

POLICY ADVICE ON THE BASEL III REFORMS: OUTPUT FLOOR

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Executive summary

In its Call for Advice (CfA) to the EBA, the European Commission included a request to assess the introduction of the output floor as part of the implementation of the Basel III reforms in the EU. The European Banking Authority (EBA) has assessed various aspects related to this requirement, starting with the question of whether or not the output floor is to be recommended considering its overall objectives and impact. As one of the global measures aimed at restoring the credibility of internal models by providing a backstop, it is essential that the output floor is implemented by EU institutions at a 72.5% level in compliance with the Basel agreement. This will support other significant efforts in this area undertaken by EU authorities, including the EBA.

The precise impact of the output floor is difficult to predict, as its implementation is expected to result in some potential offsetting effects in Pillar 2 requirements (P2R) and systemic risk buffer (SRB) requirements, which to some extent may currently target the same prudential objectives as the output floor. On the basis of the most conservative assumptions, assuming that the P2R and SRB in terms of percentage of risk-weighted assets (RWAs) remain unchanged and are applied to the new RWAs resulting from the application of the output floor, the impact of the output floor on the minimum required capital (MRC) would be 9.1% across the quantitative impact study (QIS) sample. However, these assumptions are crucial in understanding this outcome, as the final impact will differ substantially depending on the assumptions. The EBA has chosen an approach that is likely to represent an upper bound of the overall impact.

The QIS results indicate that the output floor complements other requirements, resulting in a broadly comparable impact of the revised Basel framework for most business models. The results indicate that, while the output floor and leverage ratio are both backstop measures and to some extent similar, their different mechanics appear to ensure that they mostly do not overlap.

In terms of the objectives of reducing excessive risk-weight variability and promoting comparability of risk-weighted capital ratios, the QIS demonstrates that the output floor raises the average risk weights of institutions constrained by the floor, with the result that they become more comparable with other institutions using internal models. The QIS also indicates that the backstop function of the output floor mitigates variability in internal modelling output for certain portfolio types.

On the basis of a careful evaluation of the mechanics of the floor, the EBA concludes that the revised framework should be implemented by using the floored RWAs as a basis for all the capital layers, including the SRB and P2R. This implementation makes the output floor the most straightforward to calculate and disclose, with an uncomplicated assessment of whether or not the institution's capital ratios (common equity tier 1 (CET1), tier 1 and total capital ratio) comply with the corresponding requirements, allowing for transparency and comparability.

The EBA also assessed other approaches in which the SRB and P2R would be calculated on pre-floor RWAs or would not at all appear in the same stack of capital requirements as those based on a

floored RWA. These approaches, which could result in a lower impact, have critical drawbacks, such as the creation of complexity and inconsistencies and/or non-compliance with the revised Basel framework.

The EBA recommends that competent authorities (CAs)/designated authorities (DAs) duly take into account the effect of the output floor and its potential interaction with other own funds requirements, such as P2R and the SRB. This can broadly be understood as, firstly, the effect of an increased RWA (due to the output floor) on the absolute level of own funds requirements that can occur to the extent that authorities calculate the additional requirements as a percentage of RWAs. Secondly, there is a possibility of unnecessary overlaps regarding (e.g. model) risks addressed by P2R or the SRB, and the output floor, which may need to be addressed. The EBA intends to update its SREP Guidelines to take these aspects into account.

Further aspects covered in this report include that of the implementation of capital triggers, when the EBA recommends that Basel additional tier 1 (AT1) triggers of institutions constrained by the output floor must refer to the floored regulatory ratios. Regarding the calculation of the standardised approach for RWAs for the purposes of the output floor, it is recommended that potentially higher risk weights, pursuant to the discretion of Article 124(2) of the Capital Requirements Regulation (CRR)¹, need to be taken into account.

Regarding the calculation of RWAs at granular level (e.g. exposure class/portfolio level), the EBA foresees a continued role for pre-floor RWAs. The EBA also recommends that, for reasons of transparency, there should be a separate disclosure of the RWA add-on, stemming from the calculation of the output floor on an aggregate level, and in addition, for exposures on a granular level, pre-floor RWAs and standardised RWAs should be reported and disclosed.

In terms of scope of application and based on the understanding that the objectives of the output floor present themselves equally at all levels, the EBA recommends that the requirement should apply at all levels, similarly to other prudential requirements. However, the analysis identifies two possible drivers that could make the output floor comparatively more binding if applied at an individual level. The first driver is an unequal distribution of the exposures, with a significant difference between standardised and internal modelling outcomes across entities within a group. The second driver is a high amount of intragroup exposures. In combination, these could lead to a potentially larger impact on some business models. On the basis of a small sub-sample of the QIS, it can tentatively be observed that the impact of the output floor, when applied on an individual level, could potentially be somewhat more notable. The European Commission has therefore asked the EBA to further analyse the impact of the application at the individual level.

Against this backdrop, the EBA highlights the available CRR waivers, which include a general exemption from capital requirements and/or specific intragroup exposures and could therefore mitigate some of the potential impact mentioned above. CAs should consider the impact of the

¹ Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 (OJ L 176, 27.6.2013, p.1): <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R0575&from=EN>

implementation of the output floor at different levels and take into account the neutrality of business models in their waiver policy, in the context of CRR waiver provisions.

The EBA has also assessed the differences in the treatment of provisions between the standardised approach and the internal ratings based (IRB) approach, in the form of the IRB shortfall/excess mechanism and its potential impact on the output floor calculation. On the basis of an analysis of potential approaches that would adjust a provisioning shortfall/excess in the output floor calculation, it has been concluded that any such adjustment would be inappropriate and would add undesirable complexity.

Finally, regarding the transition to the new requirements, the EBA has performed an analysis that suggests that the arrangements laid out in the revised Basel framework, in the form of the 5-year transitional path and a transitional cap of 25% increase in RWAs, would broadly allow for capital requirements to be met on the basis of retained earnings. Against this backdrop, the EBA recommends the implementation of these transitional measures.

