



**BASEL III MONITORING EXERCISE –
RESULTS BASED ON DATA AS OF 31 December 2021**

September 2022

EBA/REP/2022/21

EBA

EUROPEAN
BANKING
AUTHORITY

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	12
1.2.1 Minimum required capital and differences with respect to methodology used by the BCBS	14
1.2.2 Description of impact metrics	14
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-21 only)	17
2.2 Evolution of the cumulative impact analysis of the final Basel III reform (Dec-19 to Dec-21)	19
2.3 Capital ratios and capital shortfalls	19
2.4 Interactions between risk-based and leverage ratio capital requirements	24
3. Credit risk	26
4. FRTB	28
5. Operational risk	31
6. Output floor	36
7. Revised leverage ratio	37
8. Interaction between output floor and leverage ratio requirements	39
9. Net stable funding ratio	42
10. Technical Annex on the impact assessment methodology	44
10.1 Methodology for the estimation of the impact per category	44
10.1.1 Credit risk impact	44
10.1.2 Market risk impact	45
10.1.3 CVA impact	45
10.1.4 Operational risk impact	46
10.1.5 Output floor impact	47
10.1.6 Leverage ratio impact	48
10.1.7 Capital shortfalls	49

List of figures

Figure 1: Distribution of changes in total T1 MRC.....	17
Figure 2: Distribution of capital ratios under CRR/CRD IV versus fully phased-in final Basel III framework.....	20
Figure 3: Evolution of the composition of Tier 1 MRC by risk category under full implementation of the revised Basel III framework over time (from Dec-19 to Dec-21), for Group 1 and Group 2 respectively	22
Figure 4: The mechanics of the calculation of actual leverage ratio MRC impact, Tier 1 MRC (EUR billion).....	24
Figure 5: Changes in Tier 1 MRC for credit risk (SA and IRB) exposures due to the final Basel III standards.....	26
Figure 6: Change of market risk capital requirements after FRTB implementation, without floor, broken down by approach and bank group (in % of market risk MRC)	28
Figure 7: Contribution to the total market risk RWAs by each calculation method before and after implementing FRTB framework.....	29
Figure 8: Distribution of changes in T1 MRC assigned to operational risk only (in % of current operational risk MRC).....	33
Figure 9: Comparison of fully phased-in EU LR and final Basel III LR.....	38
Figure 10: Distribution of NSFR by bank group (NSFR/100, %)	43
Figure 11: Integration of changes in risk-based and leverage-ratio-based MRC	49

List of tables

Table 1: Change in total T1 MRC, as a percentage of the overall current Tier 1 MRC, due to the full implementation of Basel III (2028) (weighted averages, in %)	8
Table 2: Shortfall of current available capital, due to the full implementation of CRR/CRD and Basel III (2028) (EUR billion)	9
Table 3: Capital ratios (reduced estimation bias): fully phased-in CRR/CRD and final Basel III framework (2028) (weighed 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 2019 to 2021 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/CRD IV (upper part) and final Basel III (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/CRD IV)	31
Table 10: Capital impact attributed to certain types of AMA banks	32
Table 11: Comparison of operational risk impact on the current T1 MRC following the application of baseline Basel III full implementation, i.e. ILM with EUR 20 000 loss materiality threshold, with the application of three discretions and one variation of the baseline (in % of total Tier 1 MRC)	34
Table 12: Cumulative output floor impact during the implementation phase (% of the total CRR/CRD IV Tier 1 MRC)	36
Table 13: 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-SII surcharge) of the LR T1 MRC (%)	37
Table 14: Number of banks constrained by the risk-based capital requirement, with and without the implementation of the output floor	40
Table 15: 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	40
Table 16: NSFR and NSFR shortfall in stable funding	42

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 first 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 Basel III implementation² on this representative sample of EU/EEA banks. 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 framework also introduces an aggregate output floor. In this report, 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 results separate the impact of the reform on credit risk into two major approaches, i.e. the standardised approach and the internal ratings-based approach. The results also quantify the impact of the latest version of the market risk standards (the fundamental review of the trading book, FRTB) as set out by the Basel Committee for Banking Supervision in January 2019³, 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.

The report also demonstrates the intertemporal evolution of Tier 1 minimum required capital impact. The evolution is presented for the three most recent reference dates (December 2019 – December 2021) for which the EBA has collected data with comparable breakdown of risk categories (e.g. credit risk split into the Standardised approach and the IRB approach). For this part of the exercise, a sample of banks which have been consistently submitting data over the same period is used (henceforth 'constant sample').

The cumulative impact analysis of the report uses a sample of 160 banks, split between 58 Group 1 banks and 102 Group 2 banks^{4 5}. In comparison to the last voluntary exercise (as of December 2020), the sample has increased by 61 banks (more than 60%). Among the entire sample of 160 banks, 155 banks entered the sample following the general provisions of Article 4 of the EBA Decision (EBA/DC/2021/373), while five additional banks entered the sample according to the provisions of

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

² The full Basel III implementation is implemented to ensure comparability with the report published by the Basel Committee on Banking Supervision and therefore assumes that the pure Basel III framework is implemented. In EU, the Basel III implementation would follow the Capital Requirements Regulation and Directive and the results will therefore not be directly comparable.

³ BCBS (2019), Explanatory note on the minimum capital for market risk

⁴ 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.

⁵ Only the banks that submitted data of adequate quality for at least one of the credit risk components (IRB approach or SA), the operational risk and the 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.

Article 8(3).

The baseline impact assessment methodology quantifies the difference in the Pillar 1 minimum required capital between the current EU implementation of the Basel standards (CRR/CRD IV) and the full Basel III implementation. The weighted average increase in total T1 MRC after a full implementation of the reform is +15.0% across all 160 banks. For the sub-sample of large and internationally active banks (Group 1) the impact is +16.0%. For Group 2 banks the impact amounts to +9.6% (see Table 1). The impact of the individual risk-based reforms across the full sample is +18.2%. 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 with +6.3% and +4.4%, respectively, to the aggregate results. Looking at the Group 1 banks separately, the output floor and operational risk are the two main drivers of impact, accounting for +7.1% and +4.2%, respectively. Within the Group 1 banks, the global systemically important institutions (G-SIIs) also have the output floor and operational risk as the key components of the aggregate impact, with contributions of +6.5% and +6.3%, respectively. The key driver of the aggregate impact on Group 2 banks is credit risk, with an impact of +8.8%, followed by the output floor with an impact of +1.8%.

As regards the market risk impact, for the first time since 2019 the present report does not discriminate between a “reduced bias estimation” and a “conservative estimation” in the presentation of the results in Table 1, Table 2, Table 5, and

Table 6. Instead, a single point estimation is provided that adjusts the bias that was identified in the original data submissions on market risk by several banks, among which six G-SIIs.⁶ On the contrary, the two previous Basel III monitoring reports (December 2019 and December 2020) provided two separate figures to illustrate the bias created by overly conservative data submissions. That the original bias in the submissions of market risk data results from a sequence of conservative assumptions on the use of internal models in the new FRTB framework. More specifically, a subset of G-SIIs choose to treat all trading book positions in category “Equity Investment in Funds”, where modelling is no longer allowed according to the look-through requirements, by applying the most conservative standardised approach available. The use by these banks of this so-called “other bucket” treatment means that the equity risk impact of the FRTB will be subject to the highest applicable risk weights. By choosing this approach, these banks ignore other possible treatments, such as the index treatment or the mandate-based approach,⁷ which are used by most institutions in the non-EU peer group.

In the past two issues of this report, the EBA used to set the market risk impact to zero for the banks that reported overly conservative data on the EIF. Following the same rationale, but without entirely eliminating the impact arising from market risk for the affected banks, the EBA and the BCBS have decided to switch to a methodology that reduces the impact of the EIF for banks that report overly conservative figures. This approach results in a single figure for the market risk

⁶ This is apparent in the market risk impact for G-SIIs, where the original impact of 4.2% was moderately reduced to 3.5% to cope with the overly conservative data submissions from six out of eight G-SIIs.

⁷ 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

impact for all the banks that overstated the part of the impact assigned to the treatment of EIF.⁸

After applying the EIF adjustment, the estimated market risk impact is 1.8% 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 (+3.5) whereas Group 2 banks show a small impact of +0.5%.

Finally, and in line with the previous years, for the full sample of banks the cumulative risk-based impact is partially offset by the negative (-3.3%) leverage ratio impact. This offset reflects the fact that some banks, which are constrained by the leverage ratio in the current framework, will be less constrained by the leverage ratio in the revised framework. 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, 52 banks are constrained by the leverage ratio requirement under the CRR II /CRD V, while under the final Basel III framework only 26 banks will remain constrained.⁹ For the group of G-SIIs, the leverage ratio requirement provides almost no offset because of the inclusion of the G-SII surcharge in the calculation of the final Basel III leverage ratio requirement for this group of institutions. For the G-SIIs, the LR-based requirement creates only a minor negative contribution (-0.2%) to the Tier 1 MRC.

Table 1: Change in total T1 MRC, as a percentage of the overall current Tier 1 MRC, due to the full implementation of Basel III (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 ¹⁰								
All banks	2.6	1.8	0.0	0.0	1.8	2.6	3.7	6.3	-0.6	18.2	-3.3	15.0
Group 1	1.8	1.7	0.0	0.0	2.0	2.9	4.2	7.1	-0.7	19.0	-3.0	16.0
G-SIIs	2.0	3.4	0.0	0.0	3.5	3.4	6.3	6.5	-0.2	24.9	-0.2	24.7
O-SIIs	1.5	0.1	0.0	0.0	0.6	2.3	2.1	7.8	-1.2	13.1	-5.9	7.2
Other	2.8	-0.7	0.0	0.0	-0.4	3.4	1.2	6.7	-0.4	12.6	-4.7	7.8
Group 2	6.8	2.0	0.0	0.0	0.5	1.3	1.5	1.8	0.0	14.1	-4.6	9.6
O-SIIs	7.6	0.7	0.1	0.0	0.6	1.9	2.0	1.0	-0.1	13.8	-3.8	10.0
Other	5.7	4.2	0.0	0.0	0.5	0.4	0.7	2.9	0.1	14.5	-5.7	8.8
Universal	2.4	2.3	0.0	0.0	1.9	2.7	4.2	6.1	-0.6	19.2	-3.0	16.2
Retail-oriented	6.6	-0.6	0.0	0.0	0.0	0.4	0.7	3.2	0.1	10.4	-5.3	5.1
Corporate-oriented and other	2.0	-2.4	0.0	0.0	1.4	2.9	0.8	9.3	-0.4	13.5	-5.2	8.3

Source: EBA Quantitative Impact Study (QIS) data (December 2021), sample: 160 banks

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 10.1.6) 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 Rounded to the first decimal point.

Based on the consistent sample of 86 banks that have been consistently submitting data from Dec-19 to Dec-21 and applying, where possible, the latest methodology (as of Dec-21), the results show that the estimated aggregate impact on all banks in Dec-21 is higher (16.6%) than the estimated impact in December 2020 and in December 2019 (14.5% and 17.0% respectively).

