



BASEL III MONITORING EXERCISE RESULTS BASED ON DATA AS OF 31 December 2022

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Contents

Contents	2
List of figures	3
List of tables	4
Abbreviations	5
Executive summary	6
1. Introduction	11
1.1 Data and sampling	11
1.2 Methodology for impact estimation	13
1.2.1 Minimum required capital and differences with respect to methodology used by the BCBS	14
1.2.2 Description of impact metrics	15
1.3 Distribution metrics	16
2. Regulatory capital ratios, capital shortfalls and impact on T1 MRC	17
2.1 Cumulative impact analysis of the final Basel III reform: point-in-time analysis (Dec-22 only)	17
2.2 Evolution of the cumulative impact analysis since the establishment of the EBA mandatory exercise (Dec-21 to Dec-22)	19
2.3 Capital ratios and shortfalls	19
2.4 Interactions between risk-based and leverage ratio capital requirements	22
3. Credit risk	24
4. FRTB	26
5. Operational risk	29
6. Output floor	31
7. Revised leverage ratio	32
8. Interaction between output floor and leverage ratio requirements	34
9. Annex	37
9.1 Methodology for the estimation of the impact per category	37
9.1.1 Credit risk impact	37
9.1.2 Market risk impact	38
9.1.3 CVA impact	38
9.1.4 Operational risk impact	39
9.1.5 Output floor impact	40
9.1.6 Leverage ratio impact	40
9.1.7 Capital shortfalls	42

List of figures

Figure 1: Distribution of changes in total T1 MRC.....	17
Figure 2: Distribution of capital ratios under CRR 2/CRD 5 versus fully phased-in final Basel III framework (2028)	20
Figure 3: The mechanics of the calculation of actual leverage ratio MRC impact, Tier 1 MRC (EUR billion).....	22
Figure 4: Changes in Tier 1 MRC for credit risk (SA and IRB) exposures due to the final Basel III framework (2028)	24
Figure 5: Change of market risk capital requirements after FRTB implementation, without floor, broken down by approach and bank group (in % of market risk MRC).....	26
Figure 6: Contribution to the total market risk RWAs by each calculation method before and after implementing FRTB framework.....	27
Figure 7: Distribution of changes in T1 MRC assigned to operational risk only (in % of current operational risk MRC).....	30
Figure 8: Comparison of fully phased-in EU LR and final Basel III LR.....	33
Figure 10: Integration of changes in risk-based and leverage-ratio-based MRC	41

List of tables

Table 1: Change in total T1 MRC, as a percentage of the overall current Tier 1 MRC, under full implementation of Basel III (2028) (weighted averages, in %)	8
Table 2: Shortfall of current available capital, under full implementation of CRR 2/CRD 5 and Basel III (2028) (EUR billion)	9
Table 3: Capital ratios (reduced estimation bias): fully phased-in CRR 2/CRD 5 and final Basel III framework (2028) (weighted averages, in %)	9
Table 4: Number of banks included in the cumulative analysis and in the risk specific sections of the report, per country	12
Table 5: Changes in T1 MRC, per risk category, due to the implementation of the final Basel III framework (2028) (weighted averages, in %)	18
Table 6: Changes in T1 MRC due to the implementation of the final Basel III framework (2028) (weighted averages, in %), from 2021 to 2022 for a constant sample of banks.....	19
Table 7: Comparison of risk-based capital ratios and leverage ratios under different states of implementation (weighted averages, in %)	20
Table 8: Capital shortfalls by bank group under full implementation of CRR 2/CRD 5 (upper part) and final Basel III (2028) (lower part) (EUR billion)	21
Table 9: Changes in T1 MRC assigned to operational risk only (% of the MRC T1 assigned to operational risk under CRR 2/CRD 5)	29
Table 10: Cumulative output floor impact during the implementation phase (% of total CRR 2/CRD 5 Tier 1 MRC).....	31
Table 11: Impact of LR, in isolation from the risk-based provisions, due to changes in the definition of leverage ratio exposures (LRE) and changes in the calculation (50% of G-SIIs surcharge) of the LR T1 MRC (%)	32
Table 12: Number of banks constrained by the risk-based capital requirement, with and without the implementation of the output floor	35
Table 13: Impact and implied cumulative impact on Tier 1 MRC of the implementation of risk-based capital requirements, with and without the implementation of the output floor	35

Abbreviations

AMA	advanced measurement approach
ASF	available stable funding
BCBS	Basel Committee on Banking Supervision
BI	business indicator
BIC	business indicator component
CCB	capital conservation buffer
CCP	central counterparty
CET1	Common Equity Tier 1
CfA	call for advice
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CVA	credit valuation adjustment
EBA	European Banking Authority
EIF	equity investment in funds
FRTB	fundamental review of the trading book
G-SII	global systemically important institution
HQLA	high quality liquid assets
ILM	internal loss multiplier
IMA	internal model approach
IQR	inter-quartile range
IRB	internal ratings-based
LC	loss component
LCR	liquidity coverage ratio
LR	leverage ratio
LRE	leverage ratio exposure
MRC	minimum required capital
N/A	not applicable
NSFR	net stable funding ratio
O-SII	other systemically important institution
OBS	off-balance sheet exposures
OpRisk	operational risk
QIS	quantitative impact study
RSF	required stable funding
RWA	risk-weighted assets
SA	standardised approach
SMA	standardised measurement approach
T1	Tier 1

Executive summary

This report summarises the findings from the second round of the Basel III monitoring exercise that is based on the EBA Decision to render the QIS exercise mandatory for a representative set of EU/EEA credit institutions¹. The report provides an assessment of the impact of the full baseline Basel III implementation² for this representative sample of EU/EEA banks.

The main finding is that to comply with the new framework, EU banks would need a total of EUR 0.6 billion of additional Tier 1 capital at the full implementation date in 2028. The main contributing factors are the output floor and credit risk capital requirements. The overall impact includes the economic impact of the Covid-19 pandemic that had materialised up until December 2022, the reference date of this Report. A separate Annex includes an impact assessment for the EU implementation of Basel III under the revised Capital Requirements Regulation (CRR3).

The impact is 50% lower than in the 2021 exercise. The lower impact compared to 2021 is due to a reduced contribution of market risk and an increased offsetting effect of the leverage ratio impact observed in the latest data collection.

The revisions to the Basel III framework mostly affect exposures -- and the resulting risk-weighted assets (RWA) and minimum required capital (MRC) -- for credit risk, operational risk (OpRisk) and leverage ratio (LR). Importantly, the new Basel III framework also introduces an aggregate output floor. The impact attributed to the above risk factors is measured and analysed primarily in terms of MRC and secondarily in terms of capital shortfalls and differentials in capital and leverage ratio.

The cumulative impact analysis uses a sample of 157 banks. The sample is divided into 58 Group 1 banks (of large and internationally active banks) and 99 Group 2 banks³. In comparison to the first mandatory exercise (as of December 2021), the sample has decreased by 3 banks. Among the 157 banks, 145 banks entered the sample following the general provisions of Article 4 of the EBA Decision (EBA/DC/2021/373), while 12 banks entered the sample according to the provisions of Article 8(3). The decline of the sample compared to the previous monitoring exercise was mainly due to declassifications of former participating credit institutions due to corporate actions such as mergers.

The cumulative results separate the impact of the reform on credit risk into two major approaches, the standardised approach and the internal ratings-based approach. The results also quantify the

¹ [EBA/DC/2021/373 \(consolidated version\)](#)

² In terms of operational risk, the EU co-legislators chose to adopt the option to set the ILM equal to 1 in the final revised Capital Requirements Regulation (CRR) 3 and Capital Requirements Directive (CRD) 6. Therefore, the results may not be directly comparable to the report published by the Basel Committee on Banking Supervision where ILM specific was adopted as the base case for the measurement of the output floor impact.

³ Group 1 banks are banks that have Tier 1 capital in excess of EUR 3 billion and are internationally active. All other banks are labelled as Group 2 banks.

⁴ Only the banks that submitted data of adequate quality for at least one of the credit risk components (IRB approach or SA), operational risk and leverage ratio were included in the sample of the cumulative analysis. If these banks did not submit data for any of the remaining components of the exercise, i.e. market risk and CVA, the cumulative analysis assumed that there is no impact arising from the revisions to those components.

impact of the latest version of the market risk standards (i.e. the fundamental review of the trading book, FRTB) as set out by the Basel Committee for Banking Supervision (BCBS) in January 2019⁵, as well as the changes on credit valuation adjustment (CVA). In conjunction with the BCBS Basel III regular monitoring exercise, the report also illustrates the progress made by the European banks over time in converging towards the new capital requirements.

Main results of the 2022 exercise

The baseline impact assessment quantifies the difference in the Pillar 1 minimum required capital between the current EU implementation of the Basel standards (CRR 2/CRD 5) and the full Basel III implementation. To comply with the new framework, EU banks would combined need a total of EUR 0.6 billion of additional Tier 1 capital at the full implementation date in 2028.

The weighted average relative increase in total T1 MRC after of the reform is +12.6% across all banks. For the sub-sample of large and internationally active banks (Group 1) the impact is +13.3%. For Group 2 banks the impact amounts to +8.9% (Table 1). The impact of the individual risk-based reforms (without considering the leverage ratio impact) across the full sample is +16.3%.⁶ Similar to the case in previous years, the output floor and credit risk are the two main drivers of MRC increases across the group of all banks, contributing +6.8% and +4.2%, respectively, to the aggregate results. Looking at the Group 1 banks separately, the output floor and credit risk are the two main drivers of impact, accounting for +7.4% and +3.5%, respectively. Within the Group 1 banks, the global systemically important institutions (G-SIIs) also have the output floor and credit risk as key drivers of the aggregate impact, with contributions of +7.5% and +6.0%, respectively. The key driver of the aggregate impact on Group 2 banks is credit risk, with an impact of +7.9%, followed by the output floor with an impact of +3.2%.

The full implementation findings follow the anticipated choice by the EU to set ILM=1 for operational risk when implementing the Basel III framework. In line with the decision by the EU co-legislators to apply the discretion to set ILM = 1 in the implementation of the operational risk part of Basel III, the present report uses ILM = 1 as the baseline scenario for the cumulative impact results. This change in the methodology resulted in a significant reduction of the operational risk impact on a standalone basis and, to a lesser extent, in a reduction of the total cumulative impact. To enable the comparison of the implications of this change over time, the EBA produced, retroactively, the time series of the cumulative impact based on the ILM = 1 implementation option.

The estimation referring to market risk impact adjusts the bias that results from overly conservative original data submissions on market risk by several banks, among which six G-SIIs. The original data submissions, by several banks, contain a bias in the market risk data that results from a sequence of conservative assumptions on the use of internal models in the new FRTB framework.⁷

⁵ BCBS (2019), Explanatory note on the minimum capital for market risk.

⁶ Reflecting the Basel III reforms agreed by GHOS in 2017.

⁷ More specifically, 17 banks that entered the market risk sample, i.e. show a non-zero market risk impact, chose to treat all trading book positions in category “Equity Investment in Funds”, where modelling is no longer allowed according to

Since 2021, EBA adopted a methodology proposed by the BCBS that reduces the impact of EIF for banks that report overly conservative figures. This approach results in a single figure for the market risk impact for all banks that overstated the part of impact assigned to the treatment of EIF.⁸

After applying the EIF adjustment, the estimated market risk impact is 1.2% on the entire sample.

The market risk impact is heterogeneous across the groups of banks, as the impact on G-SIIs is significant and positive (+2.1%) whereas Group 2 banks show a small impact of +0.4%.

Finally, and in line with previous years, for the full sample of banks the cumulative risk-based impact is partially offset by the negative (-3.8%) leverage ratio impact. This offset reflects the fact that some banks, which are constrained by the leverage ratio in the current framework (i.e. current implementation of Basel standards CRR 2/CRD 5), will be less constrained by the leverage ratio in the revised framework (i.e. full implementation of Basel III (2028)). In the revised framework, the higher impact on the risk-based requirements means that the leverage ratio add-on requirement will be smaller than the current add-on requirement, and the leverage ratio requirement will be less binding on average. Specifically, 43 banks are constrained by the leverage ratio requirement under the CRR 2/CRD 5, while under the final Basel III framework only 25 banks will remain constrained.⁹ For the G-SIIs, the LR-based requirement also produces a negative contribution (-1.7%) to the Tier 1 MRC, albeit lower than that of the overall sample.