1. Introduction

1. In its December 2017 publication, which sets out the finalisation of the Basel III framework after the crisis, the Basel Committee introduced² a floor requirement in the context of RWAs. The output floor that was introduced requires that the capital requirements for institutions that apply (an) internal modelling approach(es) do not fall below 72.5% of capital requirements calculated under standardised approaches.
2. In terms of rationale behind the requirement, paragraph 1 of the revised framework text on the output floor indicates that there are two broad objectives: ‘to reduce excessive variability of risk-weighted assets and to enhance the comparability of risk-weighted capital ratios, banks will be subject to a floor requirement that is applied to risk-weighted assets.’ The first objective (on excessive risk-weight variability), in general, would address perceptions that risk weights calculated by institutions using internal models may in some cases deviate too much from those under the standardised approach. The second objective (comparability of risk-weighted ratios) is based on the understanding that, by applying a floor to the effects of internal models on RWAs, the RWAs — and consequently the capital ratios of institutions applying internal models — will be more mutually comparable.
3. In terms of mechanics of the output floor, paragraph 1 of the revised framework text clarifies that it is directly applied to risk-weighted assets, which indicates that floored RWAs generally need to be used for all further purposes (e.g. the calculation of capital requirements). In addition, it clarifies that ‘The output floor will ensure that institutions’ capital requirements do not fall below a certain percentage of capital requirements derived under standardised approaches’, which indicates that it is to be applied to all exposures and requirements.
4. This understanding of the mechanics — namely that the output floor ensures that RWAs do not fall below a level based on standardised approaches in such a way that RWAs of the institution would be the ones emerging from the application of the output floor — is further confirmed by the Governors and Heads of Supervision (GHoS) press release, which was published together with the December 2017 revised framework: ‘The reforms endorsed by the GHoS include the following elements: [...] an aggregate output floor, which will ensure that banks’ risk-weighted assets (RWAs) generated by internal models are no lower than 72.5% of RWAs as calculated by the Basel III framework’s standardised approaches.’
5. More specifically, paragraph 4 of page 137 of the revised framework text clarifies that the calculation is as follows: ‘the risk-weighted asset that banks must use to determine compliance with the requirements set out in paragraphs 2 to 3 above must be calculated as the maximum of: (i) the total risk-weighted assets calculated using the approaches that the bank has supervisory approval to use in accordance with the Basel capital framework

² Page 137 of the December 2017 BCBS document ‘Basel III: finalising post-crisis reforms’
<https://www.bis.org/bcbs/publ/d424.htm>

(including both standardised and internally-modelled based approaches); and (ii) 72.5% of the total risk weighted assets, calculated using only the standardised approaches’.

6. As paragraph 4 refers to ‘the requirements set out in paragraphs 2 to 3’, it is clear that the Basel document requires an application of the increased RWAs to the calculation of the requirements therein listed, namely the 4.5% CET1/RWA minimum, the 6% T1/RWA minimum, the 8% total capital (TC) minimum, the 2.5% capital conservation buffer requirement, the countercyclical capital buffer requirement, the global systemically important institution (G-SII) add-on and the total loss absorption capacity (TLAC) requirements. Jurisdiction-specific capital layers, such as the SRB requirement or the P2R requirements, are not mentioned. However, as mentioned in paragraph 3, the revised framework text (paragraph 1) suggests a wide application of floored RWAs.
7. To address the objective of enhancing the comparability across banks, the revised framework text (paragraph 8) prescribes a required disclosure of two sets of risk-weighted capital ratios, one based on internal modelling RWAs and another on floored RWAs. In terms of TC ratio, this means:

$$TC \text{ ratio floored} = \frac{TC}{RWA_{OF}}$$

$$TC \text{ ratio unfloored} = \frac{TC}{RWA_{IM}}$$

8. By publishing the ratio based on floored RWAs (RWA_{OF}), clarity is provided on the capital requirements of the banks. In addition to enhancing comparability, the disclosure of RWA_{OF} may contain incentives to implement more conservative modelling practices, leading to less risk-weight variability. Furthermore, by publishing the ratio based on non-floored RWAs (RWA_{IM}), information on the capital outcome of using the internal models is maintained. In this report, the role of the output floor in providing an appropriate balance between risk sensitivity and credible modelling practices is assessed.
9. The European Commission has included a request to provide an estimate of the impact of introducing the output floor, as part of the implementation of other Basel III reforms in the EU, in its CfA to the EBA of 4 May 2018. Various aspects related to the impact and desirability of the output floor have been raised, such as the interaction with other own funds requirements (e.g. P2R, buffers), the impact on RWA variability, business models and exposure classes, the role of the treatment of provisions and the appropriateness of transitional arrangements.

2. General implementation approach

10. The actual implementation of the framework in terms of the technical specification is important for a proper analysis of its impact. The EBA has therefore carefully evaluated the mechanics of the floor. In this report, the EBA provides its understanding of the intended implementation of the revised framework, namely the use of the floored RWAs (RWA_{OF}) as a basis for all the capital layers, including the SRB and P2R. This approach is explained below and is referred to as the main approach.
11. In addition, to carry out a comprehensive evaluation, the EBA has also assessed an alternative approach, which is not recommended for various reasons. Under this approach, capital layers that are not mentioned explicitly in the revised framework text regarding the output floor, namely P2R and the SRB, continue to be based on the RWAs resulting from internally modelled approaches (RWA_{IM}), instead of the RWA_{OF} . Only after the calculation of the amount in euros of these EU-specific buffer requirements on the basis of RWA_{IM} would they be converted to requirements in terms of RWA_{OF} .
12. Finally, the EBA has also explored the feasibility of relying on an approach that builds on how the Basel I floor was previously implemented in many countries (including countries in the EU). Under this approach, the MRC is determined by the higher of the two parallel stacks of requirements. In addition to its non-compliance with the Basel Committee on Banking Supervision (BCBS) framework, this approach is rejected and considered inappropriate for multiple reasons. To provide a comprehensive explanation, the mechanics of this approach are outlined in Annex 1.1 as well as the reasons for its rejection.

2.1 The main approach (fully RWA_{OF} based)

13. Under this approach, all layers of the MRC are calculated and expressed on the basis of the institutions' floored RWAs (RWA_{OF}), as per Basel standards, including the SRB, the other systemically important institutions (O-SII) buffer and P2R.
14. This can be formalised as follows:

$$MRC^{main} = RWA_{OF} \cdot \left\{ \begin{array}{c} SRB \\ G - SII/O - SII \\ CCyB \\ 2.5\% CCB \\ P2R \\ Min. Req. \end{array} \right\}$$

where

Min. Req. refers to the minimum requirements, that is, either the 4.5% CET1 requirement, the 6% tier 1 requirement or the 8% total capital requirement;

P2R refers to the P2R requirement rate;

2.5% *CCB* refers to the 2.5% capital conservation buffer rate;

CCyB refers to the countercyclical capital buffer rate;

G – SII refers to the G-SII buffer rate and *O – SII* refers to the O-SII buffer rate;

SRB refers to the SRB rate (Article 133 of the Capital Requirements Directive (CRD)³) and specifically the contribution of the SRB to the combined buffer.