Full implementation of Basel III will create a Tier 1 capital shortfall for the entire sample of banks and in particular for Group 2 banks (Table 2). Note that all capital shortfalls in this report are computed from Pillar 1 capital requirements only, with the exception of CCB and G-SII surcharge. Keeping this in mind, the total shortfall due to the implementation of the final Basel III minimum common equity tier 1 (CET1) capital is EUR 0.5 billion, which is entirely attributed to Group 2 banks. The Tier 1 capital shortfall due to the risk-based capital requirements is approximately EUR 0.8 billion, again originating in full from Group 2 banks. The implementation of the revised LR framework creates an additional Tier 1 shortfall of EUR 0.4 billion (on top of the risk-based capital requirements).

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

Bank group	Capital shortfalls — CRR/CRD (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	0.5	0.8	0.4
Group 1	0.0	0.0	0.0	0.0	0.0	0.4
Of which: G-SIIs	0.0	0.0	0.0	0.0	0.0	0.4
Group 2	0.0	0.0	0.0	0.5	0.8	0.0

Source: EBA QIS data (December 2021), sample: 160 banks

When considering the full sample of banks, the risk-based CET1 ratio drops by 250 basis points as a result of the revised Basel III framework. The broader measures Tier 1 and Total Capital Ratios decline by 270 and 310 basis points, respectively, following the implementation of the reform (Table 3). Again for the full sample, the leverage ratio impact does not change between the revised Basel III framework and the current (CRR II/CRD V) (at 5.6%). These results do not meaningfully change when considering Group 1 and Group 2 banks separately.

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

Bank group	Capital ratios — CRR/CRD (fully phased in)				Capital ratios — Basel III framework (2028)			
	CET1	Tier 1	Total capital	LR	CET1	Tier 1	Total capital	LR
All banks	15.6	16.8	19.3	5.6	13.1	14.1	16.2	5.6
Group 1	15.4	16.6	19.1	5.4	12.8	13.8	16.0	5.4
Of which: G-SIIs	14.3	15.6	18.0	4.8	11.4	12.4	14.3	4.8
Group 2	16.8	17.9	20.0	6.5	14.6	15.6	17.3	6.4

Source: EBA QIS data (December 2021), sample: 160 banks

This Report also includes an Annex titled “Analysis of EU specific adjustments”, which provides an assessment of the impact of the Basel III framework when including additional implementation features that are either part of the current CRR2 / CRD4 framework or of the

European Commission’s (EC) CRR3 Proposal¹¹. The purpose of this additional analysis is to highlight the impact of the implementation of these adjustments relative to the pure Basel III reform. The Annex includes a comparison with the results shown in the main text of this report, highlighting the impact of each proposed adjustment. 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. Finally, the Annex also makes a comparison to the EU Commission impact assessment results that were published alongside the CRR 3 proposal.

Net stable funding ratio (NSFR) impact

In addition to the estimation of the impact of the implementation of the Basel III reforms, as finalised in December 2017, the current monitoring exercise report also assesses the impact of implementing the net stable funding ratio (NSFR) framework. The results show that in December 2021, EU banks required additional stable funding of EUR 0.1 billion to fulfil the minimum NSFR requirement of 100% (Table 16).

¹¹ Link to the legislative proposal <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0664>

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. The assessment of the final package includes the revisions to the internal ratings-based (IRB) approach¹², the standardised approach to credit risk (SA)¹³ and the standardised approach to operational risk¹⁴, as well as the revisions to the Basel III leverage ratio framework¹⁵, securitisation¹⁶ and counterparty credit risk frameworks¹⁶. In addition, it includes the impact of the fundamental review of the trading book (FRTB)¹⁷ agreed in 2019 and the credit valuation adjustment (CVA), as well as changes resulting from the revised securitisation framework¹⁸.

1.1 Data and sampling

The data submitted for the cumulative impact assessment, as of December 2021, covers a total of 163 banks from all European Economic Area countries, including 58 Group 1 and 105 Group 2 banks. Only banks 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. Based on these criteria and following data cleansing, 160 banks were finally included in the cumulative results of the point-in-time analysis for December 2021: 58 Group 1 banks and 102 Group 2 banks (see Table 4).

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 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.

¹² 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*.

¹³ 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*.

¹⁴ 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*.

¹⁵ See BCBS (2016), *Revisions to the Basel III leverage ratio framework: Consultative document*.

¹⁶ See BCBS (2019), *Calculation of RWA for credit risk (CRE)*: https://www.bis.org/basel_framework/standard/CRE.htm

¹⁷ See BCBS (2016), *Minimum capital requirements for market risk: Standards*; BCBS (2019), *Explanatory note on the minimum capital for market risk*.

¹⁸ 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)	NSFR (8)
AT	10	10	5	8	10	10	2
BE	6	6	2	4	6	6	1
BG	3	3	0	1	3	3	2
CY	3	3	0	1	3	3	0
CZ	1	1	0	1	1	1	1
DE	38	39	14	29	39	39	37
DK	7	7	7	5	7	7	2
EE	2	2	1	2	2	2	0
ES	6	6	3	6	6	6	5
FI	3	3	1	3	3	3	3
FR	7	8	6	5	8	8	7
GR	4	4	4	4	4	4	4
HR	1	1	1	0	1	1	1
HU	2	2	2	1	2	2	2
IE	9	9	8	7	9	9	5
IS	3	3	2	2	3	3	2
IT	8	8	6	8	9	9	3
LI	3	3	1	3	3	3	0
LT	1	1	0	0	1	1	1
LU	4	4	3	4	4	4	4
LV	2	2	2	2	2	2	0
MT	4	4	1	2	4	4	2
NL	8	8	3	7	8	8	6
NO	4	4	1	3	4	4	4
PL	5	5	3	4	5	5	3
PT	5	5	4	5	5	5	4
RO	2	2	1	2	2	2	2
SE	6	6	3	6	6	6	6
SI	2	2	2	2	2	2	2
SK	1	1	0	1	1	1	1
All banks	160	162	86	128	163	163	112
Group 1	58	58	47	50	58	58	45
Of which: G-SIIs	8	8	7	8	8	8	7
Group 2	102	104	39	78	105	105	67

Source: EBA QIS data (December 2021)

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)¹⁹, 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 T1 MRC includes both risk-based capital requirements and leverage ratio capital requirement.** 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 requirement, under the Capital Requirements Regulation (CRR)/Capital Requirements Directive (CRD) IV 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 ratio of the difference between the Basel III and CRR/CRD IV Pillar 1 Tier 1 MRC to the CRR/CRD IV 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 2021 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-21 reference date only) consists of 160 while the sample of the time series analysis (Dec-19, Dec-20 and Dec-21) consists of 86 banks, to allow comparisons over time of 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 allow.**

¹⁹ CCB and G-SII buffers are assumed to be part of Pillar 1 requirements given that they are universally applicable and quantifiable.

- The analysis apply 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 EIF from “other market risk impact”, and recognises only 20% of the impact assigned to the former²⁰.

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 (CRR2)/Capital Requirements Directive (CRD) V 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 (CET1, T1, total capital) vis-à-vis the CRR2/CRD V 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’²¹ 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-SIIs surcharge²², where applicable²³.

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:

²⁰ For further details, please see page 7 and section 4 (FRTB)

²¹ 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.

²² 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.

²³ 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>

- ‘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 to 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 not exercise any of the discretions allowed under the revised 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 requirement 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 II/CRD V 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 II / CRD V LR add-on.

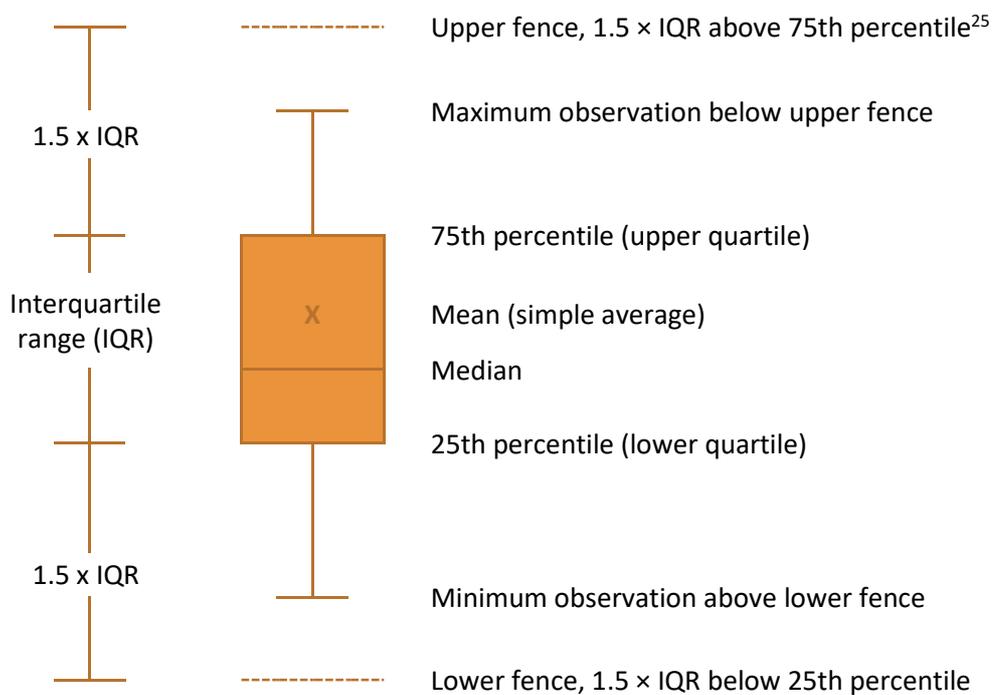
In addition, the impact of the final Basel III framework is assessed in terms of ‘capital shortfall’ of the actual CET1, T1 and total capital, in relation to the MRC for CET1, T1, and total capital of the new framework, as follows:

- ‘*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.²⁴

²⁴ In the Basel III Call for Advice report, all the requirements are taken into account and the shortfalls are consequently considerably higher.