Table 1: Change in total T1 MRC, as a percentage of the overall current Tier 1 MRC, under full implementation of Basel III (2028) (weighted averages, in %)

Bank group	Credit risk				Market risk	CVA	Op Risk ¹⁰	Output floor	Other Pillar 1	Total risk-based	Revised LR	Total
	SA	IRB	Securitisation	CCPs ¹¹								
All banks	2.6	1.6	0.0	0.0	1.2	2.4	2.2	6.8	-0.4	16.3	-3.8	12.6
Group 1	1.9	1.6	0.0	0.0	1.3	2.6	2.6	7.4	-0.5	17.0	-3.7	13.3
G-SIIs	2.0	4.0	0.0	0.1	2.1	3.1	3.1	7.5	-0.3	21.7	-1.7	20.0
O-SIIs	1.8	-0.8	0.0	0.0	0.4	2.0	2.1	7.5	-0.6	12.2	-5.9	6.3
Other	2.2	-1.1	0.0	0.0	2.8	6.3	1.0	2.2	0.0	13.4	-2.1	11.3

the look-through requirements, by applying the most conservative standardised approach available. The use of this so-called “other bucket” treatment means that the equity exposures of the FRTB will be subject to the highest applicable risk weights, increasing the impact assigned to this category and eventually to the market risk. By choosing this approach, these banks ignore other possible treatments, such as the index treatment or the mandate-based approach which are used by most institutions in the non-EU peer group. See BCBS (15 December 2019), MAR – Calculation of RWA for market risk / MAR21 – Standardised approach: sensitivities-based method,

https://www.bis.org/basel_framework/chapter/MAR/21.htm?inforce=20220101

⁸ The methodology agreed between the EBA and the BIS Secretariat involves separating the impact of the EIF from the impact of other market risk factors and recognizing only 20% of the reported impact of EIF. The resulting value is then added to the rest of the market risk impact. Henceforth, both the EBA Basel III monitoring report and the QIS report of the BCBS will reflect this adjustment in the market risk impact.

⁹ See Annex (Section 9.1.6) for more details on the interpretation of the impact of the leverage ratio. Note that in the methodology applied in this report, the contribution of the leverage ratio is overestimated since the Pillar 2 requirements, O-SII capital requirement and the countercyclical capital buffer are disregarded in the exercise.

¹⁰ The operational risk figures represent the impact arising from the choice by EU co-legislators to set ILM=1 for the full implementation of Basel III (2028).

¹¹ Rounded to the first decimal point.

Bank group	Credit risk				Market risk	CVA	Op Risk ¹⁰	Output floor	Other Pillar 1	Total risk-based	Revised LR	Total
Group 2	6.0	1.9	0.0	0.0	0.4	1.0	0.5	3.2	-0.1	12.9	-4.0	8.9
O-SIIs	6.3	0.9	0.0	0.0	0.3	1.3	0.5	3.1	0.1	12.6	-4.8	7.7
Other	5.5	3.4	0.0	0.0	0.6	0.4	0.4	3.4	-0.3	13.4	-2.8	10.7
Universal	2.6	2.2	0.0	0.0	1.2	2.3	2.3	6.6	-0.4	16.8	-3.5	13.3
Retail-oriented	5.9	-0.1	0.0	0.0	0.9	0.8	0.4	2.8	-0.2	10.4	-2.2	8.2
Corporate-oriented and other	0.7	-2.9	0.0	0.0	0.8	3.7	2.0	10.2	-0.1	14.3	-7.2	7.2

Source: EBA Quantitative Impact Study (QIS) data (December 2022), sample: 157 banks

Full implementation of Basel III results in a total CET1 capital shortfall of EUR 0.2 billion, which can be attributed fully to Group 2 banks (see Table 2). The Tier 1 capital shortfall due to the risk-based capital requirements is approximately EUR 0.6 billion, again originating fully from Group 2 banks. The implementation of the revised LR framework does not produce an additional Tier 1 shortfall on top of the risk-based capital requirements.¹²

Table 2: Shortfall of current available capital, under full implementation of CRR 2/CRD 5 and Basel III (2028) (EUR billion)

Bank group	Capital shortfalls — CRR 2/CRD 5 (fully phased-in)			Capital shortfalls — Basel III framework (2028)		
	CET1	Risk-based Tier 1	Additional LR Tier 1	CET1	Risk-based Tier 1	Additional LR Tier 1
All banks	0.0	0.0	0.0	0.2	0.6	0.0
Group 1	0.0	0.0	0.0	0.0	0.0	0.0
Of which: G-SIIs	0.0	0.0	0.0	0.0	0.0	0.0
Group 2	0.0	0.0	0.0	0.2	0.6	0.0

Source: EBA QIS data (December 2022), sample: 157 banks

When considering the full sample of banks, the risk-based CET1 ratio drops by 210 basis points as a result of the revised Basel III framework. The broader measures Tier 1 and Total Capital Ratios decline by 220 and 270 basis points, respectively, following the implementation of the reform (Table 3). Again, for the full sample, the leverage ratio level is practically unchanged under the revised Basel III framework as compared with the current (CRR 2/CRD 5) (from 5.5% to 5.6%). This limited increase is consistent when considering Group 1 and Group 2 banks separately.

Table 3: Capital ratios (reduced estimation bias): fully phased-in CRR 2/CRD 5 and final Basel III framework (2028) (weighted averages, in %)

Bank group	Capital ratios — CRR 2/CRD 5 (fully phased-in)				Capital ratios — Basel III framework (2028)			
	CET1	Tier 1	Total capital	LR	CET1	Tier 1	Total capital	LR
All banks	15.3	16.5	19.0	5.5	13.2	14.3	16.3	5.6
Group 1	15.2	16.4	19.0	5.4	13.0	14.1	16.2	5.5
Of which: G-SIIs	14.0	15.3	17.7	4.7	11.6	12.7	14.4	4.8
Group 2	15.5	16.6	18.7	6.0	14.0	14.9	16.6	6.1

Source: EBA QIS data (December 2022), sample: 157 banks

¹² However, when the Pillar 2 requirements are included the estimated capital shortfalls increase. This analysis is included in the section of EU specific analysis later in this report.

From Dec-22 reference date, the analysis on Net Stable Funding Ratio (NSFR) is moved to the Report on Liquidity Measures that also includes the analysis on Liquidity Coverage Ratio (LCR).

This Report includes an Annex with an assessment of the impact of the Basel III framework taking into account EU specific adjustments. The considered adjustments are part of either the current CRR 2/CRD 5 framework or the different CRR 3/CRD 6 proposals to that are part of the EU Basel III implementation. The Annex includes a comparison with the main results shown in this report. Additionally, it calculates the cumulative impact results when considering all buffers and Pillar 2 requirements and not only the pure Basel requirements applied in the main text.

1. Introduction

This report presents the estimated impact of the Basel III reform package on European banks as agreed in December 2017 by the Group of Central Bank Governors and Heads of Supervision (GHOS). The assessment of the final package includes the revisions to the internal ratings-based (IRB) approach¹³, the standardised approach to credit risk (SA)¹⁴ and the standardised approach to operational risk¹⁵, as well as the revisions to the Basel III leverage ratio framework¹⁶, securitisation¹⁷ and counterparty credit risk frameworks¹⁷. In addition, it includes the impact of the fundamental review of the trading book (FRTB)¹⁸ agreed in 2019 and the credit valuation adjustment (CVA), as well as changes resulting from the revised securitisation framework¹⁹.

1.1 Data and sampling

The final sample used for the December 2022 cumulative results point-in-time analysis contains 157 banks - 58 Group 1 banks and 99 Group 2 banks (Table 4). The data submitted for the December 2022 cumulative impact assessment covers a total of 164 banks from all European Economic Area countries. The RWA coverage of the EU banking system is 76.1% and, depending on the jurisdiction, it ranges from 51.0% to 94.9%. Of these, six banks are subsidiaries of EU parent institutions that already participate in the exercise. These six banks are excluded to avoid double-counting. From the remaining sample of 158 banks, only those which submitted data for at least one of (a) the credit risk components (IRB or SA) (b) the operational risk and (c) the leverage ratio (LR) were included in the sample for the cumulative analysis. This criteria resulted in the exclusion of one additional bank.

The subsamples used for analysing the impact of Basel III revisions on individual risk categories are larger than the sample used for the overall cumulative analysis (see grey shaded column in Table 4). As a result, the impact relating to credit risk, operational risk and leverage ratio presented in the individual sections of the report may differ from those reported in the overall cumulative analysis.

¹³ 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*; BCBS (2019), *Explanatory note on the minimum capital for market risk*.

¹⁴ 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*.

¹⁵ 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*.

¹⁶ See BCBS (2016), *Revisions to the Basel III leverage ratio framework: Consultative document*.

¹⁷ See BCBS (2019), *Calculation of RWA for credit risk (CRE)*: https://www.bis.org/basel_framework/standard/CRE.htm

¹⁸ See BCBS (2016), *Minimum capital requirements for market risk: Standards*; BCBS (2019), *Explanatory note on the minimum capital for market risk*.

¹⁹ See BCBS (2016), *Basel III document: Revisions to the securitisation framework, amended to include the alternative capital treatment for ‘simple, transparent and comparable’ securitisations*, www.bis.org/bcbs/publ/d374.htm; BCBS and Board of the International Organization of Securities Commissions (2015), *Criteria for identifying simple, transparent and comparable securitisations*, www.bis.org/bcbs/publ/d332.htm

Table 4: Number of banks included in the cumulative analysis and in the risk specific sections of the report, per country

Country (1)	Included Cumulative analysis of the impact on MRC (2)	Included				
		Credit risk (3)	Market risk (4)	CVA (5)	OpRisk (6)	LR (7)
AT	10	10	5	9	10	10
BE	6	6	1	4	6	6
BG	3	3	0	1	3	3
CY	3	3	0	2	3	3
CZ	1	1	0	1	1	1
DE	36	36	13	30	36	36
DK	7	7	7	5	7	7
EE	2	2	2	2	2	2
ES	6	6	5	6	6	6
FI	3	3	2	3	3	3
FR	8	8	6	7	8	8
GR	4	4	4	4	4	4
HR	1	1	1	1	1	1
HU	2	2	2	1	2	2
IE	8	8	7	6	8	8
IS	3	3	2	1	3	3
IT	8	8	7	8	8	8
LI	2	2	1	3	3	2
LT	1	1	1	1	1	1
LU	4	4	3	4	4	4
LV	2	2	2	2	2	2
MT	4	4	0	2	4	4
NL	8	8	3	7	8	8
NO	4	4	1	3	4	4
PL	5	5	3	4	5	5
PT	5	5	5	5	5	5
RO	2	2	1	2	2	2
SE	6	6	3	6	6	6
SI	2	2	2	2	2	2
SK	1	1	0	1	1	1
All banks	157	157	89	133	158	157
Group 1	58	58	46	54	58	58
Of which: G-SIIs	8	8	6	8	8	8
Group 2	99	99	43	79	100	99

Source: EBA QIS data (December 2022)

1.2 Methodology for impact estimation

General methodological remarks

- **The methodology predominantly assesses the impact in terms of Pillar 1 Tier 1 minimum required capital (T1 MRC).** The T1 MRC in this report includes the capital conservation buffer (CCB) and the capital buffer for global systemically important institutions (G-SIIs)²⁰, where applicable. It does not incorporate any Pillar 2 requirements, nor does it consider any higher loss absorbency requirements for other (domestic) systemically important institutions (O-SIIs) and countercyclical capital buffer requirements. This methodology is in line with the approach followed by the BCBS Basel III quantitative impact study for the global banking system. For details on the methodology, see Annex.
- **The Pillar 1 Tier 1 minimum required capital (T1 MRC) includes both risk-based capital requirements and leverage ratio-based capital requirements.** The methodology assumes compliance with the higher of the risk-based capital requirements (i.e. those based on risk-weighted assets, including the effect of the output floor) and the leverage ratio-based requirement, under the Capital Requirements Regulation (CRR) 2/Capital Requirements Directive (CRD) 5 and Basel III frameworks (both fully phased-in). In order to identify the pure impact of Basel III reforms, central bank reserves, which are temporarily exempted from LREM by temporary measures justified by the Covid-19 crisis, are added back under both current and revised framework. Other exemptions that are deemed permanent are not added back, i.e. remain as deductible items for the calculation of the leverage ratio exposure measure.
- **The impact on T1 MRC is the difference between the Basel III and CRR 2/CRD 5 Pillar 1 T1 MRC, divided by the CRR 2/CRD 5 Pillar 1 T1 MRC.**
- **The impact assessment assumes a static balance sheet approach**, i.e. it does not consider any scheduled measures that banks might undertake to comply with the revised framework between December 2022 and the Basel III full implementation date.
- **The impact assessment methodology disentangles, where data allows, the impact of the IFRS 9 from the pure impact of the Basel III package.**
- **The estimated results are weighted averages, unless stated otherwise.**
- **From Dec-18 onwards, the Basel III monitoring exercise assesses the impact of the January 2019 FRTB framework.**
- **From Dec-20 onwards, the Basel III monitoring exercise considers the revision of the CVA framework agreed in July 2020.**
- **The sample of the point-in-time analysis (Dec-22 reference date only) consists of 157 banks, while the sample of the time-series analysis (Dec-21 and Dec-22) consists of 155 banks, to**

²⁰ CCB and G-SII buffers are assumed to be part of Pillar 1 requirements given that they are universally applicable and quantifiable.

allow comparisons over time using a constant sample.

- Where applicable in the report, the estimation of the Tier 1 MRC impact that feeds the time series analyses assumes the application of the most recent rules retroactively, where the granularity and quality of past data allows.
- The analysis applies an adjustment to cope with the results submitted by several banks which apply an overly conservative estimation method for the FRTB capital requirements. This method uses the originally submitted data, separates the overly conservative estimated impact on Equity Investment Funds (EIF) from “other market risk impact”, and recognises only 20% of the impact assigned to the former²¹.