These minimum requirements are visualised in Figure 1.

15. Given that all requirements/buffers are based on the floored RWA (RWA_{OF}), the main approach for the implementation of the floor is also the most straightforward to implement and disclose, that is, it is easy to assess whether or not the institution's capital ratios (CET1, tier 1 and total capital ratio) comply with the corresponding minimum requirements. This will allow transparency and comparability, as all the capital layers (including the SRB and P2R) are calculated based on the same amount of RWAs.
16. As the EU framework includes the SRB and P2R, which may not exist — or only exist to a lesser extent — in non-EU Basel member countries, it could be argued that the implementation of the floor would amplify the potential differences, when the percentage rate of EU-specific requirements remains constant. However, CAs and/or DAs will probably reassess the setting of the rates for these capital layers, for example to avoid capital requirement overlaps (see also Recommendations OF 3 and OF 4).
17. As all buffers (including the EU-specific buffers) are based on the floored RWA (RWA_{OF}), which by construction exceeds the institution's RWAs stemming from internally modelled approaches — referred to as RWA_{IM} in all those cases in which the floor constrains the institution — this implementation of the output floor provides the strongest backstop to internal modelling outcomes. This may help address potential concerns of undue variability of RWA_{IM} and lead to a comparatively conservative outcome in terms of capital requirements.

2.2 Alternative approach (partially RWA_{IM} based)

18. When calculating the MRC under the alternative approach, the capital ratios mentioned in the Basel text (minimum capital requirements, capital conservation buffer, countercyclical

³ Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC (OJ L 176, 27.6.2013, p.338): <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013L0036>

capital buffer and G-SII buffer) are calculated and expressed on the basis of the floored RWA (RWA_{OF}), whereas the SRB and P2R are calculated on the basis of the institution's RWAs stemming from internally modelled approaches, referred to as RWA_{IM} in the figures.⁴ This can be formalised as follows:

$$MRC^{\text{alternative}} = RWA_{OF} \cdot \left\{ \begin{array}{l} G - SII/O - SII \\ CCyB \\ 2.5\% CCB \\ Min. Req. \end{array} \right\} + RWA_{IM} \cdot \left\{ \begin{array}{l} P2R \\ SRB \end{array} \right\}$$

19. This alternative implementation places more importance on modelling outcomes and provides less of a role to the output floor in constraining potential excessive RWA variability, in an area of the framework in which it could be argued that the BCBS standard is less clear or leaves potential ambiguity (P2R and SRB).
20. A disadvantage of the alternative approach is that it leaves neither the capital ratio based on RWA_{IM} nor the ratio based on RWA_{OF} as a good indicator of compliance with the requirements. For this reason, a second step of the approach is to convert the EU-specific capital requirements to layers based on the percentage of RWA_{OF} needed to make the requirements comparable with all other layers in the stack. This implementation is visualised in Figure 1 under the stack of requirements on the far right.
21. One disadvantage associated with the steps in this approach (applying a different denominator for some layers and then reconverting them) is complexity, for example due to changes to the applicable RWA_{OF} percentage rates for the EU buffer requirements each time there is a change in RWA_{IM} or RWA_{OF} .⁵ Finally, it would be difficult to justify why the setting of the SRB and P2R would be based on RWA_{IM} while other macroprudential buffer requirements are calculated on the basis of RWA_{OF} .

⁴ Note that RWA_{IM} refers to the sum of an institution's exposures that stem from internal models and those that are treated under standardised approaches.

⁵ In Figure 1, the 'SRB rate*' and the 'SREP*%' represent the ratio requirements after a reduction owing to the application of a RWA_{IM}/RWA_{OF} multiplier.

Figure 1: Components of capital requirements — stylised comparison of main and alternative approach

Main approach		Alternative approach	
CET1/RWA _{OF}		CET1/RWA _{IM}	CET1/RWA _{OF}
		Presentation in terms of RWA _{IM} with add-ons	Presentation in terms of RWA _{OF}
Article 133 SRB requirement = SRB rate x RWA _{OF}	reduced	Article 133 SRB requirement = SRB buffer rate x RWA _{IM}	Article 133 SRB requirement = SRB rate* x RWA _{OF}
CCyB rate x RWA _{OF}		Countercyclical capital buffer = CCyB rate x RWA _{IM}	Countercyclical capital buffer = CCyB rate x RWA _{OF}
G-SII buffer = G-SII rate x RWA _{OF}	equal	OF ADD-ON: CCyB rate x ΔRWA	
Conservation buffer = 2.5% x RWA _{OF}	equal	G-SII requirement = G-SII rate x RWA _{IM}	G-SII buffer = G-SII rate x RWA _{OF}
		OF ADD-ON: G-SII rate x ΔRWA	
P2R = 'SREP%' x RWA _{OF}	reduced	Conservation buffer = 2.5% x RWA _{IM}	Conservation buffer = 2.5% x RWA _{OF}
		OF ADD-ON: 2.5% x ΔRWA	
Minimum = 4.5% x RWA _{OF}	equal	P2R = 'SREP%' x RWA _{IM}	P2R = 'SREP*%' x RWA _{OF}
		Minimum = 4.5% x RWA _{IM}	Minimum = 4.5% x RWA _{OF}
		OF ADD-ON: 4.5% x ΔRWA	

Note: ΔRWA = RWA_{OF} - RWA_{IM}

22. On the whole, as indicated in a stylised manner by the arrows in Figure 1, the alternative approach, assuming that the RWA percentage rate of P2R and the SRB are the same for both approaches, leads to equal amounts of capital requirements for the minimum requirement, the capital conservation buffer, the countercyclical buffer and the G-SII requirement, and slightly smaller requirements for P2R and the SRB, compared with the main approach.

