Tables and figures complementing the analysis

**Table 10: Number of banks which provided data (shaded column: number of banks included in the overall cumulative analysis), Group 1 banks, per country**

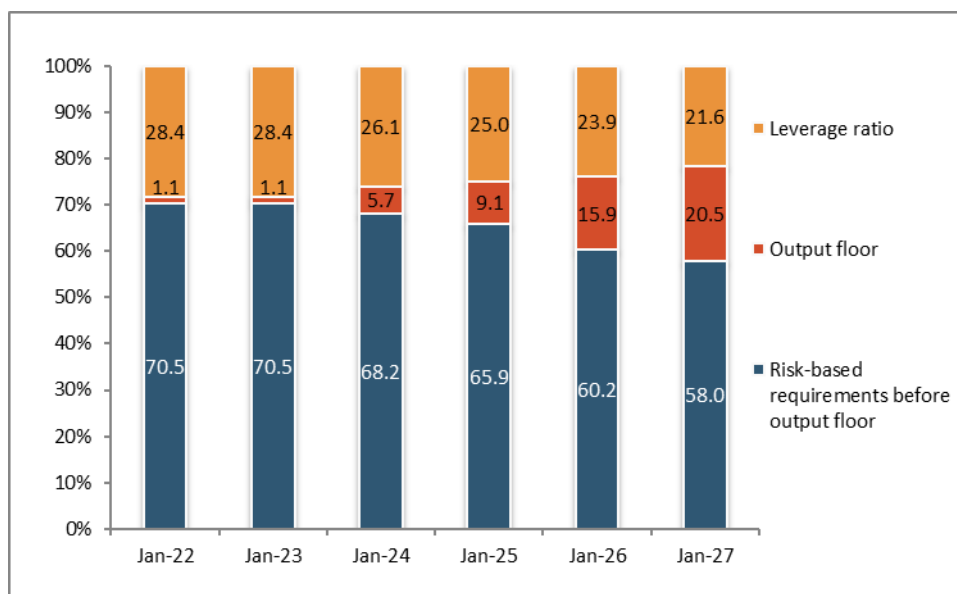
Group 1	Overall analysis on the impact on MRC	Credit risk		OpR	Market risk	LR
		IRB	SA			
Austria	1	2	2	–	–	2
Belgium	1	2	2	2	1	2
Denmark	1	1	1	1	–	1
France	4	5	5	5	5	5
Germany	4	8	8	8	3	8
Greece	4	2	4	4	3	4
Hungary	1	–	1	1	–	1
Ireland	2	2	2	2	–	2
Italy	2	2	2	2	2	2
Malta	–	–	–	–	–	–
Netherlands	3	3	3	3	3	3
Norway	1	1	1	–	–	1
Poland	–	–	–	–	–	–
Portugal	1	1	2	2	–	2
Spain	2	2	2	2	1	2
Sweden	4	4	4	4	3	4
United Kingdom	5	5	5	5	4	5
<b>Total</b>	<b>36</b>	<b>40</b>	<b>44</b>	<b>41</b>	<b>25</b>	<b>44</b>
G-SIIs	12	13	13	13	12	13
O-SIIs	24	27	31	28	13	31



**Table 11: Number of banks which provided data (shaded column: number of banks included in the overall cumulative analysis), Group 2 banks, per country**

Group 2	Overall analysis on the impact on MRC	Credit risk		OpR	Market risk	LR
		IRB	SA			
Austria	1	1	1	–	–	1
Belgium	2	2	2	1	1	2
Denmark	7	4	8	–	2	7
France	1	1	2	2	1	2
Germany	12	10	42	34	5	42
Greece	–	–	–	–	–	–
Hungary	1	–	1	1	–	1
Ireland	1	1	1	1	–	1
Italy	8	4	13	13	4	13
Malta	1	–	2	2	–	2
Netherlands	4	3	8	–	1	8
Norway	2	4	4	–	–	3
Poland	5	–	5	3	2	5
Portugal	1	–	3	3	–	2
Spain	5	5	6	6	1	6
Sweden	–	3	3	1	–	1
United Kingdom	1	3	4	5	–	1
<b>Total</b>	<b>52</b>	<b>41</b>	<b>105</b>	<b>72</b>	<b>17</b>	<b>97</b>
O-SIIs	11	10	18	10	4	17
Other	41	31	87	62	13	80