1.2.1 Minimum required capital and differences with respect to methodology used by the BCBS

The report presents the impact of the reforms in terms of changes in Tier 1 minimum required capital (T1 MRC), comparing the fully implemented revised Basel III requirements with the current fully phased-in Capital Requirements Regulation (CRR) 2/Capital Requirements Directive (CRD) 5 requirements. The definition of the overall current Tier 1 MRC is the higher between the current risk-based T1 MRC and the current LR-based Tier 1 MRC, while the overall Tier 1 MRC under Basel III reform scenario is the higher of the revised risk-based Tier 1 MRC and the revised LR-based Tier 1 MRC. The advantage of the MRC measure is that it is common across all jurisdictions and not affected by Pillar 2 capital requirements, which may vary across EU countries and may not be stable over time. Where explicitly indicated, the report provides evidence of the impact on other metrics, such as capital shortfalls of the current actual capital (common equity tier 1 (CET1), T1, total capital) vis-à-vis the CRR 2/CRD 5 MRC metric and final Basel MRC metric.

The current risk-weighted assets (RWA), which are the basis for the calculation of risk-based T1 MRC, do not include the RWA add-on based on the ‘Basel I floor’²² which was applied by some EU jurisdictions, because it ceased to exist in the EU as of 1 January 2018. As to the revised framework, the exercise assumes full implementation (as of 2028) of the output floor calibrated at 72.5% of the standardised approach RWA of the revised framework, while the estimation of the LR-based Tier 1 MRC consists of the existing minimum requirement (3%) plus 50% of the risk-based G-

²¹ For further details, please see page 7 and section 4 (FRTB)

²² The impact is measured without considering the current national implementation of the Basel I-based transitional floors set out in the Basel II framework. The transitional Basel I-based floor was implemented in Article 500 of Regulation (EU) No 575/2013 (CRR) as a floor to actual own funds rather than a floor to RWAs. The temporary requirement expired on 31 December 2017.

SIIs surcharge²³, where applicable²⁴. The results shown in the report are weighted averages, unless stated otherwise.

1.2.2 Description of impact metrics

The following variables are used in the analysis for assessing the cumulative impact, in terms of T1 MRC:

- ‘Total’ shows the overall impact on T1 MRC, when moving from the current to the revised framework and after considering that banks must meet the higher of the risk-based capital requirements (i.e. including the 72.5% output floor) and the revised Basel III LR requirement with respect to T1 capital.
- ‘Total risk-based’ shows the impact on the risk-based T1 MRC, i.e. without including the impact of the revisions in the revised Basel LR T1 MRC.
- ‘Credit risk’ shows the impact on T1 MRC assigned to the revisions of the SA and IRB approach for credit risk, as well as the changes arising from the revisions in the Securitisation and CCPs.
- ‘Market risk’ shows the impact on T1 MRC assigned to the revisions to the SA and internal model approach (IMA) for market risk (FRTB).
- ‘CVA’ shows the impact on T1 MRC due to the revisions to the CVA framework, including the removal of the CVA exemptions under Article 382 of the CRR.
- ‘Operational risk’ shows the impact on T1 MRC due to the introduction of the new standardised measurement approach (SMA), assuming that the EU will choose the option of setting the ILM equal to 1 when implementing the final Basel III framework.
- ‘Other P1 RWA’ shows the impact on T1 MRC assigned to the revisions from the Basel III framework which directly or indirectly affect the level of Other Pillar 1 RWA.
- ‘Output floor’ presents the impact on the level of T1 MRC due to the application of the aggregate output floor on the total RWA. The output floor impact is the difference between 72.5% of the total SA-equivalent RWA and the model-based RWA.
- ‘Revised LR’ shows the impact on LR-based T1 MRC add-ons (i.e. the additional MRC on top of the risk-based MRC) assigned to the implementation of the revised LR framework. A positive change shows that the LR requirement²⁵ becomes more constraining under the new framework, i.e. the final Basel III LR framework increases the T1 capital add-on in relation to the leverage ratio CRR 2/CRD 5 add-on over the risk-based minimum required Tier 1 capital. A negative change shows that the final Basel III LR Tier 1 add-on becomes less constraining, i.e. the final Basel III LR T1 add-on is lower than the CRR 2 / CRD 5 LR add-on.

²³ For example, for a bank with a G-SIIs buffer of 1% the minimum LR T1 MRC would be 3.5% of the total exposure measure.

²⁴ See also BCBS (2013), ‘Global systemically important banks: Updated assessment methodology and the higher loss absorbency requirement’; Financial Stability Board (November 2018), ‘2018 list of global systemically important banks (G-SIBs)’, <http://www.fsb.org/wp-content/uploads/P161118-1.pdf>

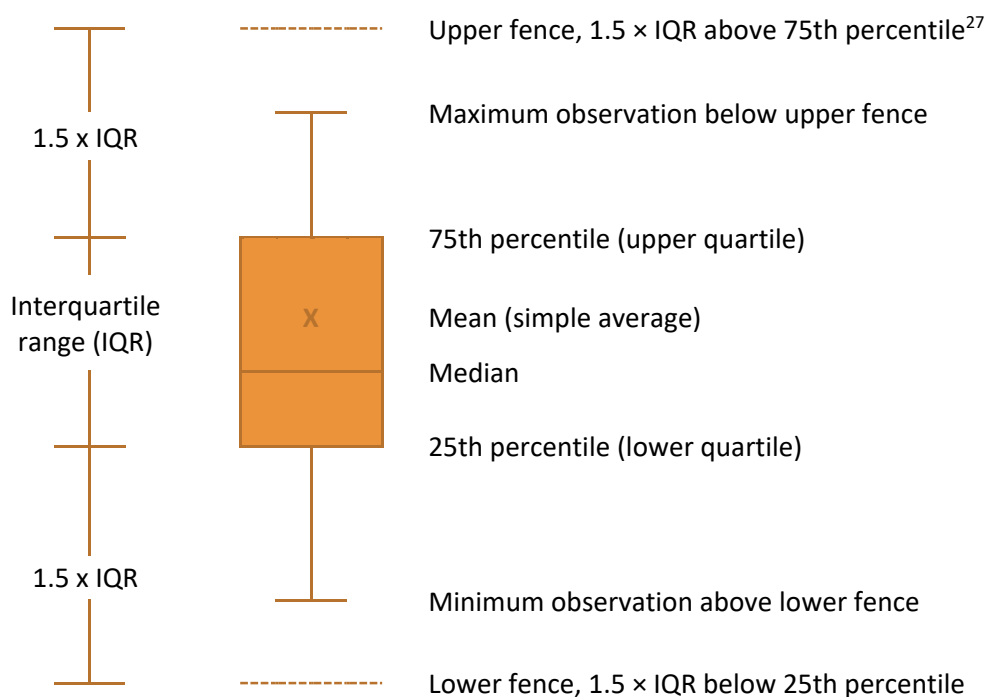
²⁵ Currently, leverage ratio requirements are not yet binding in the EU; the proposed CRR 2/CRD 5 will render the leverage ratio requirements binding.

In addition, the impact of the final Basel III framework is assessed in terms of ‘capital shortfall’ of the actual CET1, T1 and total capital, in relation to the MRC for CET1, T1, and total capital of the new framework, as follows:

- ‘Capital shortfall’ is estimated as the difference between the fully implemented MRC metric and the current actual capital set aside by the EU banks. Bearing in mind that the current actual capital (CET1, T1, total capital) covers also Pillar 2 capital requirements, as well as EU-specific macroprudential buffers imposed by the relevant supervisor, the estimated shortfall should, in most cases, be an underestimation of the actual shortfall.²⁶

1.3 Distribution metrics

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:



²⁶ In the Basel III Call for Advice report, all the requirements are taken into account and the shortfalls are consequently considerably higher.

²⁷ To calculate the upper and lower fences, 1.5 times the IQR is added to the 75th percentile and deducted from the 25th percentile.

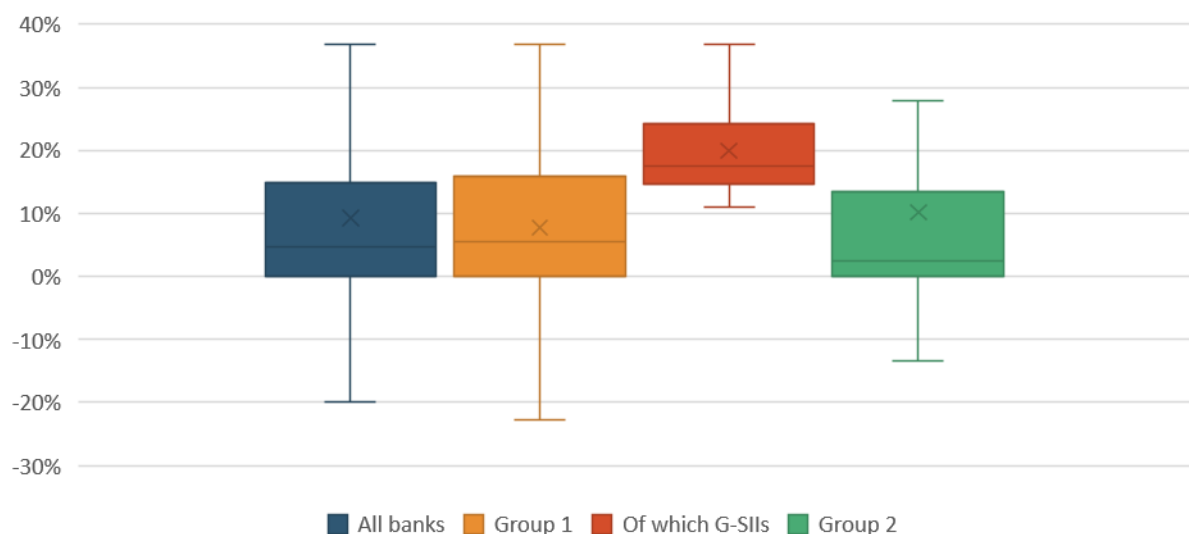
2. Regulatory capital ratios, capital shortfalls and impact on T1 MRC

This section presents several metrics to assess the impact of the full implementation of the Basel III reform package.

2.1 Cumulative impact analysis of the final Basel III reform: point-in-time analysis (Dec-22 only)

The analysis in the present section focuses on the impact of the Basel III package on the fully phased-in CRR 2/CRD 5 T1 MRC. As mentioned above, the advantage of the MRC measure is that it is common across all jurisdictions and is not affected by Pillar 2 capital requirements, which may vary across EU countries and may not be stable over time.

Figure 1: Distribution of changes in total T1 MRC



Note: the mean value ('X') is the simple average; Source: EBA QIS data (December 2022), sample: 157 banks

Figure 1 shows the distribution of T1 MRC across all banks: Group 1 banks (large, internationally active banks), Group 2 banks (other banks), and G-SIIs. Group 1 banks exhibit average and median values of 7.8% and 5.4%, respectively. G-SIIs and Group 2 banks show average values that are consistently higher than their respective medians (G-SIIs: 19.9% vs 17.6%; Group 2: 10.2% vs 2.5%). The average value for all banks is 9.3% while the median is 4.7%, implying that there are few positive outliers. The dispersion of impact on T1 MRC, measured as the interquartile range, is wider for Group 1 banks than for other bank groups and is mainly affected by the non-G-SIIs within the Group 1 banks.

The weighted average increase in T1 MRC, after including the capital conservation buffer (CCB) and G-SIIs surcharge, is 12.6% across all 157 banks in the sample, 13.3% for Group 1 banks and 8.9% for Group 2 banks. Table 5 shows the impact of the Basel reform package assuming its full implementation.

For Group 1 banks, the overall increase in T1 MRC consists of a 17.0% increase in the risk-based components, mainly driven by the 7.4% increase due to output floor implementation, while the new leverage ratio requirement offsets the risk-based T1 MRC by -3.7%. This offset reflects the fact that the revised Basel III LR becomes less constraining. For the G-SIIs, the LR requirement offsets the risk-based MRC by -1.7%.

For Group 2 banks, the overall 8.9% increase in T1 MRC is driven by the 12.9% increase in the risk-based measure, mainly driven by an increase of 7.9% due to the credit risk revisions and an increase of 3.2% due to the output floor implementation. This increase is offset by a -4.0% reduction caused by the leverage ratio impact (see Annex, section 9.1.6 for the detailed methodology).