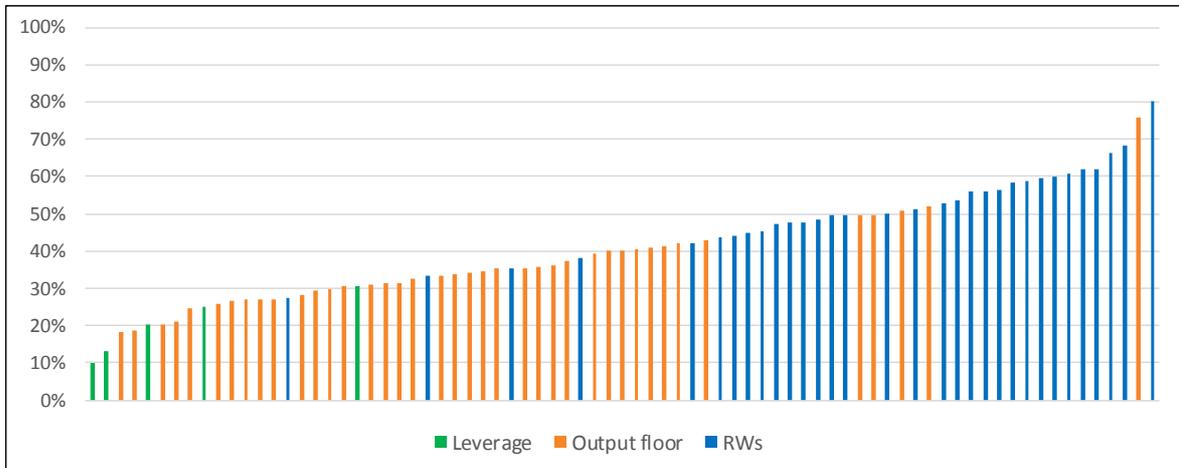
2.3 Conclusions

2.3.1 Introduction of the output floor in the EU

23. The output floor is one of the global measures aimed at restoring the credibility of internal models. By not implementing the measure in compliance with the Basel agreement, the credibility of internal models used by EU institutions would be called into question. Significant efforts have been undertaken by the EU and CAs to ensure the continued use of internal models and initiatives to guarantee a harmonised implementation, including the efforts of the EBA to harmonise the regulatory framework. It is therefore of the utmost importance that the output floor is introduced to avoid jeopardising these efforts.
24. The backstop function of the output floor and its propensity to meet the objectives of reducing excessive risk-weight variability and promoting comparability of risk-weighted capital ratios are illustrated by the results from the QIS. When observing the distribution of RWA densities,⁶ which are highlighted in Figure 2, it is apparent that the output floor particularly constrains those institutions that tend to have lower risk-weight densities than most of the other institutions using internal models. As a result of this tendency, the risk-weight densities of these institutions will be pushed closer towards the average and will consequently become more comparable with other institutions using internal models.

⁶ The RWA density is computed as the ratio of the total RWA over the current total asset of each bank. As the RWA changes under the different frameworks, the denominator is kept constant.

Figure 2: Distribution of RWA density in the central Basel III scenario before implementation of the output floor

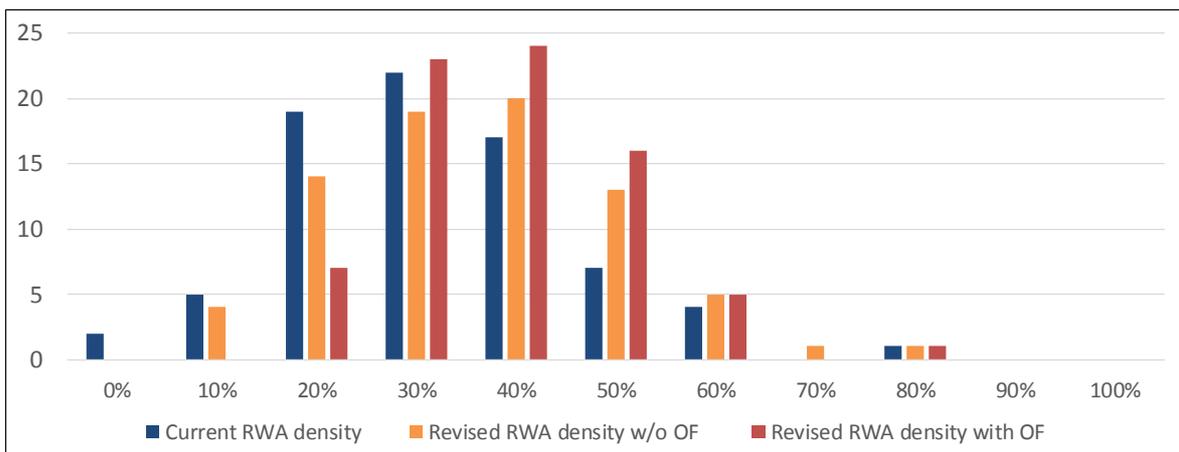


Sources: EBA 2018-Q2 QIS data and EBA calculations

Notes: Based on a sample of 77 banks. Colour represents final constraint for the bank.

25. Figure 3 further shows how both risk weight reforms and the output floor lead to a general increase in average risk weights, particularly the implementation of the output floor (a move from the orange bars to the red bars in Figure 3), which mostly affects the left tail of the distribution, leading to less dispersion between banks and a higher comparability of risk densities.

Figure 3: RWA density distribution under different frameworks for internal model institutions

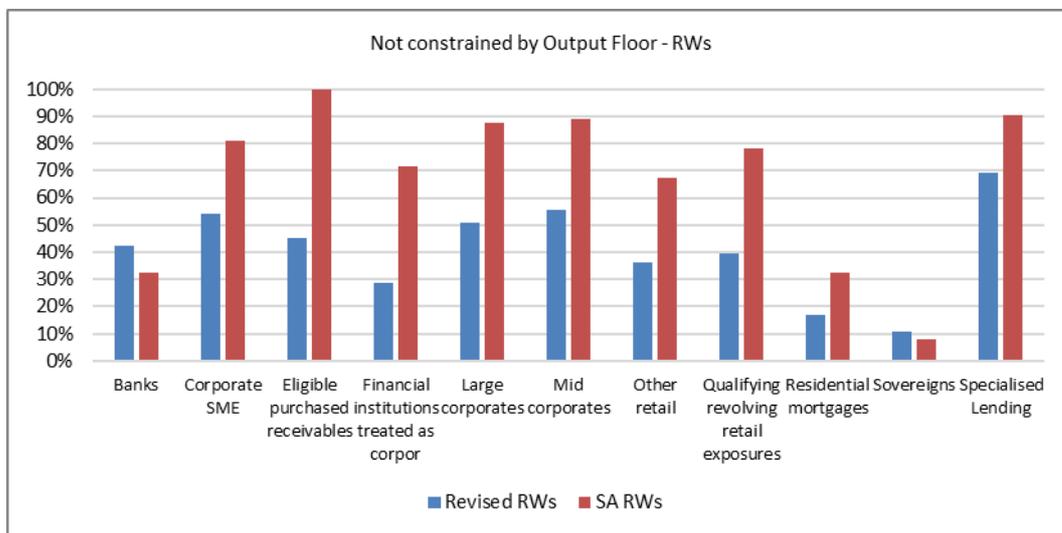


Sources: EBA 2018-Q2 QIS data and EBA calculations.