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:



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

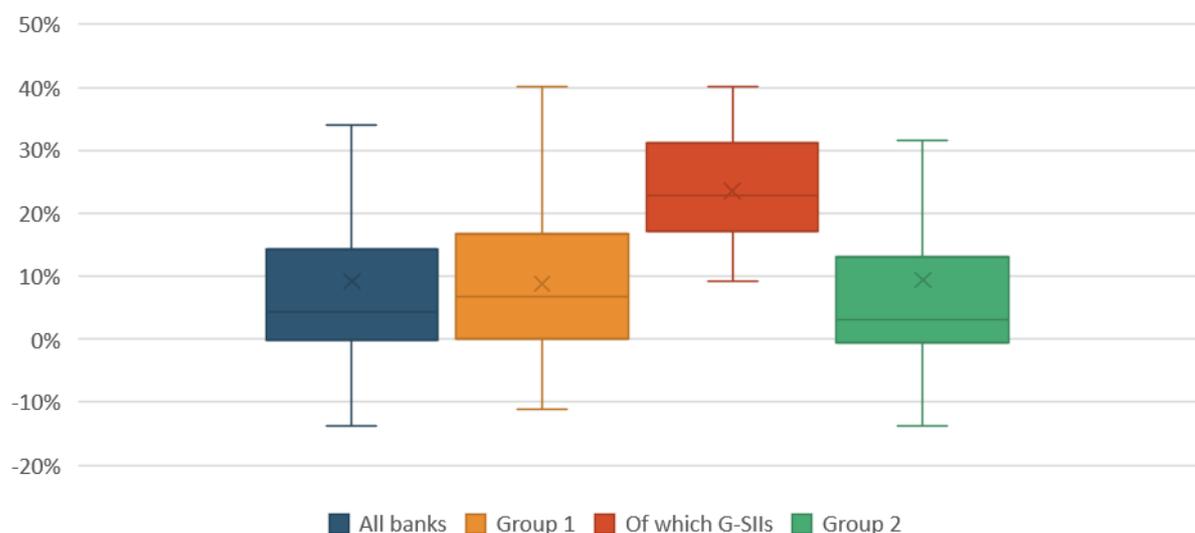
2. Regulatory capital ratios, capital shortfalls and impact on T1 MRC

This section presents several metrics to assess the impact of the full implementation of the Basel III reform package. These metrics are the level of risk-based and LR-based capital, the capital shortfalls (section 2.1), the impact per risk category (section 2.2) and the interaction between the output floor, applied to the risk-based metrics, and the new leverage ratio framework (section 2.3).

2.1 Cumulative impact analysis of the final Basel III reform: point-in-time analysis (Dec-21 only)

The analysis in the present section focuses on the impact of the Basel III package on the fully phased-in CRR2/CRD V 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 2021), sample: 160 banks

Figure 1: Distribution of changes in total T1 MRC 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 and Group 2 banks exhibit median values consistently lower than their respective averages. The dispersion of changes in T1 MRC, measured as the interquartile range, is wider for Group 1 banks than for all other groups.

The weighted average increase in T1 MRC, after including the capital conservation buffer (CCB) and G-SIIs surcharge, is 15.0% across all 160 banks in the sample, 16.0% for Group 1 banks and 9.6% 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 19.0% increase in the risk-based components, mainly driven by the 7.1% increase due to output floor implementation, while the new leverage ratio requirement offsets the risk-based T1 MRC by -3.0%. This offset reflects the fact that the revised Basel III LR becomes less constraining. For the G-SIIs, the LR requirement does not significantly offset the risk-based MRC, mainly because of the introduction of the G-SIIs surcharge in the estimation of the LR requirement.

For Group 2 banks, the overall 9.6% increase in T1 MRC is driven by the 14.1% increase in the risk-based measure, mainly driven by an increase of 8.8% due to the credit risk revisions and an increase of 1.8% due to the output floor implementation. This increase is offset by a -4.6% reduction in the leverage ratio impact (see Annex, section 10.1.6 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	1.8	0.0	0.0	1.8	2.6	3.7	6.3	-0.6	18.2	-3.3	15.0
Group 1	1.8	1.7	0.0	0.0	2.0	2.9	4.2	7.1	-0.7	19.0	-3.0	16.0
G-SIIs	2.0	3.4	0.0	0.0	3.5	3.4	6.3	6.5	-0.2	24.9	-0.2	24.7
O-SIIs	1.5	0.1	0.0	0.0	0.6	2.3	2.1	7.8	-1.2	13.1	-5.9	7.2
Other	2.8	-0.7	0.0	0.0	-0.4	3.4	1.2	6.7	-0.4	12.6	-4.7	7.8
Group 2	6.8	2.0	0.0	0.0	0.5	1.3	1.5	1.8	0.0	14.1	-4.6	9.6
O-SIIs	7.6	0.7	0.1	0.0	0.6	1.9	2.0	1.0	-0.1	13.8	-3.8	10.0
Other	5.7	4.2	0.0	0.0	0.5	0.4	0.7	2.9	0.1	14.5	-5.7	8.8
Universal	2.4	2.3	0.0	0.0	1.9	2.7	4.2	6.1	-0.6	19.2	-3.0	16.2
Retail-oriented	6.6	-0.6	0.0	0.0	0.0	0.4	0.7	3.2	0.1	10.4	-5.3	5.1
Corporate-oriented	2.0	-2.4	0.0	0.0	1.4	2.9	0.8	9.3	-0.4	13.5	-5.2	8.3

Source: EBA QIS data (December 2021), sample: 160 banks

When looking at the entire sample, the final Basel III CVA risk capital charge contributes with 2.6% in the total impact when compared to the CRR/CRD IV framework. The significant CVA impact is primarily attributed to changes in the scope of CVA risk capital charge, but also to the changes in the approaches to calculate CVA capital requirements (i.e. removal of the internal model approach and introduction of the new standardised approaches). The changes in the scope of the CVA risk capital charge are mainly the result of 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 of the final Basel III reform (Dec-19 to Dec-21)

Based on the constant sample of banks (86 banks), i.e. those which have been consistently submitting data from Dec-19 to Dec-21, and after applying the latest methodology (Dec-21) for assessing the impact of the Basel III reforms,

Table 6 shows the variations in the total Tier 1 MRC. It is noteworthy that the exercise presents the results for market risk based on the January 2019 FRTB framework. The increase in the market risk impact in December 2021 (+2.3%) is attributed to the higher impact originally reported by G-SIIs (4.2% in December 2021 vs 1.5% in December 2020). The methodology for quantifying the market risk impact for December 2019 and December 2020 includes the retroactive implementation of the adjustment for overly conservative reporting of EIF positions. The total credit risk impact dropped in relation to December 2020 by 0.7% (5.3% to 4.7%). The output floor impact remains fairly stable over the last three years.

Table 6: Changes in T1 MRC due to the implementation of the final Basel III framework (2028) (weighted averages, in %), from 2019 to 2021 for a constant sample of banks

Reference date	Credit risk	Market risk	CVA	OpRisk	Output floor	Other Pillar 1	Total risk-based	Revised LR ²⁶	Total
31-Dec-19	5.2%	2.1%	3.1%	3.8%	6.6%	-0.3%	20.4%	-3.4%	17.0%
31-Dec-20	5.3%	1.4%	2.2%	3.8%	6.8%	-0.2%	19.4%	-4.8%	14.5%
31-Dec-21	4.8%	2.3%	2.4%	4.2%	6.7%	-0.6%	19.9%	-3.3%	16.6%

Source: EBA QIS data (December 2021), sample: 86 banks

2.3 Capital ratios and capital 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

²⁶ In December 2019 and December 2020, both temporary exclusions, due to COVID-19, and permanent exclusions, attributed to the general LR framework, were added back for the estimation of the leverage ratio exposure measure, as there was no discrimination of the above components in the Basel III monitoring exercise reporting. In December 2021, only temporary exclusions are added back for the estimation of current and revised framework. This results to an underestimation of the total impact for December 2019 and December 2020, which follows the overestimation of the counterbalancing effect of the LR for the same reference dates.

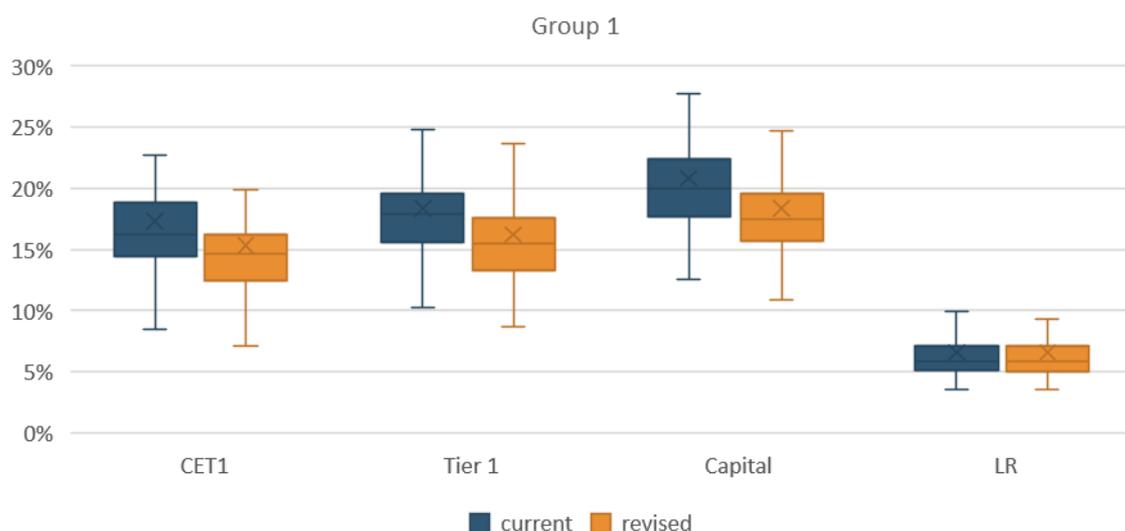
unchanged from CRR/CRD IV and that the impact on the leverage ratio is therefore entirely attributed to changes in the leverage ratio exposures.

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

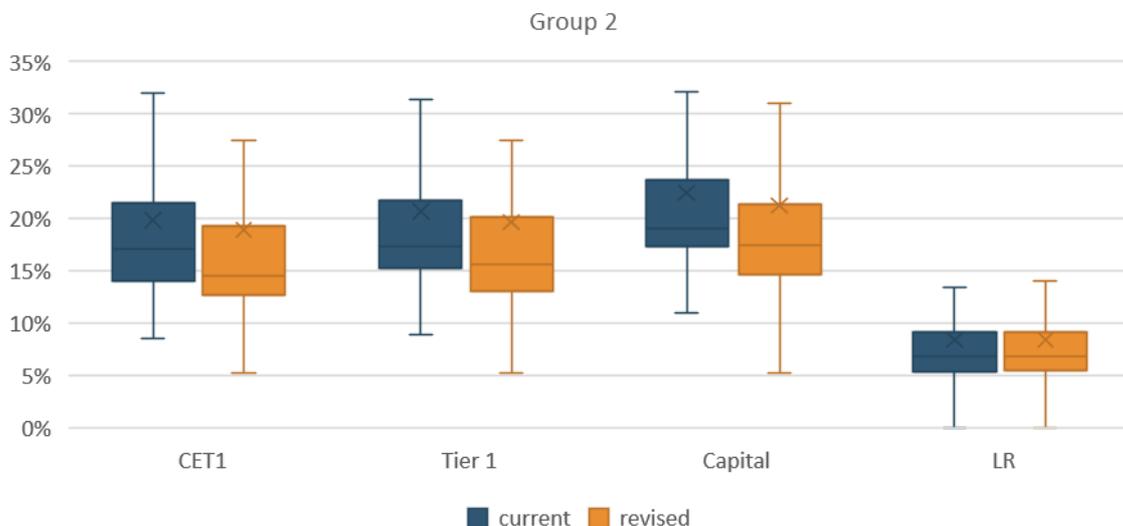
Bank group	CET1			Tier 1			Total capital			LR	
	CRR/CRD IV	Transitional Basel III (2023) ²⁷	Final Basel III (2028)	CRR/CRD IV	Transitional Basel III (2023)	Final Basel III (2028)	CRR/CRD IV	Transitional Basel III (2023)	Final Basel III (2028)	CRR II/CRD V	Final Basel III (2028)
All banks	15.6	13.9	13.1	16.8	15.0	14.1	19.3	17.1	16.2	5.6	5.6
Group 1	15.4	13.7	12.8	16.6	14.8	13.8	19.1	17.1	16.0	5.4	5.4
Of which: G-SIIs	14.3	12.1	11.4	15.6	13.1	12.4	18.0	15.1	14.3	4.8	4.8
Group 2	16.8	14.9	14.6	17.9	15.8	15.6	20.0	17.6	17.3	6.5	6.4

Source: EBA QIS data (December 2021), sample: 160 banks

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



²⁷ 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.