Table 5: Changes in T1 MRC, per risk category, due to the implementation of the final Basel III framework (2028) (weighted averages, in %)

Bank group	Credit risk				Market risk	CVA	Op Risk	Output floor	Other Pillar 1	Total risk-based	Revised LR	Total
	SA	IRB	Securitisation	CCPs								
All banks	2.6	1.6	0.0	0.0	1.2	2.4	2.2	6.8	-0.4	16.3	-3.8	12.6
Group 1	1.9	1.6	0.0	0.0	1.3	2.6	2.6	7.4	-0.5	17.0	-3.7	13.3
G-SIIs	2.0	4.0	0.0	0.1	2.1	3.1	3.1	7.5	-0.3	21.7	-1.7	20.0
O-SIIs	1.8	-0.8	0.0	0.0	0.4	2.0	2.1	7.5	-0.6	12.2	-5.9	6.3
Other	2.2	-1.1	0.0	0.0	2.8	6.3	1.0	2.2	0.0	13.4	-2.1	11.3
Group 2	6.0	1.9	0.0	0.0	0.4	1.0	0.5	3.2	-0.1	12.9	-4.0	8.9
O-SIIs	6.3	0.9	0.0	0.0	0.3	1.3	0.5	3.1	0.1	12.6	-4.8	7.7
Other	5.5	3.4	0.0	0.0	0.6	0.4	0.4	3.4	-0.3	13.4	-2.8	10.7
Universal	2.6	2.2	0.0	0.0	1.2	2.3	2.3	6.6	-0.4	16.8	-3.5	13.3
Retail-oriented	5.9	-0.1	0.0	0.0	0.9	0.8	0.4	2.8	-0.2	10.4	-2.2	8.2
Corporate-oriented	0.7	-2.9	0.0	0.0	0.8	3.7	2.0	10.2	-0.1	14.3	-7.2	7.2

Source: EBA QIS data (December 2022), sample: 157 banks

When looking at the entire sample, the final Basel III CVA risk capital charge contributes with 2.4% to the total impact when compared to the CRR 2/CRD 5 framework. The significant CVA impact is primarily attributed to changes in the scope of CVA risk capital charge, but also to the differences in the modelling of the current and the new standardised approaches. The significant CVA impact is primarily attributed to the removal of the European CVA exemptions for transactions with non-financial counterparties, sovereign counterparties, pension funds counterparties, client's transactions and intragroup transactions, as specified under Article 382 of the CRR.

2.2 Evolution of the cumulative impact analysis since the establishment of the EBA mandatory exercise (Dec-21 to Dec-22)

Based on the increased constant sample of banks (i.e. 155 banks) that resulted from the EBA mandatory exercise, i.e. those which have been consistently submitting data from Dec-21 to Dec-22, and after applying the latest methodology (Dec-22) for assessing the impact of the Basel III reforms.

Table 6 shows the variations in the total Tier 1 MRC since the establishment of the EBA mandatory exercise (Dec-21 reference date). The exercise presents the results for market risk based on the January 2019 FRTB framework. The methodology for quantifying the market risk impact includes the retroactive implementation of the adjustment for overly conservative reporting of EIF positions. Although this adjustment affects 17 of the 89 credit institutions, it has been significant (>5% of the total MR RWA) only for eight of them, of which four are G-SIIs. Overall, the impact attributed to market risk shows a significant reduction which, inter alia, is assigned to the quality improvement of the submitted data.

Table 6: Changes in T1 MRC due to the implementation of the final Basel III framework (2028) (weighted averages, in %), from 2021 to 2022 for a constant sample of banks

	Credit risk	Market risk	CVA	Op Risk	OF	Other Pillar 1	Total risk-based	Revised LR	Total
31-Dec-21	4.3	1.8	2.6	1.7	6.5	-0.6	16.4	-2.7	13.7
31-Dec-22	4.3	1.2	2.4	2.2	6.7	-0.4	16.3	-3.6	12.7

Source: EBA QIS data (December 2022), sample: 155 banks

The overall impact, after taking into consideration the entire spectrum of risk-based and LR-based factors, drops from 13.7% in December 2021 to 12.7% in December 2022.

2.3 Capital ratios and shortfalls

This section presents the development of the capital ratios from the current to the full implementation framework, as well as the capital shortfalls that would arise from the full implementation of Basel III minimum capital requirements.

2.3.1 Capital ratios

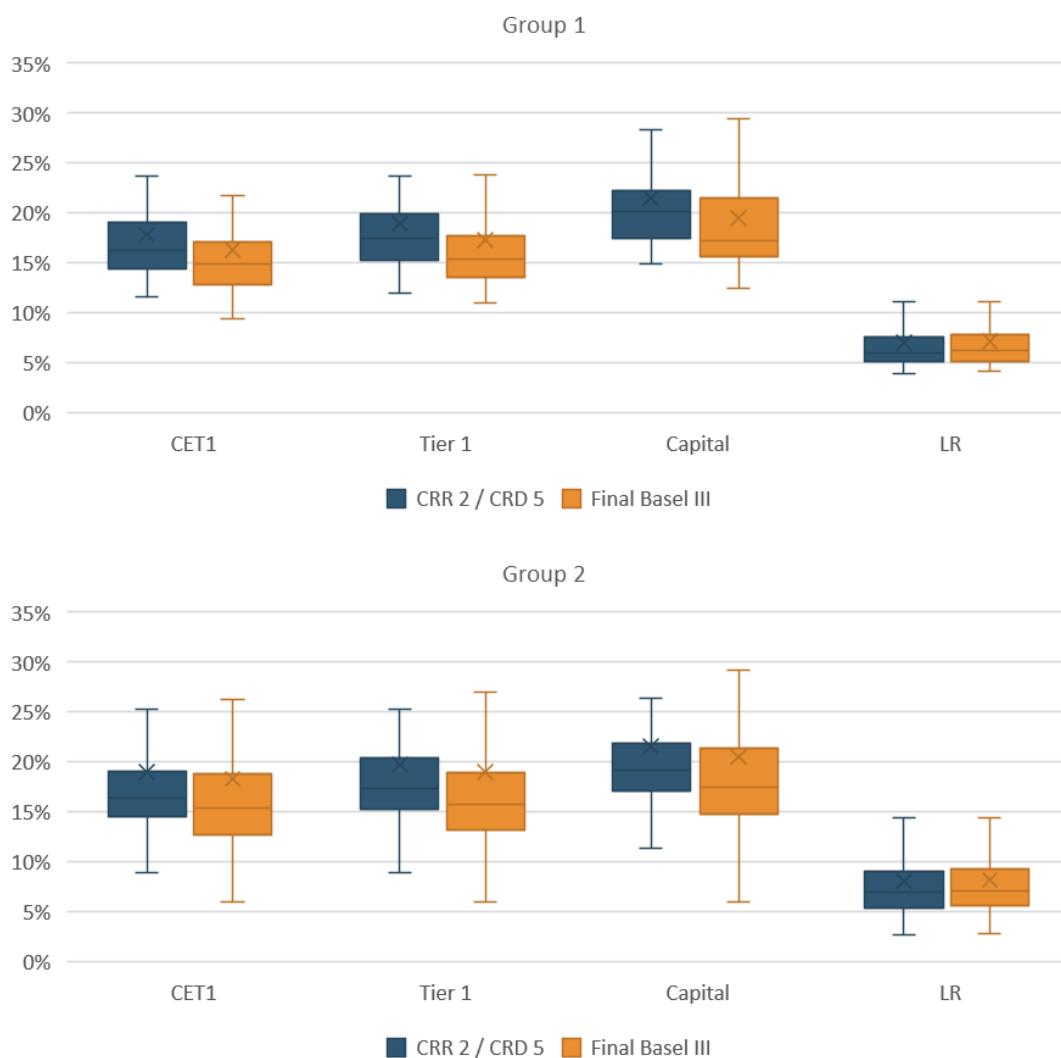
Table 7 shows the results of the calculations for CET1, T1 and total capital ratios and the leverage ratio. For the latter, it is assumed that the actual capital measure under the final Basel III remains unchanged from CRR 2/CRD 5 and that the impact on the leverage ratio is therefore entirely attributed to changes in the leverage ratio exposures.

Table 7: Comparison of risk-based capital ratios and leverage ratios under different states of implementation (weighted averages, in %)

Bank group	CET1		Tier 1			Total capital			LR		
	CRR 2/CRD 5	Transitional Basel III (2023) ²⁸	Final Basel III (2028)	CRR 2/CRD 5	Transitional Basel III (2023)	Final Basel III (2028)	CRR 2/CRD 5	Transitional Basel III (2023)	Final Basel III (2028)	CRR 2/CRD 5	Final Basel III (2028)
All banks	15.3	14.0	13.2	16.5	15.2	14.3	19.0	17.3	16.3	5.5	5.6
Group 1	15.2	14.0	13.0	16.4	15.1	14.1	19.0	17.4	16.2	5.4	5.5
Of which: G-SIIs	14.0	12.4	11.6	15.3	13.6	12.7	17.7	15.4	14.4	4.7	4.8
Group 2	15.5	14.4	14.0	16.6	15.4	14.9	18.7	17.1	16.6	6.0	6.1

Source: EBA QIS data (December 2022), sample: 157 banks

Figure 2: Distribution of capital ratios under CRR 2/CRD 5 versus fully phased-in final Basel III framework (2028)



Source: EBA QIS data (December 2022), sample: 157 banks; Note: the mean value ('X') is the simple average.

²⁸ The transitional implementation (2023) includes the impact of applying the transitional output floor rate of 50%; all other provisions of final Basel III are fully implemented.

The average impact on capital ratios is broadly similar across all bank categories. However, the dispersion across the different types of capital ratios is clearly wider for Group 2 banks both before and after the introduction of the reform. (Figure 2). Looking at the impact of the reform on distributions, the dispersion of CET1, Tier 1 and total capital ratios becomes slightly wider under the Basel III framework, while the dispersion of LR remains largely unchanged between the two frameworks.

2.3.2 Capital shortfalls

The capital shortfall compares the actual level of capital (CET1, Tier 1 and total capital) in December 2022 with the fully implemented Basel III MRC, after taking into account the CCB and G-SIIs surcharge, where applicable.²⁹ The capital shortfalls under the current fully phased-in CRR 2/CRD 5 are negligible and could be attributed to inaccuracies in the submitted data.

The combined³⁰ total capital shortfall that emerges under the full implementation of the Basel III is EUR 1.1 billion, which is entirely attributed to Group 2 banks (Table 8).

Table 8: Capital shortfalls by bank group under full implementation of CRR 2/CRD 5 (upper part) and final Basel III (2028) (lower part) (EUR billion)

Full implementation of CRR 2/CRD 5

Bank group	CET1	Tier 1			Total capital	
		Risk-based ³¹	Stand-alone LR-based	Risk-based and LR-based Tier 1 ³²	Risk-based ³³	Risk-based total capital and LR-based Tier 1 ³⁴
All banks	0.0	0.0	0.0	0.0	0.0	0.0
Group 1	0.0	0.0	0.0	0.0	0.0	0.0
Of which: G-SIIs	0.0	0.0	0.0	0.0	0.0	0.0
Group 2	0.0	0.0	0.0	0.0	0.0	0.0

Full implementation of Basel III (2028)

Bank group	CET1	Tier 1			Total capital	
		Risk-based	Stand-alone LR-based	Risk-based and LR-based Tier 1	Risk-based	Risk-based total capital and LR-based Tier 1
All banks	0.2	0.6	0.0	0.6	1.1	1.1
Group 1	0.0	0.0	0.0	0.0	0.0	0.0
Of which: G-SIIs	0.0	0.0	0.0	0.0	0.0	0.0
Group 2	0.2	0.6	0.0	0.6	1.1	1.1

Note: upper part, full implementation of CRR 2/CRD 5; lower part, full implementation of final Basel III.

Source: EBA QIS data (December 2022), sample 157 banks

²⁹ This metric takes into account the deficit of capital on an individual basis without it being offset by the surpluses of other banks.

³⁰ Assuming joint implementation of the risk-based and leverage ratio requirements.

³¹ 8.5% (= minimum Tier 1 (6%) + capital conservation buffer (2.5%)).

³² The results presented in this column are estimated as follows: $\sum \max(LR_based_MRC - Risk_based_MRC, 0)$.

³³ Assuming compliance with the risk-based capital ratio requirements only.

³⁴ Assuming compliance with both the risk-based capital ratio and leverage ratio requirements.

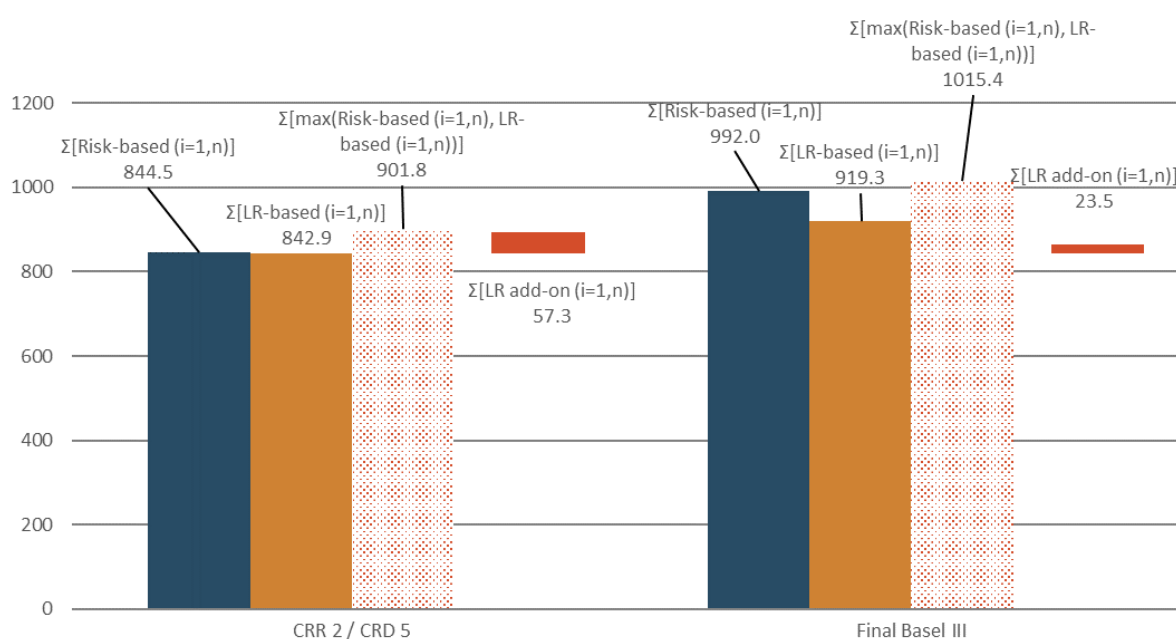
The final Basel III revisions to the risk-based capital requirements result in a CET1 capital shortfall of EUR 0.2 billion. For Tier 1 risk-based requirements, this shortfall increases to EUR 0.6 billion. The LR-based Tier 1 MRC does not exhibit any shortfall and thus not contribute to the overall combined Tier 1 shortfall.