Notes: Based on a sample of 77 banks. OF, output floor.

26. The QIS results also provide some indication of which portfolio type may be associated with risk-weight variability leading to an output floor constraint. In this regard, the comparison between Figure 4 and Figure 5 indicates how the output floor, even though the 72.5% cap is applied on an aggregated level and not on a portfolio level, helps to achieve the objective of the output floor to reduce potential excessive variability in internal modelling output and for certain portfolio types. In particular, institutions that are constrained by the output floor have, on average, a larger divergence between IRB risk weights and SA risk weights on various portfolios (e.g. residential counterparties and specialised lending) than institutions that are not constrained by the output floor.

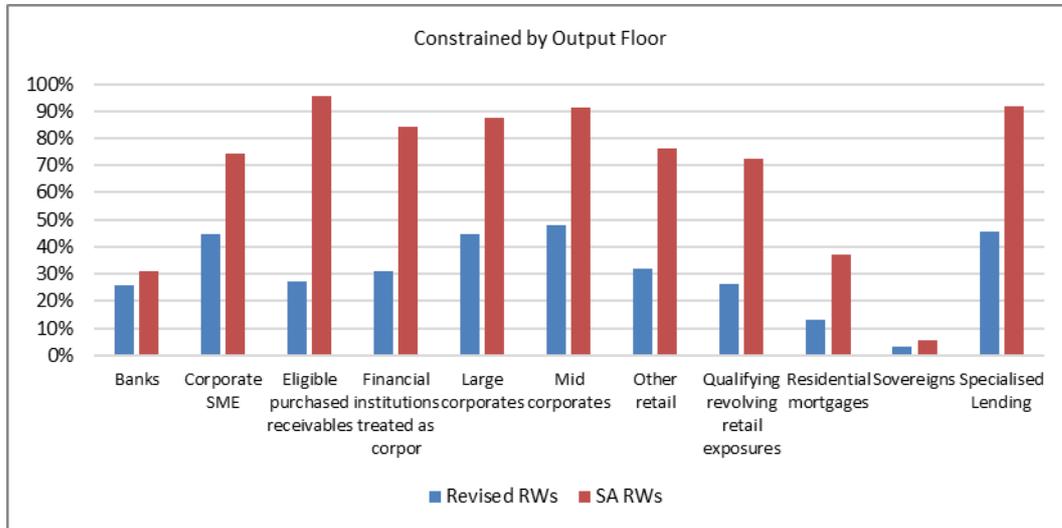
Figure 4: Average standardised and IRB risk weights — banks that are not constrained by the output floor



Sources: EBA 2018-Q2 QIS data and EBA calculations.

Notes: Based on a sample of 77 banks. SME, small and medium-sized enterprises

Figure 5: Average IRB and standardised risk weights — banks that are constrained by the output floor

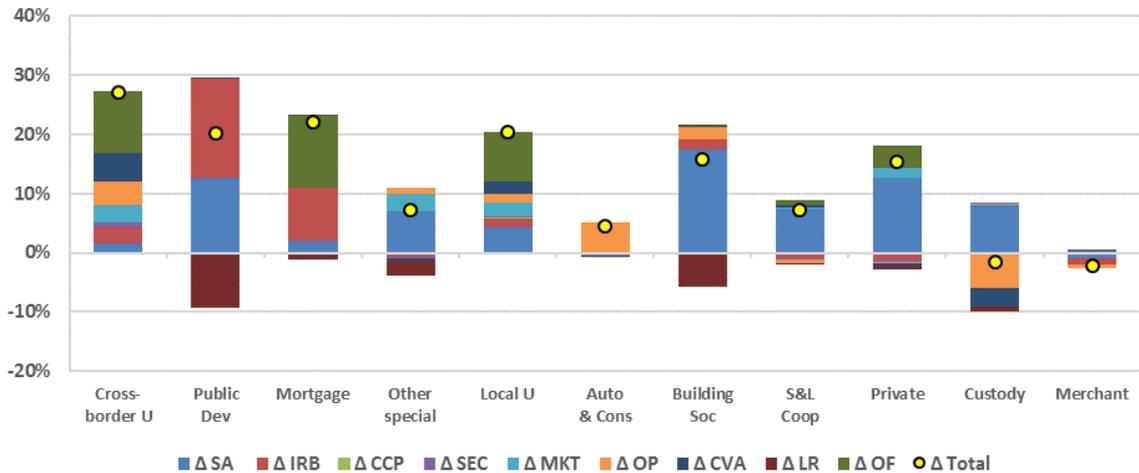


Sources: EBA 2018-Q2 QIS data and EBA calculations.

Notes: Based on a sample of 77 banks. SME, small and medium-sized enterprises

27. Another observation from the QIS (see Figure 6) is that, with everything included, the impact of the revised Basel framework overall affects most business models broadly in a more or less comparable manner (apart from a few specialised business models that seem to be, on average, affected less). This suggests that, considering the impact of the other revisions to the framework, the introduction of the output floor does not appear to unduly affect one or a few business models.
28. For some business models in particular that are not largely affected by the output floor, a higher impact can be observed from changes in the SA and/or the IRB approach (public development banks and building societies). For the public development business model and a few other business models that may specialise in exposures that receive low risk weights regardless of internal model use, the output floor impact is, on average, outweighed to some extent by the impact from the leverage ratio.
29. While the output floor and leverage ratio are both backstop measures, their different mechanics ensure that they mostly do not overlap (i.e. as evidenced in Figure 6). While the output floor targets banks with a significant difference between the RWA_{SA} and the RWA_{IM} , the leverage ratio targets institutions concentrating on exposures with low risk weights. Given this, the leverage ratio does not differentiate between whether these risk weights are estimated by internal models or by the standardised approach.

Figure 6: Percentage change in T1 MRC (relative to current T1 MRC), by business model



Sources: EBA 2018-Q2 QIS data and EBA calculations.

Notes: Based on a sample of 204 banks: Cross-border U (41), Leasing* (2), Public Dev (10), Mortgage (8), Other special (11), Local U (63), Auto and Cons (8), Building Soc (6), S&L Coop (34), Private (8), Custody (7), Merchant (5), CCP* (1).