Source: EBA QIS data (December 2021), sample: 160 banks; Note: the mean value ('X') is the simple average.

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 almost 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 2021 with the fully implemented Basel III MRC, after taking into account the CCB and G-SIIs surcharge, where applicable²⁸. The capital shortfalls under the current fully phased-in CRR/CRD IV are negligible and could be attributed to inaccuracies in the submitted data.

The combined²⁹ Tier 1 capital shortfall that emerges under the full implementation of the Basel III is EUR 1.2 billion which is mainly attributed to Group 2 banks (Table 8).

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

Full implementation of CRR/CRD IV			
Bank group	CET1	Tier 1	Total capital

²⁸ This metric takes into account the deficit of capital on an individual basis without it being offset by the surpluses of other banks.

²⁹ Assuming joint implementation of the risk-based and leverage ratio requirements.

Full implementation of CRR/CRD IV

		Risk-based ³⁰	Stand-alone LR-based	Risk-based and LR-based Tier 1 ³¹	Risk-based ³²	Risk-based total capital and LR-based Tier 1 ³³
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

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	0.5	0.8	0.4	1.2	1.3	1.7
Group 1	0.0	0.0	0.4	0.4	0.0	0.4
Of which: G-SIIs	0.0	0.0	0.4	0.4	0.0	0.4
Group 2	0.5	0.8	0.0	0.8	1.3	1.4

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

Source: EBA QIS data (December 2021), sample 160 banks

The final Basel III revisions to the risk-based capital requirements result in a CET1 capital shortfall of EUR 0.5 billion. For Tier 1 risk-based requirements, this shortfall almost doubles to EUR 0.8 billion. The stand-alone LR-based Tier 1 MRC is EUR 0.4 billion, which coincides with the marginal contribution of the LR-based requirement to the combined **Tier 1 capital shortfall**.

2.3.3 Risk category participation in the risk-based Tier 1 MRC over time

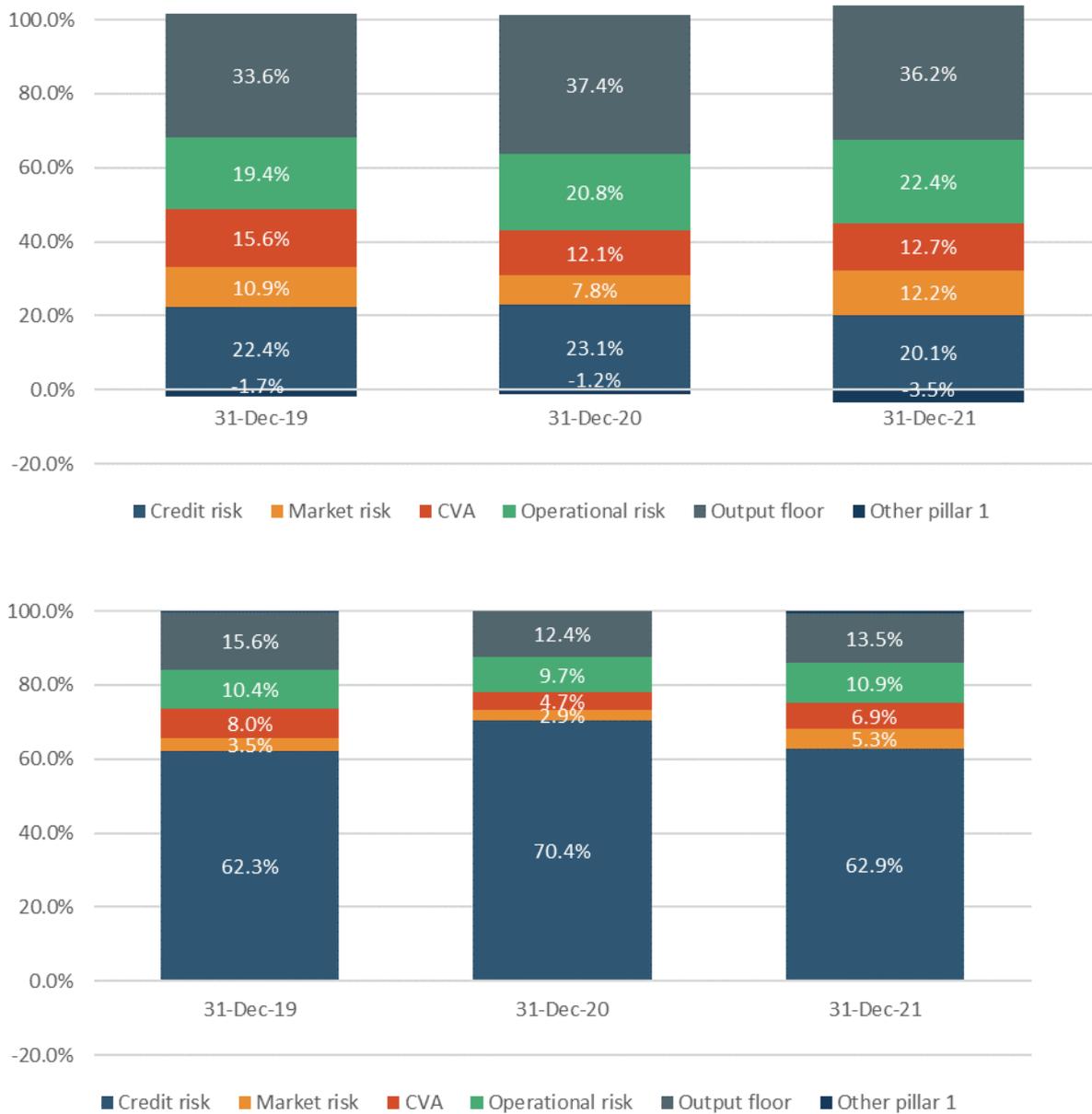
Figure 3: Evolution of the composition of Tier 1 MRC by risk category under full implementation of the revised Basel III framework over time (from Dec-19 to Dec-21), for Group 1 and Group 2 respectively

³⁰ 8.5% (= minimum Tier 1 (6%) + capital conservation buffer (2.5%)).

³¹ The results presented in this column are estimated as follows: $\sum \max(LR_based_MRC - Risk_based_MRC, 0)$.

³² Assuming compliance with the risk-based capital ratio requirements only.

³³ Assuming compliance with both the risk-based capital ratio and leverage ratio requirements.



Source: EBA QIS data (December 2021), constant sample: 86 banks

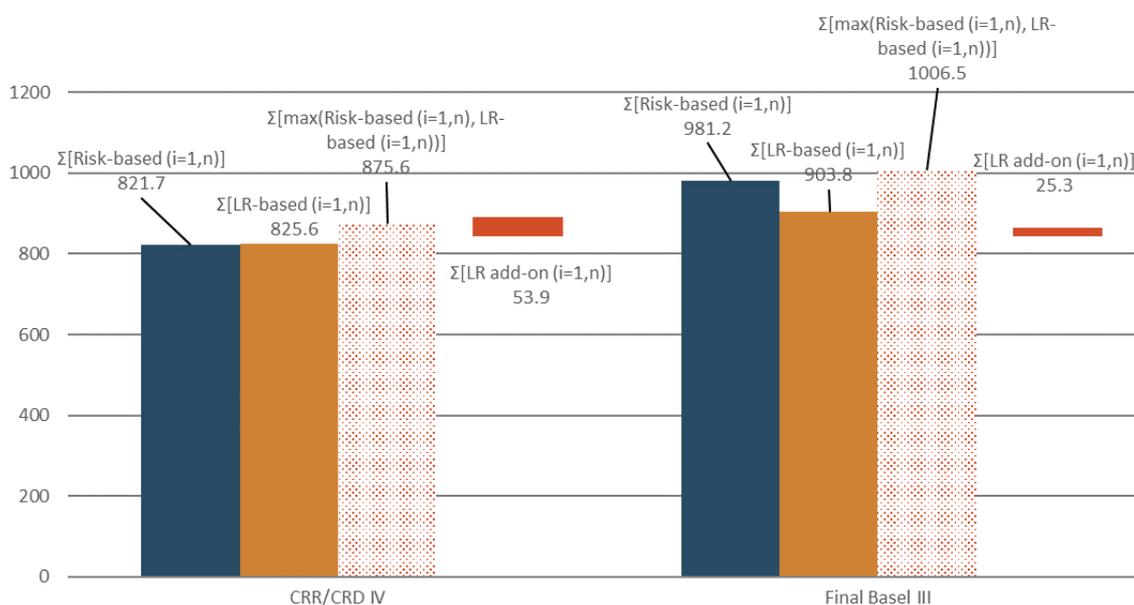
The full implementation of the Basel III reforms implies an increase in the minimum required capital across all risk categories of the risk-based Tier 1 MRC. However, compared to current EU implementation of Basel III package (CRR II / CRD V), the implementation of the output floor changes the relative contributions of all other factors. The contribution of the output floor, for Group 1 banks in December 2021, decreases in relation to the December 2020 exercise, while the output floor contribution for Group 2 banks increased over the same period. Figure 3 exhibits the composition of MRC by risk category from Dec-19 to Dec-21.

2.4 Interactions between risk-based and leverage ratio capital requirements

This section focuses on analysing whether the Basel III framework renders the leverage ratio requirements more or less constraining relative to the CRR/CRD IV 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 4 presents the mechanics for the estimation of the leverage ratio impact. Details can be found in the Annex (section 10.1.6).

The aggregate Tier 1 MRC, consisting of the combined risk-based and LR-based requirements, increases from EUR 875.6 billion under CRR/CRD IV to EUR 1006.5 billion under the final Basel III (an increase by 15.0% — see Table 1). The stand-alone risk-based MRC for all banks under the CRR/CRD IV is EUR 821.7 billion, while the stand-alone LR-based MRC is EUR 825.6 billion. The respective values under the final Basel III framework are EUR 981.2 billion and EUR 903.8 billion. The total leverage ratio requirement add-on, estimated at the individual bank level, decreases from EUR 53.9 billion under CRR/CRD IV to EUR 25.3 billion under the final Basel III framework.