**Figure 5: Percentage of banks constrained by different parts during the transitional period [output floors: Jan-22 (50%), Jan-23 (55%), Jan-24 (60%), Jan-25 (65%), Jan-26 (70%), and Jan-27 (72.5%)]**



**Table 12: Capital shortfalls incl. the CCB: (a) current (as of December 2015) shortfall vis-à-vis the full implementation of CRDIV/CRR, (b) as of start date of the phase-in period (2022) and (c) as of the full implementation date of the Basel reforms (2027) as of December 2015 (in EUR billion)**

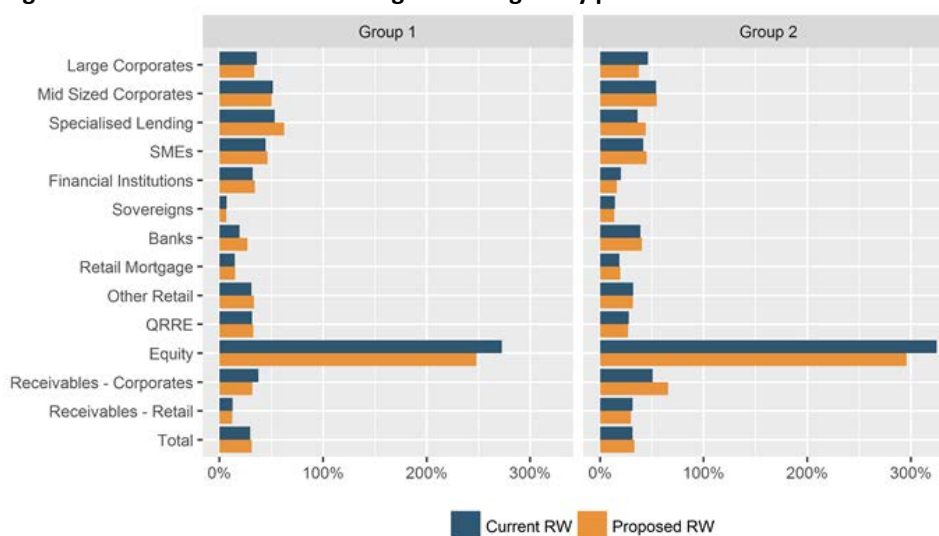
	Capital shortfalls (2015)				Revised capital shortfalls (2022)				Revised capital shortfalls (2027)			
	CET1	Tier 1 (risk-based)	Tier 1 combined	Total capital	CET1	Tier 1 (only risk-based)	Tier 1 combined	Total capital	CET1	Tier 1 (only risk-based)	Tier 1 combined	Total capital
<b>Total</b>	2.6	3.4	3.2	9.0	5.9	15.9	23.6	23.7	17.5	34.4	34.2	39.7
<b>G1</b>	0.0	0.0	0.0	4.5	4.9	14.1	21.5	21.5	16.4	32.0	32.0	36.7
<b>G-SIIs</b>	0.0	0.0	0.0	4.5	4.9	14.1	21.5	21.5	16.4	30.0	30.0	36.7
<b>G2</b>	2.6	3.4	3.2	4.5	1.1	1.8	2.0	2.5	1.1	2.4	2.2	3.0