SA, standardised approach to credit risk; IRB, internal ratings-based approach to credit risk; CCP, central counterparty; SEC, securitisation; MKT, market risk; OP, operational risk; CVA, credit valuation adjustment; LR, leverage ratio; OF, output floor.

(*) Not shown in the chart because fewer than 3 entities in the cluster. Calculation in accordance with the central reform scenario as in section 2.4 of the CfA Summary Report (e.g. unchanged P2R and SRB percentages).

30. Furthermore, as indicated in Table 1, and in line with the fact that institutions using internal models typically represent institutions of a larger size, the output floor affects large banks to a greater extent than other banks. As indicated, the weighted average changes in the MRC for institutions highlight that particularly large institutions are affected by the output floor, which levels the playing field between large and small/medium-sized banks.

Table 1: Percentage change in T1 MRC (relative to current T1 MRC), by size

	Δ SA	Δ IRB	Δ CCP	Δ SEC	Δ MKT	Δ OP	Δ CVA	Δ LR	Δ OF	Δ Total
All banks	2.7%	2.7%	0.1%	0.6%	2.5%	3.3%	3.9%	-0.5%	9.1%	24.4%
Large	2.3%	2.8%	0.1%	0.7%	2.6%	3.4%	4.1%	-0.5%	9.5%	25.0%
of which: G-SIIs	1.7%	3.5%	-0.1%	1.2%	4.2%	5.5%	5.1%	0.0%	7.6%	28.6%
of which: O-SIIs	2.3%	1.7%	0.2%	0.3%	1.6%	2.1%	3.7%	-0.5%	12.1%	23.6%
Medium	9.7%	0.1%	0.0%	0.0%	0.9%	0.3%	0.5%	-1.1%	0.9%	11.3%
Small	10.7%	0.0%	0.2%	-1.9%	0.0%	-3.7%	0.3%	-0.1%	0.0%	5.5%

Sources: EBA 2018-Q2 quantitative impact study (QIS) data and EBA calculations.

Notes: Based on a sample of 189 banks: Large (104), of which G-SII (8), of which O-SII (67); Medium (61); Small (24). SA, standardised approach to credit risk; IRB, internal rating-based approach to credit risk; CCP, central counterparty; SEC, securitisation; MKT, market risk; OP, operational risk; CVA, credit valuation adjustment; LR, leverage ratio; OF, output floor. Calculation in accordance with the central reform scenario as in section 2.4 of the CfA Summary Report (e.g. unchanged P2R and SRB percentages).

31. As a reminder, these impact estimates are based on conservative assumptions regarding the P2R and SRBs, assuming that these requirements in percentage terms remain unchanged. An alternative measure of impact is that of the impact of the revised framework on the MRC

requirements from the Pillar 1, the capital conservation buffer and the G-SII buffer (when applicable), as presented in Table 2. On the basis of this more restricted definition of the MRC, it is estimated that the implementation of the output floor would lead to a less notable increase in the MRC, namely 3.9% for all banks on average and 4% for large banks on average.

Table 2: Percentage change in T1 MRC change (relative to current T1 MRC) — EU average results (restricted definition of MRC)

	Δ SA	Δ IRB	Δ CCP	Δ SEC	Δ MKT	Δ OP	Δ CVA	Δ LR	Δ OF	Δ Total
All banks	2.6%	2.6%	0.0%	0.6%	2.4%	3.3%	3.6%	-0.7%	3.9%	18.4%
Large	2.2%	2.7%	0.0%	0.6%	2.5%	3.5%	3.8%	-0.6%	4.0%	18.7%
of which G-SIIs	1.7%	3.3%	-0.1%	1.1%	4.1%	5.5%	5.0%	3.3%	5.0%	28.9%
of which O-SIIs	2.2%	1.4%	0.1%	0.3%	1.4%	2.0%	3.2%	-3.9%	3.6%	10.3%
Medium	10.3%	0.2%	0.0%	0.0%	0.7%	0.3%	0.4%	-1.8%	0.5%	10.6%
Small	11.1%	0.0%	0.3%	-2.0%	0.0%	-3.5%	0.4%	0.8%	0.0%	7.1%

Sources: EBA 2018-Q2 QIS data and EBA calculations.

Notes: Based on a sample of 189 banks. SA, standardised approach to credit risk; IRB, internal rating-based approach to credit risk; CCP, central counterparty; SEC, securitisation; MKT, market risk; OP, operational risk; CVA, credit valuation adjustment; LR, leverage ratio; OF, output floor.

Recommendation OF 1: Introduction of the output floor in the EU

The output floor should be implemented in the EU in compliance with the Basel agreement and calibrated at 72.5% of the total RWA computed under the standardised approaches, to introduce a credible backstop to internal models used for capital requirements purposes.

2.3.2 Type of output floor to be implemented

32. The main approach, as described in Section 2.1, represents the approach that is most in line with the revised framework text. As mentioned in the introduction (Section 1), the Basel framework clarifies that the output floor is intended to be directly applied to RWAs, which indicates that floored RWAs generally need to be used for all further purposes (e.g. the calculation of capital requirements). In addition, it appears that all the capital requirements of institutions should be calculated on the basis of floored RWAs. The main approach satisfies these preconditions.
33. The alternative approach is not recommended, given the drawbacks with its implementation, as described in Section 2.2. Significant drawbacks, as explained, include the need to recalculate the applicable percentage rate for some of the layers (the SRB, P2R), as a result of the calculation on the basis of RWA_{IM} and the subsequent conversion as a percentage of RWA_{OF} , which leads to complexity and a lack of transparency, as well as different applicable percentage rates any time there is a change in RWA_{IM} or RWA_{OF} . Another drawback is that there is no justification of why the setting of the SRB and P2R would be based on RWA_{IM} while

other prudential buffer requirements are calculated on the basis of RWA_{OF} . Finally, it reduces comparability between institutions.