Figure 4: The mechanics of the calculation of actual leverage ratio MRC impact, Tier 1 MRC (EUR billion)



Source: EBA QIS data (December 2021), sample 160 banks

$\Sigma[\text{Risk-based } (i = 1, n)]$, the aggregate risk-based Tier 1 MRC;
 $\Sigma[\text{LR-based } (i = 1, n)]$, the aggregate leverage-ratio-based Tier 1 MRC;
 $\Sigma[\text{max}(\text{Risk-based } (i = 1, n), \text{LR-based } (i = 1, n))]$, the aggregate total Tier 1 MRC, which ensures compliance, at individual bank level, with both risk-based and leverage ratio requirements;
 $\Sigma[\text{LR add-on } (i = 1, n)]$, 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

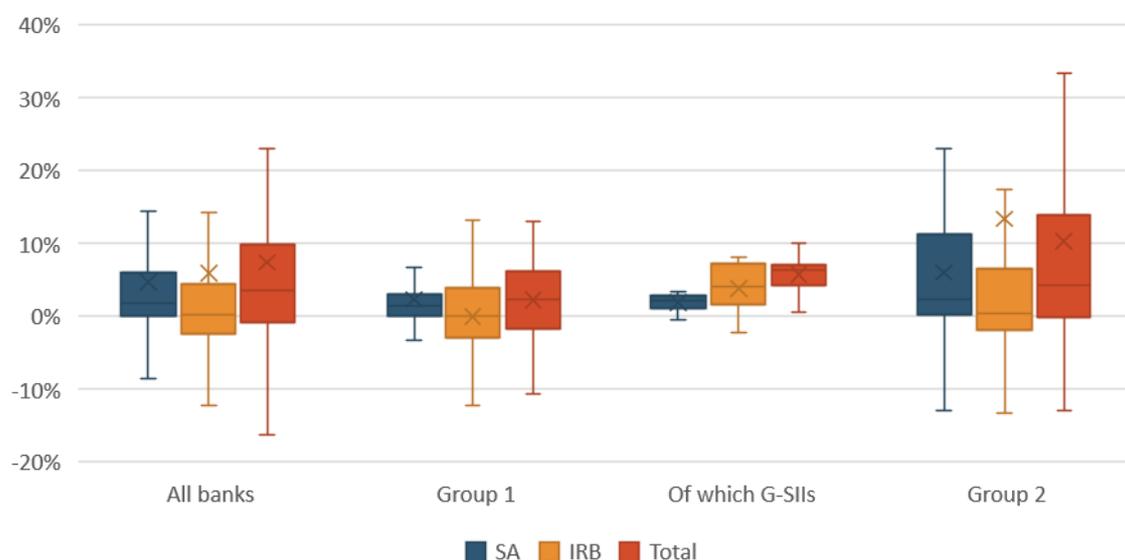
The comparison between the CRR II / CRD V and the final Basel III frameworks therefore indicates that the leverage ratio requirement becomes less constraining under the final Basel III framework. This means that part of the additional MRC, that was previously attributed to the LR, will be attributed to the risk-based Basel III MRC. In percentage terms, this change corresponds to the leverage ratio impact of -3.3% 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 classes³⁴. 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. 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 assumes throughout that the loan-splitting approach is adopted³⁵.

Figure 5: Changes in Tier 1 MRC for credit risk (SA and IRB) exposures due to the final Basel III standards



Note: the mean value ('X') is the simple average.

Source: EBA QIS data (December 2021), sample: 162 banks

The median impact over all portfolios, i.e. SA and IRB approach portfolios, that is attributed to credit risk only, is approximately 3.6% as a percentage of the current Tier 1 MRC. Figure 5 shows

³⁴ For more information, please refer to <https://www.bis.org/bcbs/publ/d424.htm>

³⁵ Nevertheless, few banks reported data under the whole-loan approach.

the distribution of changes in Tier 1 MRC assigned to the revisions of the SA and the IRB approaches for credit risk. The median impact for SA portfolios is approximately +1.7% and for IRB portfolios is slightly above zero (+0.3%).

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).

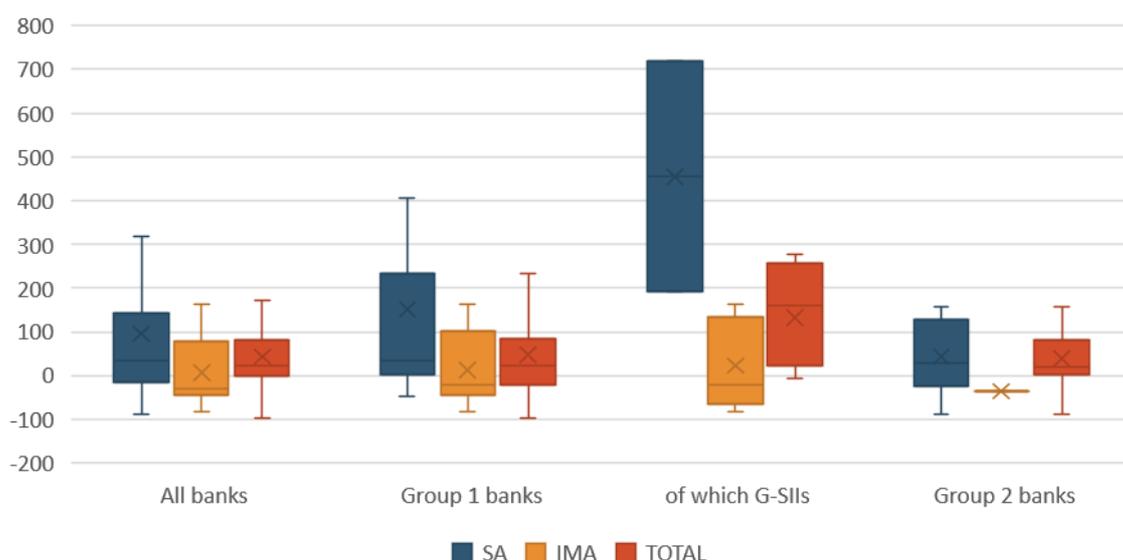
On the opposite direction, the removal of the IRB approach for exposures to 'equity' (i.e. the migration to SA) causes the RWAs for this exposure class to decrease. The risk weight for 'equity' exposures is expected to drop to 250%, under the revised SA framework, from the current prevailing risk weight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

4. FRTB

This section assesses the impact – *ceteris paribus* -- of the January 2019³⁶ 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 that was present in the original submissions on market risk. As in previous Basel III monitoring reports (December 2019 and December 2020), this adjustment to reported data is introduced to cope with the overly conservative data submitted by several large banks on the EIF. Compared to previous exercises, however, the bias is treated by reducing the reported impact on EIF instead of excluding the market risk impact of the banks reporting conservative data altogether. Therefore, the presented results on the impact of the FRTB is higher than in previous Basel monitoring exercises.

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 MAR21.36³⁷. 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 86 banks which reported market risk data.

Figure 6: Change of market risk capital requirements after FRTB implementation, without floor, broken down by approach and bank group (in % of market risk MRC)



³⁶ <https://www.bis.org/bcbs/publ/d457.htm>

³⁷ 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

Source: EBA QIS data (December 2021), sample: 86 banks; Note: the mean value ('X') is the simple average.

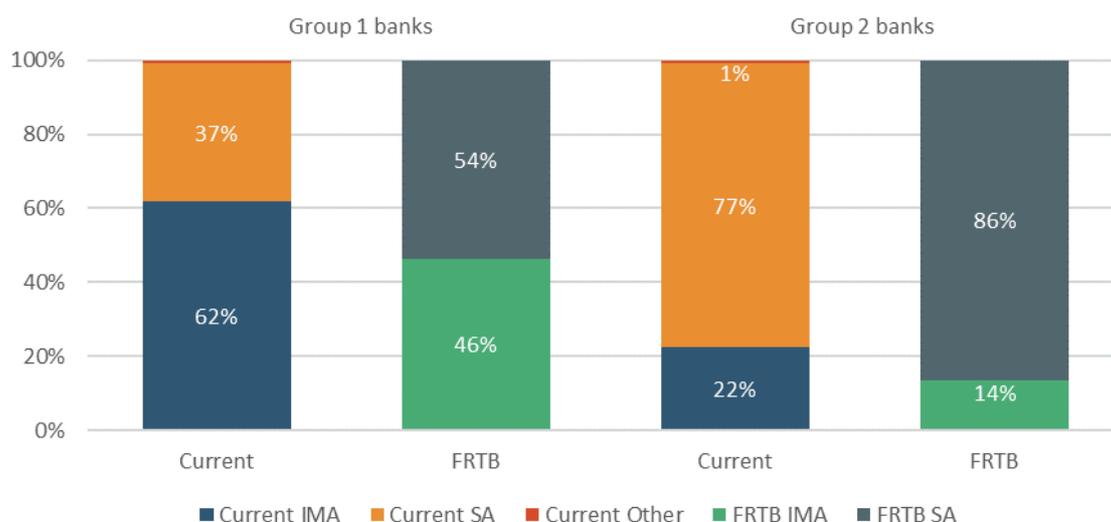
As in other sections, data quality checks revealed some additional issues and limitations in the information submitted by banks and the findings should therefore be interpreted with caution. In particular, some outliers affect the summary results, pushing the average values beyond the median values across 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 6.

Figure 6 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 44% of current market risk MRC, with an interquartile range that spans from approximately 0% to 81%. 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 negative values to strongly positive (more than 318% - not considering outlier). Most of the highly positive impact under FRTB SA is due to the treatment applied to equity investments in funds (CIUs).

Figure 7 shows the proportion of market risk capital requirements that are attributable to the approaches under the current rules and under the revised standards.

Figure 7: Contribution to the total market risk RWAs by each calculation method before and after implementing FRTB framework



Source: EBA QIS data (December 2021), sample: 86 banks

For Group 1 banks, market risk capital requirements under the current rules are mostly computed using the IMA (62%), followed by the SA (37%), while other market risk capital requirements are

negligible (<1%). Under the revised rules, the proportion of market risk capital requirements calculated under IMA decreases to 46% while the SA proportion increases to 54%. In contrast, Group 2 banks currently have most of their minimum capital requirements computed under the SA (77%), with 22% under the IMA. Under the revised rules, the SA makes up 86% 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

As regards operational risk, the final Basel III framework replaces all existing approaches, including the model-driven advanced measurement approach (AMA), with a new approach, the Standardised Measurement Approach (SMA). 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 revisions to the framework generate an aggregate increase in operational risk MRC of approximately 45.1% for Group 1 banks and 18.2% for Group 2 banks. The results show that, on average, the revisions affect Group 1 banks which are migrating from the AMA by less than those Group 1 banks that are currently using other approaches. However, the average impact on Group 1 non-AMA banks is driven by few outliers. The opposite development can be observed for Group 2 banks, where the AMA banks are affected by the new framework by more than the non-AMA banks.

There are several reasons for the higher impact of operational risk on Group 1 than on Group 2. First, the main driver of the observed increase is the fact that some of the AMA banks currently have significantly lower MRC for operational risk (OpRisk) than banks that use the current indicator-based approaches. Second, 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 levels to addressing the higher operational risks that are generally observed for these kinds of business models. Third, large banks are generally affected by the high business indicator. Larger banks belonging to buckets 2 and 3 are also affected by the high marginal coefficients assigned to them (see Annex, section 0).

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

Bank group	Migrating from AMA	Others	Total
All banks	46.1	34.6	40.6
Group 1	48.2	40.4	45.1
Of which: G-SIIs	52.7	82.6	59.9
Group 2	2.0	21.0	18.2

Source: EBA QIS data (December 2021), sample 163 banks

A deeper look into the data shows that, for Group 1 banks, and for G-SIIs in particular, the proportion of operational risk MRC in the total MRC is lower 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.