2.4 Interactions between risk-based and leverage ratio capital requirements

This section analyses whether the Basel III framework renders the leverage ratio requirements more or less constraining relative to the CRR 2/CRD 5 requirements. It is notable that the contribution of leverage ratio is overestimated since Pillar 2 requirements, O-SII's capital requirement and countercyclical capital buffers, which would increase risk-based requirements without impacting leverage ratio, are disregarded. Figure 3 presents the mechanics for the estimation of the leverage ratio impact. Details can be found in the Annex (section 9.1.6).

The aggregate Tier 1 MRC, consisting of the combined risk-based and LR-based requirements, increases from EUR 901.8 billion under CRR 2/CRD 5 to EUR 1015.4 billion under the final Basel III (an increase by 12.6% — see Table 1). The stand-alone risk-based MRC for all banks under the CRR 2/CRD 5 is EUR 844.5 billion, while the stand-alone LR-based MRC is EUR 842.9 billion. The respective values under the final Basel III framework are EUR 992.0 billion and EUR 919.3 billion. The total leverage ratio requirement add-on, estimated at the individual bank level, decreases from EUR 57.3 billion under CRR 2/CRD 5 to EUR 23.5 billion under the final Basel III framework.

Figure 3: The mechanics of the calculation of actual leverage ratio MRC impact, Tier 1 MRC (EUR billion)



Source: EBA QIS data (December 2022), sample 157 banks

$\sum[\text{Risk – based } (i = 1, n)]$, the aggregate risk-based Tier 1 MRC;
 $\sum[\text{LR – based } (i = 1, n)]$, the aggregate leverage-ratio-based Tier 1 MRC;
 $\sum[\max(\text{Risk – based } (i = 1, n), \text{LR – based } (i = 1, n))]$, the aggregate total Tier 1 MRC,
 which ensures compliance, at individual bank level, with both risk-based and leverage ratio
 requirements;
 $\sum[\text{LR add – on } (i = 1, n)]$, the aggregate amount of leverage ratio add-ons, i.e. the sum of the
 differences where the LR-based Tier 1 MRC is higher than the risk-based Tier 1 MRC

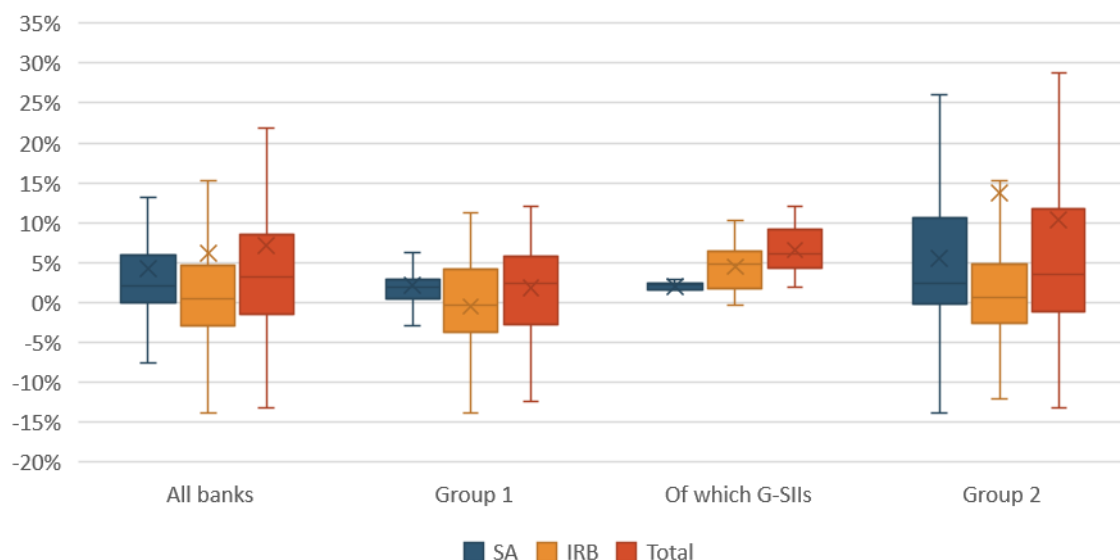
The comparison between the CRR 2 / CRD 5 and the final Basel III frameworks therefore indicates that the leverage ratio requirement becomes less constraining under the final Basel III framework. This means that part of the additional MRC, that was previously attributed to the LR, will be attributed to the risk-based Basel III MRC. In percentage terms, this change corresponds to the leverage ratio impact of -3.8% shown in Table 1 and Table 5.

3. Credit risk

This section assesses the impact of the Basel III reforms that is related to the revisions to the SA and the IRB approach for credit risk. The changes in the final framework aim, among other things, to increase comparability by aligning definitions and taxonomies between the SA and IRB approaches. In particular, the final reforms (1) introduce new asset classes, or split the existing asset classes, and (2) revise the eligibility and/or the scope of using the IRB approach for some asset classes³⁵. Because of these changes, a direct comparison between the proposed and current frameworks is not possible. Therefore, the estimated impact is an approximation.

The analysis suffered from some data quality issues, arising mainly from difficulties in allocating portfolios according to the revised categorisation of the asset classes as well as from different interpretations of the revised framework. The outcome of data cleansing showed that banks opted to be rather conservative when providing data for the revised framework, suggesting that the impact shown in this report could be an overestimation of the actual impact. Although the final Basel III framework allows jurisdictions to choose either the loan-splitting approach or the whole-loan approach for residential and commercial real estate, the current analysis adopts the EU approach that assumes the application of the loan-splitting approach³⁶.

Figure 4: Changes in Tier 1 MRC for credit risk (SA and IRB) exposures due to the final Basel III framework (2028)



Note: the mean value ('X') is the simple average; Source: EBA QIS data (December 2022), sample: 157 banks

The median impact over all portfolios, i.e. SA and IRB approach portfolios, that is attributed to credit risk only, is approximately 3.2% as a percentage of the current Tier 1 MRC. Figure 4 shows the distribution of changes in Tier 1 MRC assigned to the revisions of the SA and the IRB approaches

³⁵ For more information, please refer to <https://www.bis.org/bcbs/publ/d424.htm>

³⁶ Nevertheless, few banks reported data under the whole-loan approach

for credit risk. The median impact for SA portfolios is approximately 2.1% and for IRB portfolios is slightly above zero (0.5%).

When the overall impact is broken down into asset classes (not shown), the largest increases are expected for 'equities', 'equity investment in funds' and 'subordinated debt and capital instruments other than equity'.

The increase in the RWA reflects the rise of the risk weight of 'other equity' from 100% in the current framework (with higher risk weights if specific conditions apply) to 250% in the revised framework within the 'other equity' sub-category. The newly created sub-categories 'speculative equity' (risk weight 400%) and 'equity under National Legislated Programmes' (risk weight 100%) represent jointly a minor share of the EU equity portfolio under the SA (below 5% in terms of exposure amounts).

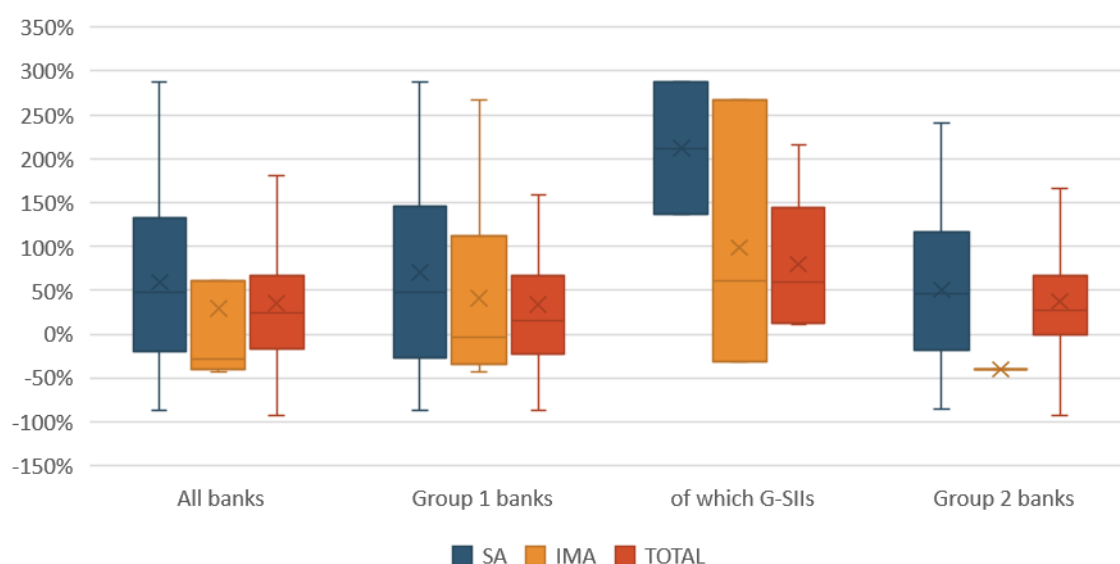
On the opposite direction, the removal of the IRB approach for exposures to 'equity' (i.e. the migration to SA) causes the RWAs for this exposure class to decrease. The risk weight for 'equity' exposures is expected to drop to 250%, under the revised SA framework, from the current prevailing risk weight of 370%, under the so-called simple risk weight approach.

4. FRTB

This section assesses the impact – *ceteris paribus* – of the January 2019³⁷ BCBS reforms related to the capital requirements for market risk. As in the rest of the report, the impact of the FRTB is based on an adjusted estimation which reduces the bias embedded in the original data submissions related to market risk. This adjustment intends to cope with the overly conservative data submitted by several large banks on the EIF. However, since the Dec-21 exercise, the bias is treated by reducing the reported impact on EIF instead of excluding altogether the market risk impact, i.e. by setting it to zero, for the banks reporting conservative data.

More specifically, several banks treat all trading book positions in EIF where modelling is no longer allowed according to the look-through requirements, by applying the most conservative standardised approach (the “other bucket” treatment). This choice implies that the equity risk impact of the FRTB will be subject to the highest applicable risk weights, rather than under other possible treatments such as the index treatment or the mandate-based approach as set out in MAR21.36³⁸. In order to cope with the bias created by the overly conservative data reported, the impact on EIF has been reduced to 20% of the reported value. This treatment, which is also applied by the BIS in their QIS impact report, has been applied to 17 out of 89 banks which reported market risk data.

Figure 5: Change of market risk capital requirements after FRTB implementation, without floor, broken down by approach and bank group (in % of market risk MRC)



Source: EBA QIS data (December 2022), sample: 89 banks; Note: the mean value ('X') is the simple average.

³⁷ <https://www.bis.org/bcbs/publ/d457.htm>

³⁸ See BCBS (15 December 2019), MAR – Calculation of RWA for market risk / MAR21 – Standardised approach: sensitivities-based method, https://www.bis.org/basel_framework/chapter/MAR/21.htm?inforce=20220101

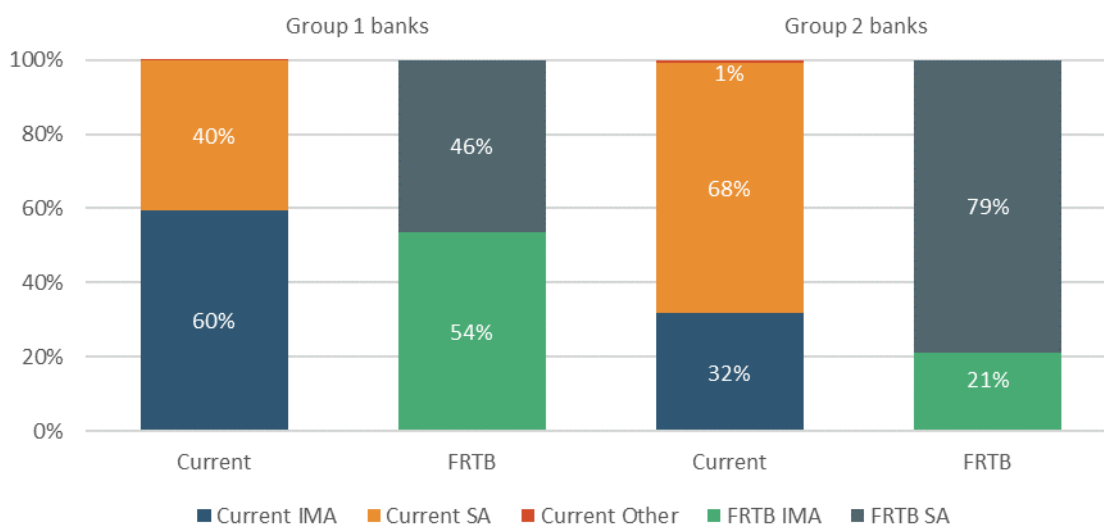
As in other sections, data quality checks revealed some additional issues and limitations in the information submitted by banks and the findings should therefore be interpreted with caution. In particular, some outliers affect the summary results, pushing the average values beyond the median values across the majority of risk categories and bank groups. Note that although the reported figures include the impact of the outliers, they have been eliminated from the graphical presentation in Figure 5.