34. Any approaches based on parallel stacks, as described in Annex 1.1, are strongly rejected for different reasons (also see Annex 1). Importantly, they would reduce the output floor to a very minor role, with the risk-based requirement continuing to be based on the RWAs resulting from internally modelled based approaches. In particular, they would circumvent impacts, on the basis that the RWA_{IM} -based stack is likely to exceed the output floor requirement for most institutions. Conversely, for institutions for which the output floor requirement leads to the highest amount of capital requirements, there may be no changes in capital requirement stemming from the introduction of EU-specific buffers.
35. In addition, they can be deemed inappropriate, since parallel stacks would create confusion in terms of trigger levels, such as that of AT1 or those associated with minimum distributable amount (MDA), as these levels would be calculated both in the RWA_{IM} stack and in the RWA_{OF} stack. A more fundamental point is that this interpretation would not be in compliance with the Basel agreement, because it is based on a comparison of two amounts of capital requirements, whereas the Basel text states that the capital ratio requirements should be applied to the institution's RWA_{OF} .
36. Compared with the alternative approach, the main approach does not suffer from any significant drawbacks, and would lead to a relatively straightforward and transparent calculation of the amount of required capital. Furthermore, it is to be noted that, when the output floor may result in a potential interaction with other prudential requirements, such as P2R or the SRB, the way in which such aspects should be addressed is described in Section 3.1. This could result in an outcome with no difference in impact between both approaches.

Recommendation OF 2: Type of output floor to be implemented

The output floor should be implemented in compliance with the Basel agreement, in accordance with the main approach described in this report under Section 2.1, i.e. all the full stack of capital requirements should be calculated and expressed on the basis of institutions' floored RWA, including the countercyclical buffer, G-SII buffer, O-SII buffer, capital conservation buffer, the systemic risk buffer and Pillar 2 requirements.

3. Other aspects regarding the output floor

3.1 Interaction of the output floor with other prudential requirements

3.1.1 P2R and the SRB

37. P2R consist of a variety of elements, as described in detail in the ‘Guidelines on the revised common procedures and methodologies for the supervisory review and evaluation process (SREP) and supervisory stress testing’, published on 19 July 2018.⁷ Some of the elements in the EBA SREP Guidelines may be subject to a trade-off with the output floor. In particular, if these add-ons are currently required to compensate for deficiencies in the measurement of these elements in Pillar 1 due to the use of internal models (paragraph 257 of the EBA Guidelines), an extensively constraining output floor could be a reason to remove these add-ons.
38. More specifically, it may seem appropriate to duly consider the effect of a constraining floor (i.e. $72.5\% \times RWA_{SA} > RWA_{IM}$) for cases in which P2R add-ons are currently calculated as a percentage of RWAs, with RWAs as the current RWA_{IM} . In particular, it may be appropriate to review such a calculation approach and focus on the amount of P2R add-ons in terms of the absolute capital level targeted with the P2R levels. The SREP Guidelines (paragraph 371) specify that the determination of the own funds add-ons should lead to absolute amounts, whereas for communication to institutions the guidelines clarify (paragraph 375) that the own funds add-ons should (at least) be a proportion of RWA.
39. Another issue that would have to be further addressed in an update of the guidelines relates to the challenges mentioned in Section 3.2 on the calculation of RWAs at a granular level, that is, how to decompose the RWA impact of the output floor. It is clear that aggregate RWAs, including the impact of a constraining output floor, will become the reference point for assessing overall risk. However, when using it at a more granular level, this can potentially pose decomposition challenges. In particular, for those P2R add-ons that target specific portfolios or types of risk (e.g. credit concentration risk, which would be based on credit risk RWAs), it will be difficult to attribute the impact of the floor on RWAs to such a portfolio/risk type. This is an issue that will need to be considered. More broadly, it will be important to carefully consider the implementation of the P2R add-ons so that there is no overlap between current P2R charges and the output floor.

⁷ <https://www.eba.europa.eu/regulation-and-policy/supervisory-review-and-evaluation-srep-and-pillar-2/guidelines-for-common-procedures-and-methodologies-for-the-supervisory-review-and-evaluation-process-srep-and-supervisory-stress-testing>

Recommendation OF 3: Pillar 2 decisions

Competent authorities should reconsider the appropriate level of Pillar 2 to ensure that these amounts take due account of the new output floor requirements. In addition, the EBA Guidelines on SREP should be reviewed with this in mind.

40. Regarding the SRB, there are two main effects that are important for DAs to appropriately adjust for in the implementation of the output floor. Firstly, it is important for DAs to consider that an inappropriate or disproportionate impact of the SRB may occur where the SRB would, to some extent, address objectives that are similar to that of the output floor. It is to be noted that the purpose of the SRB is to prevent and mitigate systemic or macroprudential risks.
41. In this regard, as highlighted in the tables below — which are based on the overview of macroprudential measures compiled by the European Systemic Risk Board (ESRB)⁸ — it may be relevant to review the description of the SRB measures that are currently applicable as well as the intermediate objective (the ESRB classifies the measure in accordance with four intermediate objectives). The majority of the measures are classified by the ESRB so that they have the intermediate objective of either ‘credit growth and leverage’ (six countries shown in Table 3) or ‘misaligned incentives’ (10 countries show in Table 4). One country has implemented the SRB with the intermediate objective of ‘concentration of exposures’ (Table 5).
42. As indicated in the tables, the objectives or rationales for the implementation of the SRB are often quoted to relate to broader macroprudential or (banking sector) structural features, and not necessarily to relate to concerns on model risk or the RWA variability associated with the output floor. However, SRB measures mostly apply to the more systemically relevant institutions, which also happen to perform more internal modelling and are therefore typically more affected by the output floor. In particular, under the objective of ‘misaligned incentives’ the measures mostly target O-SIIs, which cannot directly be required in the form of an O-SII buffer requirement, given the cap that is applicable in the CRD IV framework (which is set to be removed under CRD V).

⁸ https://www.esrb.europa.eu/national_policy/systemic/html/index.en.html

Table 3: Implementation of the SRB — ‘credit growth and leverage’ as an intermediate objective

Country	Description measure	Type of exposures to which measure is applied
Austria	Setting and maintaining of the SRB for 13 institutions, up to a maximum of 2%. Continuation of the phasing-in period, with the buffer applied to all exposures on either a consolidated or individual basis.	All exposures
Bulgaria	SRB of 3% applied to domestic exposures of all banks in Bulgaria on individual, consolidated and sub-consolidated basis.	Domestic exposures
Croatia	Two SRB rates (1.5% and 3%) applied to two sub-groups of banks (market share < 5%, market share > 5%). Applied to all exposures.	All exposures
Denmark	Activation of SRB in the Faroe Islands. All Danish credit institutions with exposures in the Faroes Islands above DKK 200 million are requested to recognise the SRB. The general SRB of 1% for exposures in the Faroe Islands will be applied cumulatively with the institution-specific SRB.	Domestic (Faroe Islands)
Estonia	The SRB rate remains at 1%. Applied to all banks.	Domestic exposures
Poland	Activation of an SRB of 3%. The SRB will apply to all exposures located in Poland.	Domestic exposures
Romania	An SRB is calculated on the basis of all exposures of the banks to which the buffer applies. Vulnerabilities that have been identified are (i) the possibility of a renewed increase in non-performing loan ratios, following the rise in interest rates and a slowdown in the balance sheet clean-up process; and (ii) the tensions surrounding macroeconomic equilibria. The level of the SRB is set to 0%, 1% or 2%, according to the 12-month average of the non-performing loans ratio and the coverage ratio, with provisions reported by each individual credit institution.	All exposures