Apart from the business model, the use of the AMA approach affects the proportion of operational risk in relation to the total risk. The dominant factor in the operational risk models is the past losses, which tend to drive the risk exposure and therefore the proportion of operational risk. The European AMA banks have experienced a wide variety of loss histories in the past 10 years. For example, some of them suffered high past losses due to crystallised conduct risk, which has significantly increased their MRC for the OpRisk category.

The analysis in Table 10 presents the relation between the level of past losses and the proportion of OpRisk MRC in the total capital for different types of AMA banks. Type 1 institutions comprises of AMA banks with a low proportion of operational risk to total MRC and low past operational losses. These banks show mild capital increases due to the dominant impact of the BIC-driven capital requirements. The low past operational risk losses reduce the loss component (LC) and, in turn, the internal loss multiplier (ILM) causing the capital requirements (= BIC X ILM) to be equal or lower than the BIC alone would suggest (see Annex, section 0). Similar capital impacts are also observed for Type 2 AMA banks, which exhibit high proportions of operational risk and high past losses. However, the BIC of these banks dampens the capital increase triggered by the ILM. Type 3 AMA banks have a high proportion of operational risk and low past losses. This type of AMA banks do not tend to benefit from capital relief because of a dampening effect of BIC and ILM values. Finally, type 4 AMA banks have a low proportion of operational risk and high past losses. This type of banks suffer significant capital increases due to a double impact of an increase in both the BIC and the ILM values. The first impact is purely due to the AMA migration to the standardised approach, so that already the BIC increases the MRC. The second impact comes from the fact that the high past operational risk losses increase the loss component (LC) and, in turn, the internal loss multiplier (ILM) causing the capital requirements (= BIC X ILM) to be even higher than the BIC alone would suggest.

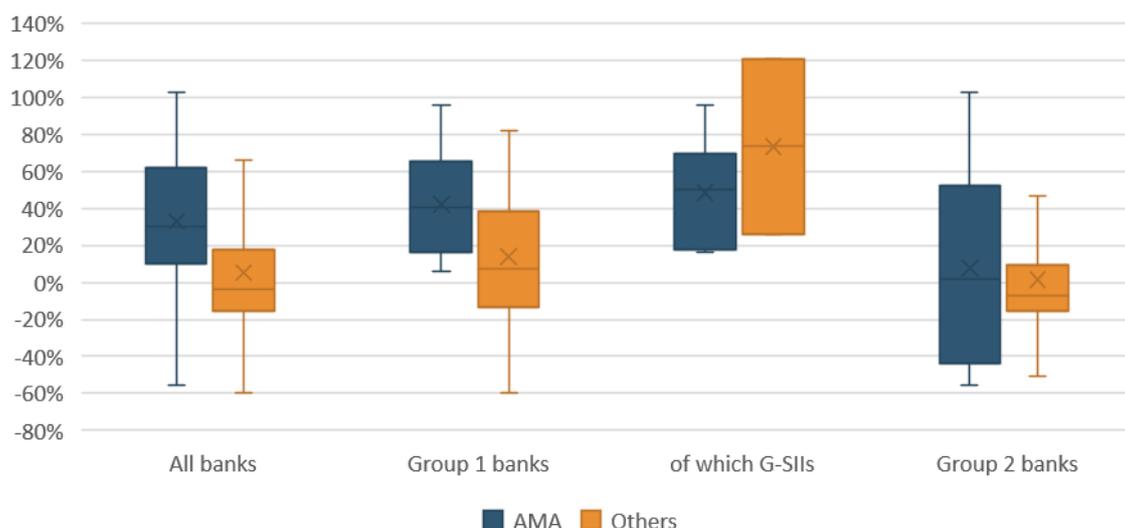
Table 10: Capital impact attributed to certain types of AMA banks

Level of past losses	Proportion of OpRisk MRC in total MRC	
	Low	High
Low	Type 1 AMA (normal AMA): <ul style="list-style-type: none"> • BIC increasing impact • LC/ILM decreasing impact most likely an increase in MRC due to the higher weight of BIC	Type 3 AMA (conservative AMA): <ul style="list-style-type: none"> • BIC decreasing impact • LC/ILM decreasing impact significant reduction in MRC
	Type 4 AMA (progressive AMA): <ul style="list-style-type: none"> • BIC increasing impact • LC/ILM increasing impact significant increase in MRC	Type 2 AMA (normal AMA): <ul style="list-style-type: none"> • BIC decreasing impact • LC/ILM increasing impact dependent on the level of past losses: slight reduction in MRC due to the higher weight of the BIC or slight increase due to extreme losses that even compensate for the dominant effect of the decreasing BIC

The findings in the operational risk section refer only to those banks that belong to the quantitative impact study (QIS) sample. The sample covers almost the entire population of large AMA banks, which face more significant capital increases than Group 2 banks, which use mainly simple approaches and are underrepresented in the sample. This may create a bias towards a higher overall/average impact. In addition, some of the banks currently have Pillar 2 capital additions because of weaknesses in their operational risk management and which are not considered in the current analysis. As a result, the total impact shown in Table 9 may be an overestimation.

The average change in the operational risk capital requirements for AMA banks is clearly higher than the corresponding value for banks that currently apply other methods. The differences between AMA banks and other banks are more pronounced when comparing the 75th percentiles of the changes of the operational risk capital requirements (Figure 8).

Figure 8: 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 2021), sample 163 banks

The final Basel III framework provides supervisors with the discretion to set the past-losses threshold at EUR 100 000 and/or to set ILM = 1 for all banks in their jurisdictions. For the sake of comparability with the operational risk impact, which appears in the cumulative impact analysis (Table 1 and Table 5), the analysis below presents the alternative impact arising from the exercise of such jurisdictional discretions. To this end, the analysis compares (i) the operational risk capital requirements that arise from the actual calculation of the ILM with (ii) the capital requirements

that arise when the discretions to set the loss materiality threshold at EUR 100 000 for bucket 2 and 3 banks³⁸ and to set ILM = 1 for all banks are exercised.

Table 11 includes an analysis of the impact on the T1 MRC for operational risk assigned to each jurisdictional discretion (ILM = 1 and actual ILM based on EUR 100 000 operational loss materiality threshold for banks with a BI > EUR 1 billion or the equivalent of BIC > EUR 120 million). Discretions 1 and 2 affect only banks with BI > EUR 1 billion, i.e. bucket 2 and bucket 3 banks. The impact is shown for the cumulative analysis sample (160 banks), to allow for comparisons between the baseline Basel III operational risk framework and the discretions applied.

Table 11: Comparison of operational risk impact on the current T1 MRC following the application of baseline Basel III full implementation, i.e. ILM with EUR 20 000 loss materiality threshold, with the application of three discretions and one variation of the baseline (in % of total Tier 1 MRC)

	Basel III baseline (threshold: EUR 20000, Bucket 1: ILM=1), [input in Table 1] (1)	Variation of the Basel III baseline (threshold: EUR 20000, Bucket 1: estimated ILM) (2)	Basel III discretion 1 (loss materiality threshold: EUR 100000) (3)	Basel III discretion 2 (All buckets: ILM = 1) [EU specificity (4)	Basel III discretion 3 (estimated ILM with less than 5y, if ILM > 1) (5)
All Banks	3.7	3.7	3.3	1.7	4.2
Group 1	4.2	4.2	3.7	2.0	4.6
Of which: G-SIIs	6.3	6.3	5.6	2.4	6.4
Group 2	1.5	1.5	1.1	0.3	2.2

Source: EBA QIS data (December 2021), sample: 160 banks

The impact of the operational risk revisions under the baseline scenario is 3.7% on Tier1 MRC, as also shown in the cumulative results in Table 1. The Basel III baseline scenario (column 1), which coincides with the impact shown in the cumulative results of Table 1, shows the impact assuming that the ILM is calculated for all bucket 2 and bucket 3 banks that reported aggregate annual losses for at least five years for loss events above EUR 20000, while the ILM for bucket 1 banks, i.e. BI < EUR 1 billion, is set to 1. The impact of the variation to the Basel III baseline (column 2), which assumes the calculation of the ILM for bucket 1 banks too, remains unchanged compared to the baseline scenario.

The application of a threshold of EUR 100k for annual past losses indicates that the operational risk impact will drop to 3.3% of the current Tier 1 capital. The Basel III discretion 1 (column 3) applies the assumptions of the Basel baseline but this time for loss events above EUR 100000. **The Basel III discretion 2 (column 4), which coincides with the EC proposal for the implementation of Basel III in the EU, exhibits an operational risk impact of 1.7%.** This discretion applies ILM = 1 to all banks in the sample, i.e. enabling the BIC to be the only determinant for the operational risk capital requirements.

³⁸ See BCBS (2017), *Basel III: Finalising post-crisis reforms*, page 131, para 19(d): '...At national discretion, for the purpose of the calculation of average annual losses, supervisors may increase the threshold to €100,000 for banks in buckets 2 and 3 (i.e. where the BI is greater than €1 bn)'.

Finally, Basel III discretion 3 (column 5) shows the highest operational risk impact amongst the various scenarios / discretions (4.2%). This discretion takes into consideration the calculated ILM of banks that reported less than five years history losses, as far as the resulting ILM is higher than unity.

6. Output floor

Table 12 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 (0.2% for Group 1 banks and 0.2% 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 12) might reduce the impact in some of the years between 2023 and 2027.

Table 12: Cumulative output floor impact during the implementation phase (% of the total CRR/CRD IV 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	2.1	4.5	6.3
Group 1	0.0	0.2	0.7	2.4	5.2	7.1
Of which: G-SIIs	0.0	0.0	0.3	1.7	4.3	6.5
Group 2	0.0	0.2	0.4	0.7	1.3	1.8

Source: EBA QIS data (December 2021), sample: 160 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 260 basis points (from 1.7% to 4.3%). 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 approximately 88 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%).

⁴¹ 220 basis points/2.5% = 88 basis points of impact per percentage point of output floor increase.

7. Revised leverage ratio

This section assesses the impact of the amendments to Basel III LR requirements⁴². Figure 9 compares the distributions of the 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.