Figure 5 shows the impact of the revised market risk standards on total MRC assigned to market risk. The simple average impact of the FRTB reform for all banks is around 35% of current market risk MRC, with an interquartile range that spans from approximately -17% to 66%. The range of changes is slightly higher for Group 1 banks but significantly higher for G-SIIs. Group 2 banks shows a range of impacts which is similar to Group 1 for the total.

With regard to the individual approaches to measuring market risk, the distribution of the impact, as represented by the interquartile range, is much wider under the standardised approach (SA) than under the internal model approach (IMA). For the standardised approach, the impact ranges from -20% to strongly positive (around 133% - not considering outliers). Most of the highly positive impact under FRTB SA is due to the treatment applied to equity investments in funds (CIUs).

Figure 6 shows the proportion of market risk capital requirements that are attributable to the approaches under the current rules and under the revised standards.

Figure 6: Contribution to the total market risk RWAs by each calculation method before and after implementing FRTB framework



Source: EBA QIS data (December 2022), sample: 89 banks

For Group 1 banks, the key driver under the current rules is IMA (60%), while the SA amounts to the remaining impact (40%). Under the revised rules, the proportion of minimum capital requirements calculated under IMA decreases to 54% while the SA proportion increases to 46%. In contrast, Group 2 banks currently have most of their minimum capital requirements computed

under the SA (68%), with 32% under the IMA and the remaining part under other market risk approaches for the calculation of capital requirements. Under the revised rules, the SA makes up 79% of the entire minimum capital requirement. This demonstrates that the banks intend to shift to more conservative market risk approaches under the Basel III framework.

5. Operational risk

For operational risk, the final Basel III framework replaces all existing approaches with the new Standardised Measurement Approach (SMA) approach. In particular, the SMA approach replaces the model-driven advanced measurement approach (AMA). Under the new operational risk framework, banks can use only the SMA. Small banks will have to calculate the MRC based only on the business indicator component (BIC), while large banks will also have to calculate the so-called loss component (LC).

The results in this section rely on the assumption that EU will set ILM equal to 1, using the discretion available under Basel III. The revisions to the framework generate an aggregate increase in operational risk MRC of 28.0% for Group 1 banks and 5.2% for Group 2 banks. The results show that, on average, the revisions affect banks which migrate from the AMA less than those banks that are currently using other approaches (22.7% vs. 26.0%).

There are few reasons for the higher impact of operational risk on Group 1 than on Group 2. First, Group 1 banks are mainly large banks with more complex and more fee-driven business models, whereas Group 2 banks tend to provide universal and diversified bank services that do not rely significantly on fees. For the fee-driven business models, the new indicator has been set at a more conservative level to addressing the higher operational risks that are generally observed for these kinds of business models. Second, large banks are generally more affected by the high business indicator.

Table 9: Changes in T1 MRC assigned to operational risk only (% of the MRC T1 assigned to operational risk under CRR 2/CRD 5)

Bank group	AMA	Others	Total
All banks	22.7	26.0	24.3
Group 1	23.5	34.3	28.0
Of which: G-SIIs	24.6	48.3	30.7
Group 2	-0.4	5.9	5.2

Source: EBA QIS data (December 2022), sample 158 banks

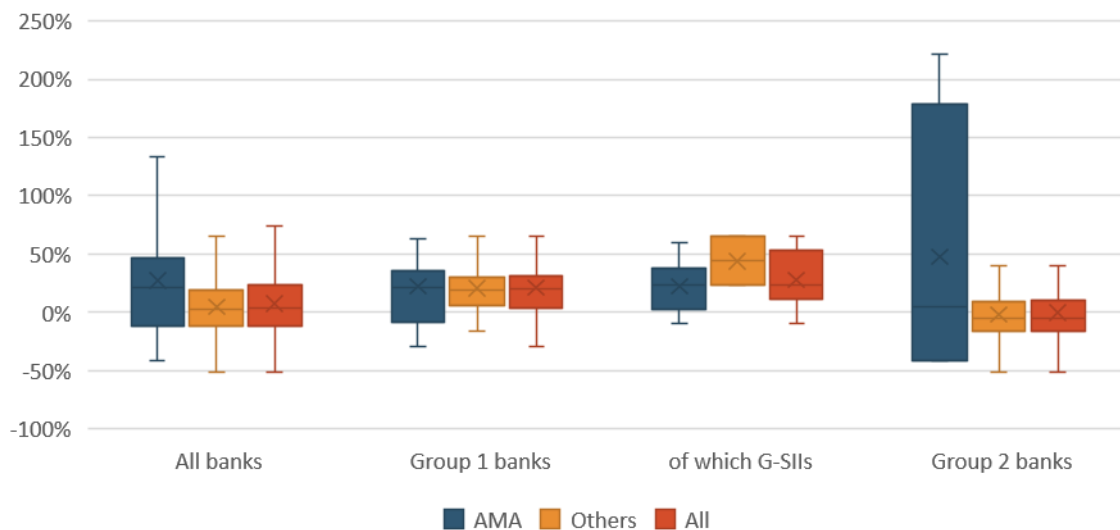
The data also shows that, for Group 1 banks, and particularly for G-SIIs, the proportion of operational risk MRC in the total MRC is higher than for Group 2 banks. This is because the business models of the Group 1 banks offer universal services and they thus have relatively homogenous operational risk characteristics, whereas Group 2 banks follow a variety of business models offering specialised, or more diverse kinds of services. Some Group 2 banks are particularly specialised, offering only fee-driven services and no services that would be exposed to credit or market risk. This makes operational risk the most dominant risk category for them.

The sample covers almost the entire population of large Group 1 AMA banks, which face more significant capital increases compared to the Group 2 banks, which either use AMA on simpler operational risk exposures or use simple standardised approaches. In addition, some of the banks may currently be subject to Pillar 2 capital add-ons due to weaknesses in their operational risk

management; these add-ons are not considered in the current analysis. As a result, the total impact shown in Table 9 may be an overestimation of the actual impact.

The distribution of the operational risk capital requirements for Group 2 AMA banks is clearly higher than the corresponding value for Group 1 AMA banks (Figure 7).

Figure 7: Distribution of changes in T1 MRC assigned to operational risk only (in % of current operational risk MRC)



Note: the mean value ('X') is the simple average; Source: EBA QIS data (December 2022), sample 158 banks

6. Output floor

Table 10 shows that the gradual elevation of the output floor affects the MRC throughout the phase-in period. According to the provisions of the Basel III reform package, there will be a 5-year transitional period for the implementation of the output floor, according to which the level of the floor, i.e. the percentage of the non-modelled RWA, will gradually increase from 50% in 2023 to the fully phased-in level of 72.5% in 2028. The impact of the output floor on the MRC during the first 2 years of the phase-in period is negligible (0.1% for Group 1 banks and 0.5% for Group 2 banks).

The analysis does not take into account the national discretion of applying a 25% cap during the transitional period. The final Basel III framework provides the national discretion of applying, during the transitional period, a cap on the incremental increase of output floor impact on total RWAs. This transitional period cap is set at 25% of a bank’s incremental increase in RWAs³⁹. Thus, the exercise of this discretion may limit the year-to-year incremental increase of the output floor impact to 25%⁴⁰. The application of this discretion (not shown in Table 10) might reduce the impact in some of the years between 2023 and 2027.

Table 10: Cumulative output floor impact during the implementation phase (% of total CRR 2/CRD 5 Tier 1 MRC)

Bank group	2023 (50%)	2024 (55%)	2025 (60%)	2026 (65%)	2027 (70%)	2028 (72.5%)
All banks	0.0	0.2	0.7	2.5	5.1	6.8
Group 1	0.0	0.1	0.7	2.7	5.6	7.4
Of which: G-SIIs	0.0	0.0	0.4	2.7	5.6	7.5
Group 2	0.2	0.5	0.8	1.5	2.5	3.2

Source: EBA QIS data (December 2022), sample: 157 banks

The highest increase in the output floor impact is observed for Group 1 banks in 2027, where the percentage of the output floor rate increases from 65% (2026) to 70% (2027) and the impact increases by approximately 290 basis points (from 2.7% to 5.6%). However, the highest sensitivity of MRC impact to the introduction of the output floor is observed for G-SIIs in 2028, where the impact increases by 76 basis points for each percentage point increase in the output floor rate between 70% and 72.5%⁴¹.

³⁹ See BCBS (2017), *Basel III: Finalising post-crisis reforms*, p. 139, paragraph 10: ‘During the phase-in period, supervisors may exercise national discretion to cap the incremental increase in a bank’s total RWAs that results from the application of the floor. This transitional cap will be set at 25% of a bank’s RWAs before the application of the floor...’

⁴⁰ For example, if the application of the output floor on total RWAs results in an impact of EUR 10 billion in 2024 (output floor rate = 55%) and EUR 15 billion in 2025 (output floor rate = 60%), the exercise of the discretion implies that the impact in 2025 may be capped at EUR 12.5 billion (= EUR 10 billion + EUR 10 billion × 25%).

⁴¹ 190 basis points/2.5% = 76 basis points of impact per percentage point of output floor increase.

7. Revised leverage ratio

This section assesses the impact of the amendments to the Basel III LR requirements⁴². Given that, in the EU, the current implementation of the Basel III framework coincides with the full Basel III implementation, the LRE remains unchanged for all banks. In terms of LR-based MRC, the figures change only for G-SIIs which are subject to an additional “0.5 X G-SIIs surcharge”, on top of the 3% of the LRE which is the generic capital requirement.

Considered in isolation from the other Basel III risk-based reforms (Table 11), the measure of the leverage ratio exposure remains the same given that the EU has already implemented the final Basel III framework. When the 50% of the G-SIIs surcharge is included, the LR-based Tier 1 MRC rises to 9.0%. Another element that contributes to the formulation of the final impact of LR MRC is the deficit of provisions that is added to ensure equivalence with the risk-based MRC.

Table 11: Impact of LR, in isolation from the risk-based provisions, due to changes in the definition of leverage ratio exposures (LRE) and changes in the calculation (50% of G-SIIs surcharge) of the LR T1 MRC (%)

Bank group	CRR 2/CRD 5 LR exposure	Impact due to changes in the definition of LRE only	Impact due to the definition of LRE and inclusion of 50% of G-SIIs surcharge
All banks	100.0	0.0	9.0
Group 1	100.0	0.0	10.7
Of which: G-SIIs	100.0	0.0	20.8
Group 2	100.0	0.0	0.0

Source: EBA QIS data (December 2022), sample: 157 banks

Figure 8 compares the distributions of leverage ratio levels according to the current fully phased-in definition with the final Basel III definition. Results in this section include all banks that submitted leverage ratio data that was of sufficiently good quality⁴³.

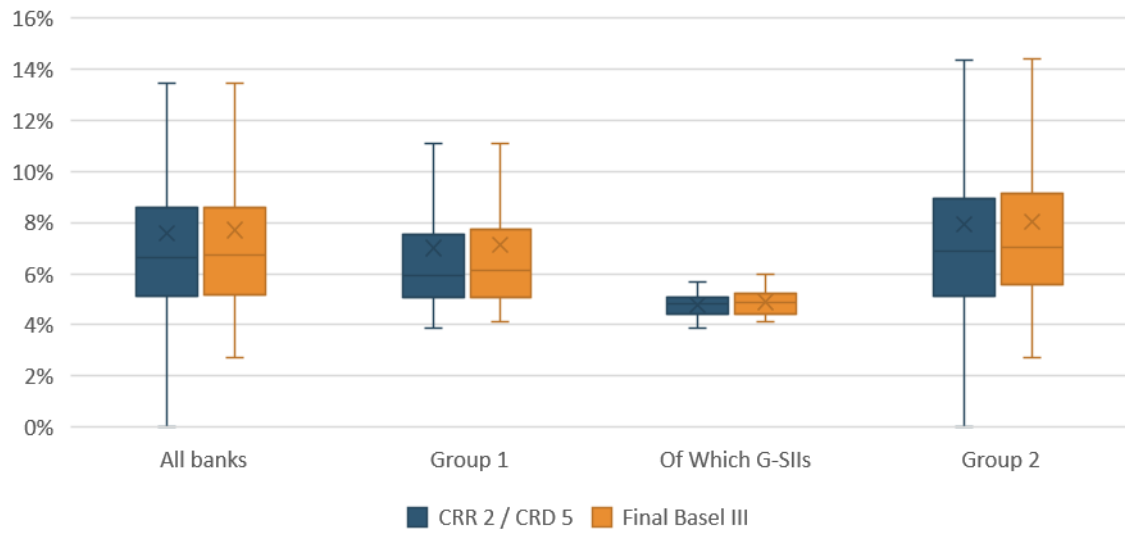
The implementation of the final Basel reforms will imply only negligible changes in the average LR for all bank categories considered. The comparison of leverage ratio levels between the current and revised frameworks (Figure 8) show that there are little changes in the average and median values, as well as in the distribution of the LR.