**Table 13: Distribution of RWA per risk category (in %)**

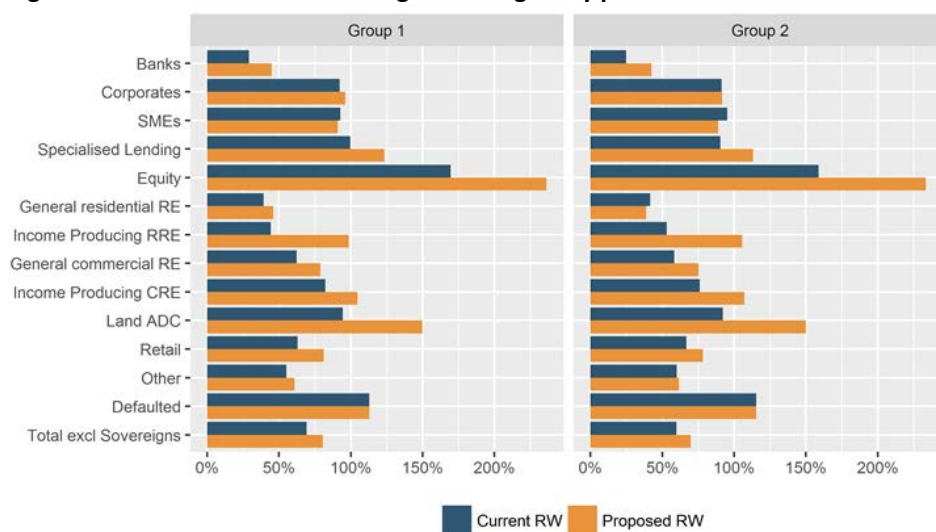
	All banks		Group 1 banks		Of which: G-SIIs		Group 2 banks	
	Current	Revised	Current	Revised	Current	Revised	Current	Revised
<b>Credit risk</b>	81.7	74.9	81.3	74.4	79.8	75.1	84.2	79.2
<b>OpR</b>	10.7	11.9	11.0	12.3	11.9	13.4	8.2	8.8
<b>Market risk</b>	5.9	5.3	5.8	5.1	6.5	5.8	6.6	6.3
<b>CVA</b>	1.3	1.2	1.4	1.2	1.5	1.4	0.9	0.8
<b>Output floor</b>	–	6.4	–	6.6	–	4.1	–	4.7
<b>Other RWA*</b>	0.4	0.3	0.4	0.4	0.3	0.2	0.2	0.2

\* The "other RWA" category does not change in absolute values; its participation in the total RWA might change due to the inflation of the elements subject to Basel revisions.

**Figure 6: Current and revised average risk weights by portfolio – IRB banks**



**Figure 7: Current and revised average risk weights by portfolio – SA banks**



**Table 14: Revisions NOT included in the impact assessment**

**Standardised approach for credit risk**

Exposures to banks

- Unrated exposures to “well-capitalised” banks to be risk weighted at 30% (instead of 40% for Grade A)
- Allow national discretion for the assignment of risk weights (as low as 0%) for interbank exposures, where the two banks belong under the same institutional protection scheme

Equity exposures: Create a category for equity exposures to certain legislated programmes with a 100% risk weight (instead of 250%)

Residential real estate (RRE) exposures: Expand definition of RRE to include loans guaranteed by financial institutions

Commercial real estate (CRE) exposures: Allow loan splitting approach

**Internal ratings-based approach**

- Increase threshold for definition of mid-sized corporates (below which the A-IRB is permitted) from EUR200m to EUR500m
- Lower F-IRB LGD from 45% to 40% for corporate exposures
- Lower the exposure level LGD input floor for residential mortgages from 10% to 5%
- Lower the exposure level LGD that applies to the secured portion of exposures by 5 percentage points
- Recognise IPRE as general corporate collateral (rather than SL) in "well developed and long established markets"
- Expand definition of residential real estate to include loans guaranteed by financial institutions
- Adjust the definition of "transactors" to include only facilities on which balances have been carried over during the last 12 months

**Operational Risk:** Exclude divested activities and "non-repeatable" losses from loss calculation

**Leverage ratio**

- Central bank reserve national discretion
- Exclusion of SRT securitisations from exposure measure

**Capital floor:** Provisioning adjustment review



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