Considered in isolation from the other Basel III risk-based reforms (Table 13), the measure of the leverage ratio exposure increases by 0.3% for all banks relative to the current framework. When the 50% of the G-SIIs surcharge is included, the overall increase of the LR Tier 1 MRC rises to 9.5%. 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 13: 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	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 and the deficit of provisions
All banks	0.3	9.5
Group 1	0.2	11.1
Of which: G-SIIs	0.1	21.3
Group 2	0.9	0.9

Source: EBA QIS data (December 2021), sample: 160 banks

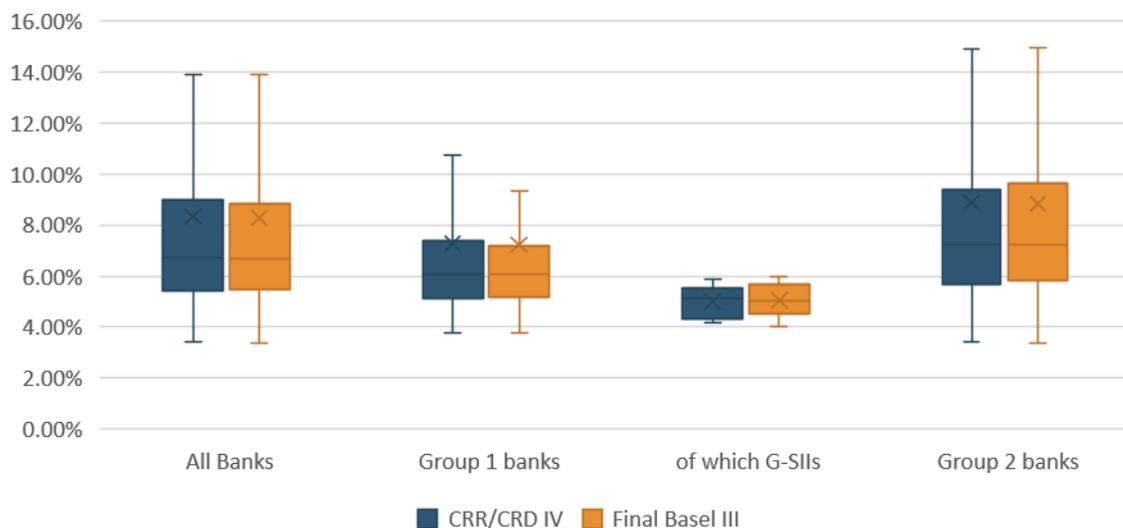
The implementation of the final Basel reforms will imply only negligible changes in the average LR for all bank categories considered. The comparison of leverage ratio levels between the current and revised frameworks (Figure 9) show that there are little changes in the average and median values, as well as in the distribution of the LR. Approximately 28.3% of the banks showed an increase in the leverage ratio exposure due to the implementation of the final Basel III package, while approximately 49.7% showed a decrease in the LR exposure.

In terms of Tier 1 MRC, the impact becomes more prominent when the analysis includes both the changes in the definition of leverage ratio exposure and the implementation of the additional 50% of the G-SIIs surcharge. The G-SII surcharge only affects the averages of the categories Group 1 and ‘all banks’. Group 2 banks are not subject to the G-SIIs surcharge, and, therefore, the average impact of the LR revisions is solely due to changes in the definition of LR exposure.

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 6 provide LR levels for a sample of 160 banks that are included in the cumulative impact analysis.

Figure 9: Comparison of fully phased-in EU LR and final Basel III LR



Source: EBA QIS data (December 2021), sample: 160 banks; Note: the mean value ('X') is the simple average.

The main driver of the total change in the leverage ratio exposure values is the change in 'Derivatives' exposures, albeit the direction and magnitude of these changes differ from bank to bank. However, the lack of consistent reporting of the breakdown of exposures that sum up to the leverage ratio exposure measure does not allow for a precise quantification of these changes for individual factors.

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 (9.5%), vis-à-vis the relative LR impact after taking into account the risk-based capital requirements, including the output floor (-3.3%).

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 14 show the number of constrained banks under the two scenarios, as well as the difference attributed to the output floor.

Table 14: 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)	118	-	42
Risk-based capital requirements with the output floor (baseline scenario)	118	16	26

Source: EBA QIS data (December 2021), sample: 160 banks

Under the baseline scenario of the Basel III framework, 73.8% of the banks in the sample are constrained by the risk-based requirements, before applying the output floor, 10% is constrained by the output floor and 16.2% by the leverage ratio requirement (see Table 14). The implementation of Basel III risk-based requirements, without the output floor, and the leverage ratio requirements results in 118 banks being constrained by the risk-based requirements and 42 banks by the leverage ratio (see Table 14). The implementation of the output floor, as part of the risk-based requirements, results in 16 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 -28.6 billion and 54.7 billion, respectively, (b) Scenario 1 is EUR +2.1 billion and zero, respectively and (c) Scenario 2 is EUR +2.1 billion and EUR +24 billion, respectively (see also Table 15). The negative leverage ratio impact implies a reduction in the add-on of leverage ratio from the current CRR/CRD IV regime because the add-on is reduced by EUR 28.6 billion, from EUR 53.9 billion to EUR 25.3 billion, owing to the increase of RWA. This translates into a -3.3% LR impact (see also Table 1) compared with the current Tier 1 MRC (-28.6/875.6).

Under scenarios 1, the leverage ratio add-on is EUR +2.1 billion, which implies an overall impact of the LR on MRC of +0.2%. 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 +2.7%, which is significantly lower than the +6.3% 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 +24 billion (or +2.7% increase).

Table 15: 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 (%)
Baseline: with output floor (before LR)	926.5	54.7	903.8	-28.6	Not Applicable	15.0%
	12.0%	6.3%		-3.3%		

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 (%)
Scenario 1: without output floor	926.5	Not Applicable	903.8	2.1	Not Applicable	12.2%
	12.0%			0.2%		
Scenario 2: with output floor (after LR)	926.5	Not Applicable	903.8	2.1	24.0	15.0%
	12.0%			0.2%	2.7%	

Source: EBA QIS data (December 2021), sample: 160 banks

Note: The 'leverage ratio implied impact' for the baseline scenario is -3.3% (also shown in Table 1, Table 5 as 'LR impact') and is calculated as EUR -28.6 billion (= EUR 25.3 billion – EUR 53.9 billion)/EUR 875.6 billion. EUR 25.3 is the Basel III leverage ratio add-on while EUR 53.9 billion is the CRR II/CRD IV leverage ratio add-on (Figure 4), and EUR 875.6 billion is the combined CRR/CRD IV Tier 1 MRC arising from the implementation of both risk-based and LR-based requirements (see also Figure 4).

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. Net stable funding ratio

The BCBS standards include two regulatory measures of liquidity risk: (a) the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). The LCR requires banks to have a sufficient level of high-quality liquid assets (HQLA) to withstand a stressful funding scenario for 30 days. The LCR has already been implemented in the EU as a binding minimum requirement in October 2015 (followed by a gradual phase-in of the minimum levels starting with 60% in 2015 and reaching 100% in 2018). The monitoring of the LCR is assessed separately in the EBA’s report on liquidity measures under Article 509(1) of the CRR. The NSFR is a longer-term structural ratio that addresses liquidity mismatches and provides incentives for banks to use stable sources to fund their activities. The NSFR has been introduced via the CRR2 and was applied as a binding minimum requirement as of 28 June 2021. This section aims to monitor the impact of the BCBS standard on NSFR on EU banks.

The NSFR is defined as the amount of available stable funding (ASF) relative to the amount of required stable funding (RSF). The Basel III framework intends that, from 1 January 2018, this ratio should be equal to or higher than 100%. The ASF is defined as the portion of capital and liabilities expected to be reliable over the one-year time horizon considered by the NSFR. The amount of RSF is a function of the liquidity characteristics and residual maturities of the various assets held by a particular institution, as well as those of its off-balance-sheet exposures. Table 16 provides an overview of the NSFR levels by groups of banks and the amount of shortfall needed to comply with the 100% requirement set in the Basel III framework.

Table 16: NSFR and NSFR shortfall in stable funding

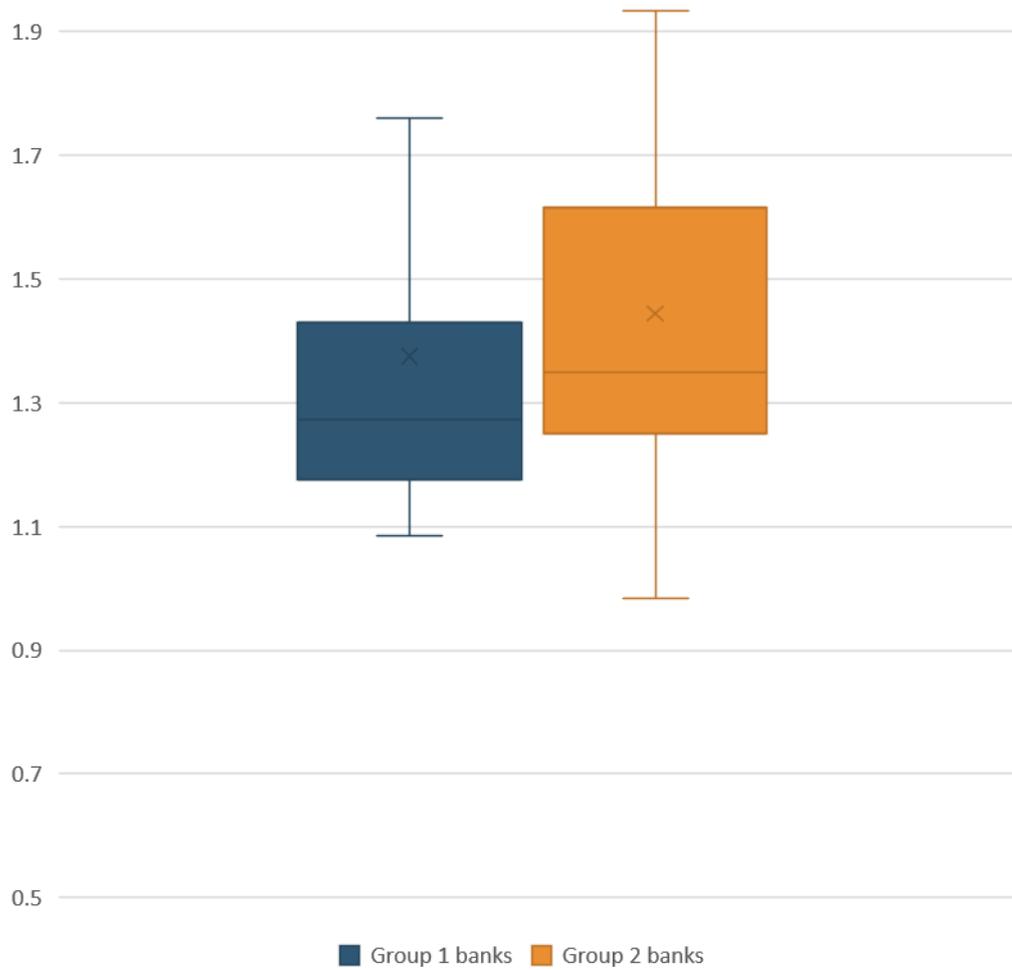
Bank group	NSFR (%)	Shortfall (EUR billion)
All banks	126.8	0.1
Group 1	124.9	0.0
Of which: G-SIIs	122.2	0.0
Group 2	137.1	0.1
Of which: large Group 2	138.4	0.0
Of which: medium-sized Group 2	133.8	0.1
Of which: small Group 2	139.7	0.0

Source: EBA QIS data (December 2021), sample: 112 banks

Overall, as of December 2021, banks in the sample needed additional stable funding of EUR 0.1 billion (Table 16). The need for stable funding is estimated by aggregating only the positive differences between RSF and ASF (RSF - ASF) — the deficit in the stable funding of banks whose NSFR is below the 100% requirement — and does not account for any surplus of stable funding observed in banks with an NSFR above the 100% requirement.