In terms of LR there is a negligible impact.

⁴² 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 of pending settlement transactions; clarification on cash-pooling transactions; reduction 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 derivative-clearing services within a multi-level client structure; incorporation of identical credit conversion factors to off-balance-sheet items, as for the SA for credit risk; and introduction of an add-on buffer to the minimum LR requirement, calibrated at 50% of the current G-SIIs buffer in the risk-weighted surcharge ratio.

⁴³ Table 3 and Table 7 provide LR levels for a sample of 157 banks that are included in the cumulative impact analysis.

Figure 8: Comparison of fully phased-in EU LR and final Basel III LR



Source: EBA QIS data (December 2022), sample: 157 banks; Note: the mean value ('X') is the simple average.

8. Interaction between output floor and leverage ratio requirements

The analysis in the current report applies the leverage ratio requirements following the Basel III provisions, which provide that they act as a backstop to the risk-based requirements and thus are applicable after the risk-based requirements, including the output floor. According to this methodology, the output floor creates an additional capital requirement under the Basel III framework, which smooths out the impact of the LR add-on on the risk-based requirements. This offset of the LR impact is obvious when examining the stand-alone increase in the leverage ratio capital requirements (9.0%), vis-à-vis the relative LR impact after taking into account the risk-based capital requirements, including the output floor (-3.8%).

This chapter aims to calculate the stand-alone impact of the output floor on MRC by assuming that all other requirements, including the LR, are applied before the output floor. The order of the application of the various requirements does not change the final impact on MRC, but it allows the isolation of the impact of the last requirement that is applied. In the case of the output floor, this takes into account the fact that some of the increase in MRC, attributed to the output floor in the cumulative analysis of the present report (Table 1 and Table 5), is, in fact, already required by the LR, but in the final Basel III regime it is 'taken on' by the output floor because it is applied before the LR. Therefore, this approach underestimates the stand-alone impact of the LR (indeed, it shows a decrease in MRC) and overestimates the stand-alone impact of the output floor.

To illustrate the case, three scenarios are calculated:

- *Baseline scenario*: application of leverage ratio requirement after applying the output floor requirement, as part of the risk-based requirements (final Basel III regime);
- *Scenario 1*: application of the leverage ratio requirement alone, i.e. without applying the output floor;
- *Scenario 2*: application of the output floor requirement after applying the leverage ratio requirement, i.e. reversed order of application.

Scenario 1 assumes the output floor is equal to 0%. Scenario 2 is calculated as the difference between the baseline scenario (presented in the cumulative results), where the output floor is set to 72.5%, and Scenario 1.

Note that, in the interaction between leverage ratio and output floor, the impact of the leverage ratio is overestimated since Pillar 2 requirements, O-SIIs capital requirement and countercyclical capital buffers are disregarded.

The results in Table 12 show the number of constrained banks under the two scenarios, as well as the difference attributed to the output floor.

Table 12: Number of banks constrained by the risk-based capital requirement, with and without the implementation of the output floor

Scenarios	Number of banks constrained by the risk-based requirements	Number of banks constrained by output floor	Number of banks constrained by leverage ratio
Risk-based capital requirements without the output floor (scenario 1)	114	-	43
Risk-based capital requirements with the output floor (baseline scenario)	114	18	25

Source: EBA QIS data (December 2022), sample: 157 banks

Under the baseline scenario of the Basel III framework, 114 banks in the sample are constrained by the risk-based requirements, before applying the output floor, 18 banks are constrained by the output floor and 25 banks by the leverage ratio requirement (see Table 12). The implementation of Basel III risk-based requirements, without the output floor, and the leverage ratio requirements results in 114 banks being constrained by the risk-based requirements and 43 banks by the leverage ratio (see Table 12). The implementation of the output floor, as part of the risk-based requirements, results in 18 banks being constrained by the risk-based requirements after including the output floor.

The impact of LR and output floor, in EUR billion, under (a) the baseline scenario is EUR -33.8 billion and 60.9 billion, respectively, (b) Scenario 1 is EUR 5.7 billion and zero, respectively and (c) Scenario 2 is EUR 5.7 billion and EUR 21.4 billion, respectively (see also Table 13). The negative leverage ratio impact implies a reduction in the add-on of leverage ratio from the current CRR 2/CRD 5 regime because the add-on is reduced by EUR 33.8 billion, from EUR 57.3 billion to EUR 23.5 billion, owing to the increase of RWA. This translates into a -3.8% LR impact (see also Table 1) compared with the current Tier 1 MRC (-33.8/901.8).

Under scenarios 1, the leverage ratio add-on is EUR 5.7 billion, which implies an overall impact of the LR, in percentage terms, on MRC of +0.6%. Scenario 2 then applies the output floor as the last requirement in the sequence (no output floor is applied under scenario 1). In this case, the Tier 1 MRC add-on due to the output floor is +2.4%, which is significantly lower than the +6.8% add-on under the baseline scenario. This implies that the isolated impact of the output floor alone, as a new element of the framework, contributes to an increase in MRC of EUR +21.4 billion (or +2.4% increase).

Table 13: Impact and implied cumulative impact on Tier 1 MRC of the implementation of risk-based capital requirements, with and without the implementation of the output floor

Scenarios	Risk-based (without output floor) Tier 1 MRC in EUR billion (implied impact in %)	Output floor add-on (before LR) on risk-based Tier 1 MRC in EUR billion (implied impact in %)	Leverage ratio Tier 1 MRC in EUR billion	Leverage ratio add-on in EUR billion (implied impact in %)	Output floor (after LR) Tier 1 MRC in EUR billion (implied impact in %)	Total implied impact (%)
	931.1	60.9	919.3	-33.8	Not Applicable	12.6%

Scenarios	Risk-based (without output floor) Tier 1 MRC in EUR billion (implied impact in %)	Output floor add-on (before LR) on risk-based Tier 1 MRC in EUR billion (implied impact in %)	Leverage ratio Tier 1 MRC in EUR billion	Leverage ratio add-on in EUR billion (implied impact in %)	Output floor (after LR) Tier 1 MRC in EUR billion (implied impact in %)	Total implied impact (%)
Baseline: with output floor (before LR)	9.6%	6.8%		-3.8%		
Scenario 1: without output floor	931.1 9.6%	Not Applicable	919.3	5.7 0.6%	Not Applicable	10.2%
Scenario 2: with output floor (after LR)	931.1 9.6%	Not Applicable	919.3	5.7 0.6%	21.4 2.4%	12.6%

Source: EBA QIS data (December 2022), sample: 157 banks

Note: The ‘leverage ratio implied impact’ for the baseline scenario is -3.8% (also shown in Table 1, Table 5 as ‘LR impact’) and is calculated as EUR -33.8 billion (= EUR 23.5 billion – EUR 57.3 billion)/EUR 901.8 billion. EUR 23.5 is the Basel III leverage ratio add-on while EUR 57.3 billion is the CRR 2/CRD 5 leverage ratio add-on (Figure 3), and EUR 901.8 billion is the combined CRR 2/CRD 5 Tier 1 MRC arising from the implementation of both risk-based and LR-based requirements (see also Figure 3).

It is worth mentioning that the analysis has been conducted considering the Basel III target requirements only. The inclusion of other EU-specific capital requirements (e.g. calculation of the countercyclical buffer, O-SIIs capital requirement, Pillar II requirements) would reduce the marginal contribution of the leverage ratio⁴⁴, which would remain close among all scenarios.

⁴⁴ Higher capital targets, due to the implementation of a higher buffer in the risk-based requirements, would lead to a more binding risk-based framework that, in turn, reduces the overall impact of the leverage ratio framework.

9. Annex

9.1 Methodology for the estimation of the impact per category

9.1.1 Credit risk impact

$$\% \Delta T1MRC (\text{Credit risk}) = \% \Delta T1MRC (\text{SA}) + \% \Delta T1MRC (\text{IRB approach}) + \% \Delta T1MRC (\text{Securitisation}) + \% \Delta T1MRC (\text{CCP})$$

$\% \Delta T1MRC(\text{Credit risk})$ is the percentage difference in MRC attributed to credit risk;
 $\% \Delta T1MRC(\text{SA})$ is the percentage difference in MRC attributed to the standardised approach for credit risk;

$\% \Delta T1MRC(\text{IRB})$ is the percentage difference in MRC attributed to the internal ratings-based approach to credit risk;

$\% \Delta T1MRC(\text{Securitisation})$ is the percentage difference in MRC attributed to the revisions in Securitisation framework;

$\% \Delta T1MRC(\text{CCP})$ is the percentage difference in MRC attributed to the CCP framework.

Standardised approach for credit risk

$$\% \Delta T1MRC(\text{SA}) = \frac{\left[\sum_{i=1}^n \left\{ \left(\text{Tier1}_{MRC} \% \pm \text{capital conservation buffer} \% \pm G_{SII_s} \text{ surcharge} \% \right) \times \text{'Final Basel III SA}_{RWA}' \right\} - \sum_{i=1}^n \left\{ \left(\text{Tier1}_{MRC} \% \pm \text{capital conservation buffer} \% \pm G_{SII_s} \text{ surcharge} \% \right) \times \text{'CRR_CRDIV SA}_{RWA}' \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk_based Tier1 MRC'}, \text{'CRR_CRDIV total LR_based Tier1 MRC'} \}}$$

Where, Tier 1 MRC = 6% and capital conservation buffer = 2.5%

IRB approach for credit risk

$$\% \Delta T1MRC(\text{IRB}) = \frac{\left[\sum_{i=1}^n \left\{ \left(\text{Tier1}_{MRC} \% + \text{capital conservation buffer} \% + G_{SII_s} \text{ surcharge} \% \right) \times \text{'Final Basel III IRB}_{RWA}' - \left(\min(\text{Amount of IRB deficit of provisions added to revised T1 MRC}, 0) \right) \right\} - \sum_{i=1}^n \left\{ \left(\text{Tier1}_{MRC} \% + \text{capital conservation buffer} \% + G_{SII_s} \text{ surcharge} \% \right) \times \text{'CRR_CRDIV IRB}_{RWA}' - \left(\min(\text{Amount of IRB deficit of provisions added to current T1 MRC}, 0) \right) \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk_based Tier1 MRC'}, \text{'CRR_CRDIV total LR_based Tier1 MRC'} \}}$$

Securitisation

$$\% \Delta T1MRC(Sec.) =$$

$$\frac{\left[\sum_{i=1}^n \left\{ \begin{array}{l} \text{'Final Basel III } Sec_{RWA}' \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_S} \text{surcharge}\%) \end{array} \right\} - \right. \\ \left. \sum_{i=1}^n \left\{ \begin{array}{l} \text{'CRR_CRDIV } Sec_{RWA}' \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_S} \text{surcharge}\%) \end{array} \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk_based Tier1 MRC'}, \\ \text{'CRR_CRDIV total LR_based Tier1 MRC'} \}}$$

CCPs

$$\% \Delta T1MRC(CCP) =$$

$$\frac{\left[\sum_{i=1}^n \left\{ \begin{array}{l} \text{'Final Basel III } CCP_{RWA}' \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_S} \text{surcharge}\%) \end{array} \right\} - \right. \\ \left. \sum_{i=1}^n \left\{ \begin{array}{l} \text{'CRR_CRDIV } CCP_{RWA}' \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_S} \text{surcharge}\%) \end{array} \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk_based Tier1 MRC'}, \\ \text{'CRR_CRDIV total LR_based Tier1 MRC'} \}}$$

9.1.2 Market risk impact

$$\% \Delta T1MRC(MR) =$$

$$\frac{\left[\sum_{i=1}^n \left\{ \begin{array}{l} \text{'Final Basel III } FRTB \text{ capital}' \times 12.5 \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_S} \text{surcharge}\%) \end{array} \right\} - \right. \\ \left. \sum_{i=1}^n \left\{ \begin{array}{l} \text{'CRR_CRDIV market risk capital}' \times 12.5 \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_S} \text{surcharge}\%) \end{array} \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk_based Tier1 MRC'}, \\ \text{'CRR_CRDIV total LR_based Tier1 MRC'} \}}$$

9.1.3 CVA impact

$$\% \Delta T1MRC(CVA) =$$

$$\frac{\left[\sum_{i=1}^n \left\{ \begin{array}{l} \text{'Final Basel III } CVA \text{ capital}' \times 12.5 \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_S} \text{surcharge}\%) \end{array} \right\} - \right. \\ \left. \sum_{i=1}^n \left\{ \begin{array}{l} \text{'CRR_CRDIV } CVA \text{ capital}' \times 12.5 \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_S} \text{surcharge}\%) \end{array} \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk_based Tier1 MRC'}, \\ \text{'CRR_CRDIV total LR_based Tier1 MRC'} \}}$$

9.1.4 Operational risk impact

$$\% \Delta T1MRC(Op risk) =$$

$$\frac{\left[\sum_{i=1}^n \left\{ \begin{array}{l} \text{'Final Basel III operational risk capital'} \times 12.5 \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII}s\text{surcharge}\%) \end{array} \right\} - \sum_{i=1}^n \left\{ \begin{array}{l} \text{'CRR_CRDIV operational risk RWA'} \times \\ (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII}s\text{surcharge}\%) \end{array} \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk_based Tier1 MRC'}, \text{'CRR_CRDIV total LR_based Tier1 MRC'} \}}$$

Small banks calculate the MRC by simply calculating the BIC, which is a proxy for the risk exposure for a certain confidence level. The BIC is calculated in two steps. In the first step, the business indicator (BI) is the sum of three components — the interest, leases and dividends component; the services component; and the financial component — which are based on accounting figures. The second step assigns the BI to one of the three different BI buckets, i.e. bucket 1, 2 or 3, depending on its level. Each bucket has a greater marginal coefficient than the previous one, so large banks, with high BIs, will receive exponential MRC increases. More specifically, the first bucket, for BIs up to EUR 1 billion, has a marginal coefficient of 0.12, the second bucket, for BIs between EUR 1 billion and EUR 30 billion, has a marginal coefficient of 0.15 and the third bucket, for BIs above EUR 30 billion, has a marginal coefficient of 0.18. Thus, the new SA takes into account the fact that during the financial crisis large banks with more complex business models suffered much higher operational risk losses.