Both average and median values of Group 2 NSFR is higher than the Group 1 banks. Also, the interquartile range of NSFR levels for Group 2 banks is wider than that of Group 1 banks. Figure 10 shows the distribution of NSFR per bank group.

Figure 10: Distribution of NSFR by bank group (NSFR/100, %)



Source: EBA QIS data (December 2021), sample: 112 banks

10. Technical Annex on the impact assessment methodology

10.1 Methodology for the estimation of the impact per category

10.1.1 Credit risk impact

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

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

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

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

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

Standardised approach for credit risk

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

$$\frac{\left[\sum_{i=1}^n \left\{ \frac{\text{'Final Basel III } SA_{RWA}' \times (Tier1_{MRC}\% \pm \text{capital conservation buffer}\% \pm G_{SII_s} \text{surcharge}\%)}{\text{'CRR_CRDIV } SA_{RWA}' \times (Tier1_{MRC}\% \pm \text{capital conservation buffer}\% \pm G_{SII_s} \text{surcharge}\%)} \right\} - \sum_{i=1}^n \left\{ \frac{\text{'CRR_CRDIV } SA_{RWA}' \times (Tier1_{MRC}\% \pm \text{capital conservation buffer}\% \pm G_{SII_s} \text{surcharge}\%)}{\text{'CRR_CRDIV } SA_{RWA}' \times (Tier1_{MRC}\% \pm \text{capital conservation buffer}\% \pm G_{SII_s} \text{surcharge}\%)} \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk_based Tier1 MRC'}, \text{'CRR_CRDIV total LR_based Tier1 MRC'} \}}$$

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

IRB approach for credit risk

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

$$\frac{\left[\sum_{i=1}^n \left\{ \frac{\text{'Final Basel III } IRB_{RWA}' \times (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_s} \text{surcharge}\%)}{\text{'CRR_CRDIV } IRB_{RWA}' \times (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_s} \text{surcharge}\%)} - (\min(\text{Amount of IRB deficit of provisions added to revised T1 MRC}, 0)) \right\} - \sum_{i=1}^n \left\{ \frac{\text{'CRR_CRDIV } IRB_{RWA}' \times (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_s} \text{surcharge}\%)}{\text{'CRR_CRDIV } IRB_{RWA}' \times (Tier1_{MRC}\% + \text{capital conservation buffer}\% + G_{SII_s} \text{surcharge}\%)} - (\min(\text{Amount of IRB deficit of provisions added to current T1 MRC}, 0)) \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk_based Tier1 MRC'}, \text{'CRR_CRDIV total LR_based Tier1 MRC'} \}}$$

Securitisation

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

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

CCPs

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

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

10.1.2 Market risk impact

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

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

10.1.3 CVA impact

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

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

10.1.4 Operational risk impact

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

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

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.

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.

10.1.5 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.

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

10.1.6 Leverage ratio impact

$$\% \Delta T1MRC(LR) = \frac{\left[\sum_{i=1}^n \max \left\{ \begin{array}{l} 0, \\ \left(\frac{\text{'Final Basel III total LR}_{based} T1 MRC'}{\text{'Final Basel III total risk}_{based} T1 MRC'} - 1 \right) \end{array} \right\} - \sum_{i=1}^n \max \left\{ \begin{array}{l} 0, \\ \left(\frac{\text{'CRR_CRDIV total LR}_{based} T1 MRC'}{\text{'CRR_CRDIV total risk}_{based} T1 MRC'} - 1 \right) \end{array} \right\} \right]}{\sum_{i=1}^n \max \{ \text{'CRR_CRDIV total risk}_{based} T1 MRC'}, \text{'CRR_CRDIV total LR}_{based} T1 MRC' \}}$$

Where,

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

CRR II/CRD V total LR-based T1 MRC = *CRR II/CRD V total leverage ratio exposure* × 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.

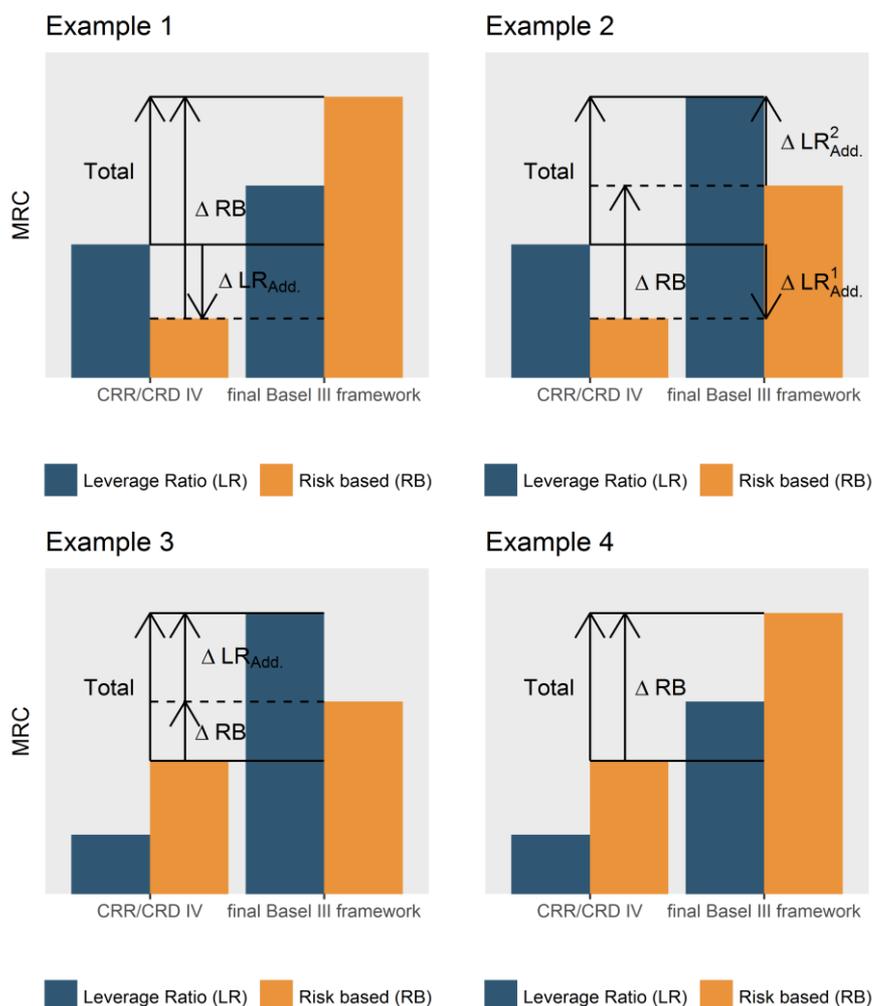
The analysis adopts the BCBS methodology for estimating the leverage ratio impact⁴⁶. This methodology quantifies the impact of the leverage ratio as the change in the LR add-ons between the proposed and current regulatory frameworks, as a metric of the change in the LR's constraining power in determining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

The leverage ratio impact would be negative (see ΔLR_{Add} in example 1 of Figure 11) 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 11) were lower than the Tier 1 LR add-on of the full implementation of the CRR/CRD IV (positive in example 1 of Figure 11). This particular case indicates that the leverage ratio is less constraining under the final Basel III framework than under the CRR II/CRD V framework.

The leverage ratio impact would be positive (see ΔLR_{Add} in example 3 of Figure 11) if the Tier 1 LR add-on of the full implementation of the final Basel III framework (positive in example 3 of Figure 11) were higher than the Tier 1 LR add-on of the full implementation of the CRR II/CRD V (0 in example 3 of Figure 11). This can be interpreted as the leverage ratio becoming more constraining under the final Basel III framework than under the CRR II/CRD V framework.

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

Figure 11: Integration of changes in risk-based and leverage-ratio-based MRC



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

The leverage ratio impact would be 0 in cases where either the T1 LR add-on of the CRR II/CRD V and the T1 LR add-on of the final Basel III framework are both 0 (example 4, Figure 11), or the T1 LR add-on remained the same under the CRR/CRD IV and the final Basel III framework (example 2, Figure 11, 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 II/CRD V and the final Basel III frameworks. Figure 11 illustrates all four cases of the relationship between the T1 LR-based MRC and T1 risk-based MRC, under the CRR II/CRD V and final Basel III frameworks.

10.1.7 Capital shortfalls

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

$$T1Shortfall_{CRR_CRDIV} =$$

$$\sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \text{'Risk_based_Tier1_Shortfall}_{CRR_CRDIV}' \\ \text{'LR_based_Tier1_Shortfall}_{CRR_CRDIV}' \end{array} \right] \right\}$$

$$=$$

$$\sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \max (0, \text{'Risk_based_Tier1_MRC}_{CRR_CRDIV}' - \text{'Actual_Tier1'}) \\ \max (0, \text{'LR_based_Tier1_MRC}_{CRR_CRDIV}' - \text{'Actual_Tier1'}) \end{array} \right] \right\}$$

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

$$\mathbf{T1Shortfall}_{BaselIII}$$

$$=$$

$$\sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \text{'Risk_based_Tier1_Shortfall}_{Basel_III}' \\ \text{'LR_based_Tier1_Shortfall}_{Basel_III}' \end{array} \right] \right\}$$

$$=$$

$$\sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \max (0, \text{'Risk_based_Tier1_MRC}_{Basel_III}' - \text{'Actual_Tier1'}) \\ \max (0, \text{'LR_based_Tier1_MRC}_{Basel_III}' - \text{'Actual_Tier1'}) \end{array} \right] \right\}$$

Table 2 – column ‘Capital shortfalls – CRR/CRD IV (fully phased in) – ‘Additional LR Tier 1’

$$\mathbf{Add. LR}_{T1Shortfall}_{CRRCRDIV}$$

$$=$$

$$\sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \max (0, \text{'Risk_based_Tier1_MRC}_{CRR_CRDIV}' - \text{'Actual_Tier1'}) \\ \max (0, \text{'LR_based_Tier1_MRC}_{CRR_CRDIV}' - \text{'Actual_Tier1'}) \end{array} \right] \right\}$$

$$- \sum_{i=1}^n \left\{ \max [\max (0, \text{'Risk_based_Tier1_MRC}_{CRR_CRDIV}' - \text{'Actual_Tier1'})] \right\}$$

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

$$\mathbf{Add. LR}_{T1Shortfall}_{BaselIII}$$

$$=$$

$$\sum_{i=1}^n \left\{ \max \left[\begin{array}{l} \max (0, \text{'Risk_based_Tier1_MRC}_{Basel_III}' - \text{'Actual_Tier1'}) \\ \max (0, \text{'LR_based_Tier1_MRC}_{Basel_III}' - \text{'Actual_Tier1'}) \end{array} \right] \right\}$$

$$- \sum_{i=1}^n \left\{ \max [\max (0, \text{'Risk_based_Tier1_MRC}_{Basel_III}' - \text{'Actual_Tier1'})] \right\}$$



EUROPEAN BANKING AUTHORITY

Tour Europlaza, 20 avenue André Prothin CS 30154
92927 Paris La Défense CEDEX, FRANCE

Tel. +33 1 86 52 70 00

E-mail: info@eba.europa.eu

<https://eba.europa.eu>