Large banks will also have to calculate the LC, as an additional proxy for risk exposure. The Basel III framework necessitates the use of LC for bucket 2 and bucket 3 banks. The proxy value of the LC is determined by multiplying the average annual operational loss of the past 10 years by 15. To calculate the average annual loss, the new framework requires the aggregation of all losses above the EUR 20 000 threshold. All in all, the BIC and LC are proxies for operational risk, but based on different input data, i.e. they are observing the operational risk from different viewpoints. While the BIC relies on stable, but less risk-sensitive, accounting data, the LC relies on risk-sensitive, but volatile, internal loss observations. To balance the risk-sensitivity without excessive capital volatility, the ILM is used to adjust the BIC. The ILM compares the BIC and LC in a way that imposes a capital add-on where the LC is larger than the BIC; otherwise, it allows a capital discount.

The influence of the LC is limited by the dampening features of the logarithm and the exponent of 0.8 in the end-point formula for the calculation of the ILM. Although the calculation of the ILM is easy, thanks to the simple formula applied, it becomes complex because of the difficulty in gathering additional data. To gather comprehensive and sufficient loss data, banks need to implement clear processes to identify all relevant operational risk losses. The additional burden to fulfil these requirements should be limited to the banks that currently apply the basic indicator approach and belong to bucket 2 and bucket 3, as the current framework for AMA and SA banks requires them to have proper loss data collection already in place⁴⁵.

⁴⁵ See Article 320(a) of the CRR and Article 322(3) of the CRR.

The formula for the calculation of ILM is $\ln[\exp(1) - 1 + (LC/BIC)^{0.8}]$

where, the LC is calculated as 15 times the average losses above EUR 20 000 (with national discretion to increase this threshold to EUR 100 000).

BIC = 0.12 x BI for BI ≤ EUR 1 billion, BIC = EUR 120 million + 0.15 × (BI - EUR 1 billion) for EUR 1 billion < BI ≤ EUR 30 billion, and BIC = EUR 4470 million + 0.18 × (BI - EUR 30 billion) for BI > EUR 30 billion

where BI = ILDC average + SC average + FC average 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.

9.1.5 Output floor impact

$$\% \Delta T1MRC(\text{Output Floor}) =$$

$$\frac{\left[\sum_{i=1}^n \max \{0, 'Final Basel III total SA equivalent_{RWA}' \times \text{Output Floor}\% - 'Final Basel III total RWA'\} \right]}{\sum_{i=1}^n \max \{ 'CRR_CRDIV total risk_{based} Tier 1 MRC', 'CRR/CRD IV total LR_based Tier 1 MRC' \}}$$

where

Final Basel III total SA equivalent RWA = the total RWA, assuming that 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;

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

Output Floor % = 72.5%, which, when multiplied by the SA equivalent RWA, provides the output floor level for internal models' RWA.

9.1.6 Leverage ratio impact

$$\% \Delta T1MRC(LR) =$$

$$\frac{\left[\sum_{i=1}^n \max \left\{ \begin{array}{l} 0, \\ ('Final Basel III total LR_{based} T1 MRC' - \\ 'Final Basel III total risk_{based} T1 MRC') \end{array} \right\} - \sum_{i=1}^n \max \left\{ \begin{array}{l} 0, \\ ('CRR_CRDIV total LR_{based} T1 MRC' - \\ 'CRR_CRDIV total risk_{based} T1 MRC') \end{array} \right\} \right]}{\sum_{i=1}^n \max \{ 'CRR_CRDIV total risk_{based} T1 MRC', 'CRR_CRDIV total LR_based T1 MRC' \}}$$

where, *Final Basel III total LR-based T1 MRC* = *Final Basel III total leverage ratio exposure* × (3% + 0.5 × *G-SIIs surcharge*); and,

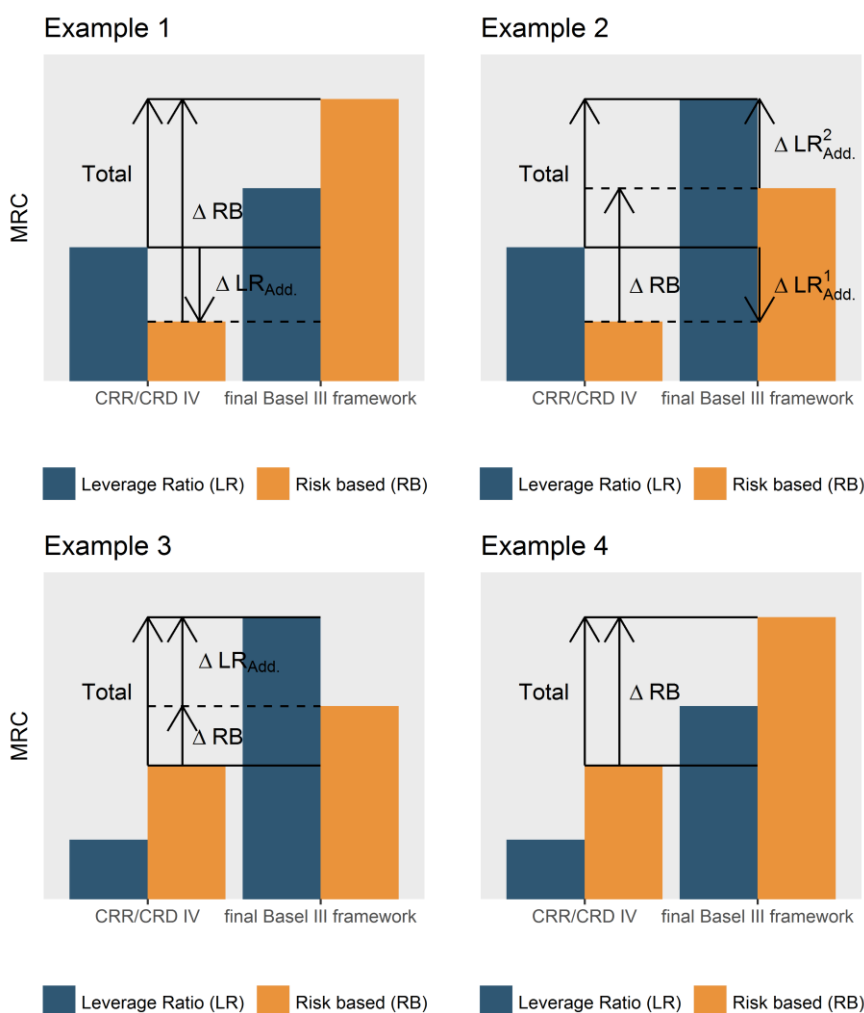
$$CRR\ 2/CRD\ 5\ total\ LR\text{-}based\ T1\ MRC = CRR\ 2/CRD\ 5\ total\ leverage\ ratio\ exposure \times 3\%;$$

The estimation of the total leverage ratio exposure assumes that the temporary deductions due to COVID-19 are added back, while the permanent deductions are not.

n is the number of banks in the sample.

The analysis adopts the BCBS methodology for estimating the leverage ratio impact⁴⁶. This methodology quantifies the impact of the leverage ratio as the change in the LR add-ons between the proposed and current regulatory frameworks, as a metric of the change in the LR’s constraining power in determining the total T1 MRC.

Figure 9: Integration of changes in risk-based and leverage-ratio-based MRC



Source: based on the BIS Basel III monitoring report as of December 2017

⁴⁶ See BCBS (2017), Basel III monitoring report December 2017: Results of the cumulative quantitative impact study.

The leverage ratio impact would be negative (see ΔLR_{Add} in example 1 of Figure 9) if the Tier 1 LR add-on of the full implementation of the final Basel III framework (equal to 0 in example 1 of Figure 9) were lower than the Tier 1 LR add-on of the full implementation of the CRR 2/CRD 5 (positive in example 1 of Figure 9). This particular case indicates that the leverage ratio is less constraining under the final Basel III framework than under the CRR 2/CRD 5 framework.

The leverage ratio impact would be positive (see ΔLR_{Add} in example 3 of Figure 9) if the Tier 1 LR add-on of the full implementation of the final Basel III framework (positive in example 3 of Figure 9) were higher than the Tier 1 LR add-on of the full implementation of the CRR 2/CRD 5 (0 in example 3 of Figure 9). This can be interpreted as the leverage ratio becoming more constraining under the final Basel III framework than under the CRR 2/CRD 5 framework.

The leverage ratio impact would be 0 in cases where either the T1 LR add-on of the CRR 2/CRD 5 and the T1 LR add-on of the final Basel III framework are both 0 (example 4, Figure 9), or the T1 LR add-on remained the same under the CRR 2/CRD 5 and the final Basel III framework (example 2, Figure 9, where $\Delta LR^1_{Add} = \Delta LR^2_{Add}$, then $\Delta LR_{Add} = 0$). Both cases illustrate that the LR is equally constraining under the CRR 2/CRD 5 and the final Basel III frameworks. Figure 9 illustrates all four cases of the relationship between the T1 LR-based MRC and T1 risk-based MRC, under the CRR 2/CRD 5 and final Basel III frameworks.

9.1.7 Capital shortfalls

Table 8 — Part 1 — column ‘Risk-based and LR-based Tier 1’

$$\begin{aligned}
 & \mathbf{T1Shortfall}_{CRR_CRDIV} \\
 & = \\
 & \sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \text{‘Risk_based_Tier1_Shortfall}_{CRR_CRDIV}\text{’} \\ \text{‘LR_based_Tier1_Shortfall}_{CRR_CRDIV}\text{’} \end{array} \right] \right\} \\
 & = \\
 & \sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \max (0, \text{‘Risk_based_Tier1_MRC}_{CRR_CRDIV}\text{’} - \text{‘Actual_Tier1’}), \\ \max (0, \text{‘LR_based_Tier1_MRC}_{CRR_CRDIV}\text{’} - \text{‘Actual_Tier1’}) \end{array} \right] \right\}
 \end{aligned}$$

Table 8 — Part 2 — column ‘Risk-based and LR-based Tier 1’

$$\begin{aligned}
 & \mathbf{T1Shortfall}_{Basel_III} \\
 & = \\
 & \sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \text{‘Risk_based_Tier1_Shortfall}_{Basel_III}\text{’} \\ \text{‘LR_based_Tier1_Shortfall}_{Basel_III}\text{’} \end{array} \right] \right\} \\
 & = \\
 & \sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \max (0, \text{‘Risk_based_Tier1_MRC}_{Basel_III}\text{’} - \text{‘Actual_Tier1’}), \\ \max (0, \text{‘LR_based_Tier1_MRC}_{Basel_III}\text{’} - \text{‘Actual_Tier1’}) \end{array} \right] \right\}
 \end{aligned}$$

Table 2 — column ‘Capital shortfalls — CRR 2/CRD 5 (fully phased-in) — ‘Additional LR Tier 1’

$$\begin{aligned}
 & \mathbf{Add. LR}_{T1Shortfall_{CRR_{CRDIV}}} \\
 & = \\
 & \sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \max (0, 'Risk_based_Tier1_MRC_{CRR_CRDIV}' - 'Actual_Tier1'), \\ \max (0, 'LR_based_Tier1_MRC_{CRR_CRDIV}' - 'Actual_Tier1') \end{array} \right] \right\} \\
 & - \sum_{i=1}^n \left\{ \max [\max (0, 'Risk_based_Tier1_MRC_{CRR_CRDIV}' - 'Actual_Tier1')] \right\}
 \end{aligned}$$

Table 2 – column ‘Capital shortfalls – Basel III framework (2027)’ – ‘Additional LR Tier 1’

$$\begin{aligned}
 & \mathbf{Add. LR}_{T1Shortfall_{BaselIII}} \\
 & = \\
 & \sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \max (0, 'Risk_based_Tier1_MRC_{Basel_III}' - 'Actual_Tier1'), \\ \max (0, 'LR_based_Tier1_MRC_{Basel_III}' - 'Actual_Tier1') \end{array} \right] \right\} \\
 & - \sum_{i=1}^n \left\{ \max [\max (0, 'Risk_based_Tier1_MRC_{Basel_III}' - 'Actual_Tier1')] \right\}
 \end{aligned}$$



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