Source: ESRB overview

Table 4: Implementation of the SRB — ‘misaligned incentives’ as an intermediate objective

Country	Description measure	Type of exposures to which measure is applied
Czechia	Setting of SRB of between 1% and 3%, depending on the systemic importance of the five selected institutions. Applied to all exposures on sub-consolidated basis.	All exposures
Denmark	Setting of SRB of between 0.5% and 3% for seven O-SIIs, depending on the level of systemic importance of each institution.	All exposures
Denmark	Setting of SRB for Nordea Kredit Realkreditaktieselskab.	All exposures
Finland	Activation of a new SRB to be implemented without a phase-in period. The SRB is applied at 1% for all credit institutions authorised in Finland. In addition, institution-specific rates are applied to three credit institutions.	All exposures
Iceland	The application of the SRB to eight institutions at a rate of 3%.	Domestic exposures

Country	Description measure	Type of exposures to which measure is applied
Liechtenstein	The application of the SRB to three institutions at the rate of 2.5% of RWAs.	All exposures
Netherlands	SRB of 3% applied to three (out of five) of the systemically important institutions identified in the Netherlands. Applied to all exposures on a consolidated basis.	All exposures
Norway	The SRB is set to 2% for the identified O-SIIs. Norway applies an SRB on the identified O-SIIs. In addition, an SRB of 3% is applied to all banks in Norway.	All exposures
Slovakia	Changing of the level of an existing SRB. An SRB of 1% for domestic exposures of three selected O-SIIs. The decision to introduce the buffer was with the aim of addressing structural risks related to the significance of the banking sector in the Slovak financial system, its high concentration and the external risk derived from Slovakia being a small and open economy.	Domestic exposures
Sweden	The three largest banking groups are subject to an SRB of 3%. Applied to all exposures on a consolidated basis.	All exposures

Source: ESRB overview

Table 5: Implementation of SRB — ‘exposure concentration’ as an intermediate objective

Country	Description measure	Type of exposures to which measure is applied
Hungary	Reassessment of institution-specific SRB set in the range of 0% to 2%.	Domestic exposures

Source: ESRB overview

43. The second main effect for DAs to take into account is that the SRB, in accordance with Article 133(11) of the CRD, would be particularly affected by an increase in RWAs due to the implementation of the floor, with an unchanged SRB rate leading to higher amounts in euros for this capital requirement.
44. Against the backdrop of these considerations, it may be appropriate for DAs to reconsider the sets of institutions to which the SRB applies as well as the applicable rate(s). On this basis, DAs could avoid institutions that are affected by the output floor becoming disproportionately affected by the SRB. In addition, another potential reason for DAs to reconsider may be the revisions in CRD V regarding the implementation of the SRB.
45. Similarly, taking into account these considerations regarding the interaction with the output floor would also be relevant for capital buffer requirements applied on the basis of

Article 458(2)(d)(i) or (iv) of the CRR. At present, there are no capital buffer requirements on the basis of Article 458(2)(d)(i) or (iv) of the CRR.

Recommendation OF 4: Systemic risk buffer

Designated authorities are recommended to reconsider the appropriate level of the SRB rate(s) for output floor-constrained institutions, once the revised Basel III framework enters into force in EU legislation, to ensure no overlap in objectives between the macroprudential measure and the output floor or unintended increases in the requirement due to an increase in RWA.

3.1.2 AT1 trigger

46. Consistent with the recommended ‘main approach’ to the implementation of the output floor, whereby floored RWAs are used to compute the full stack of capital requirements applicable in the EU, the regulatory ratios (CET1, tier 1 and total capital) computed on the basis of floored RWAs — that is, the ‘floored ratios’ — are the ratios to be monitored to assess institutions’ compliance with capital requirements. In accordance with this change, for institutions constrained by the output floor, the AT1 triggers of the BCBS framework implemented in the EU (Article 54 (1)(a)(i) of the CRR) should be based on the floored ratios.

Recommendation OF 5: AT1 triggers

The legislation implementing the revised Basel III framework should clarify that the Basel AT1 triggers of institutions constrained by the output floor should refer to the floored regulatory ratios, i.e. the regulatory ratios computed on the basis of floored RWAs.

3.1.3 Implementation of Article 124

47. Another interaction between the output floor and a macroprudential measure is that of Article 124 of the CRR, which, if triggered, increases the RWAs in the SA risk weights on real estate exposures on a jurisdiction-wide basis, and consequently leads to the question of whether or not the output floor RWA (which is based on the SA calculation) should also increase.
48. To understand the materiality of the requirement, it can be observed from Table 6 and Table 7 — taken from the overview of macroprudential measures compiled by the ESRB⁹ — that the discretion in Article 124(2) of the CRR currently applies in 11 cases. Of these 11 cases, 7 apply to exposures secured by commercial immovable property (an increase to a 100% risk weight in 5 cases and tightening conditions for the 50% risk weight in the 2 other cases). In 4

⁹ https://www.esrb.europa.eu/national_policy/other/html/index.en.html

of the 11 cases, the application of the discretion targets exposures secured by residential immovable property, implementing more stringent conditions for the 35% risk weight.¹⁰ All measures under Article 124 of the CRR are classified by the ESRB as having ‘credit growth and leverage’ as an intermediate objective.

Table 6: Implementation of Article 124 of the CRR — risk weights on commercial real estate

Country	Description measure
Croatia	Higher risk weights for exposures secured by mortgages on commercial immovable property (from 50% to 100%).
Ireland	Minimum risk weight on commercial property lending increased from 50% to 100%. These are a continuation of previous policies that have been in place since 2007.
Latvia	Risk weights: 100% for exposures secured by mortgages on commercial immovable property.
Norway	Higher risk weights (100%) and stricter criteria than in the CRR for commercial real estate exposures of SA institutions.
Poland	Risk weights: 100% for exposures secured by mortgages on commercial immovable property.
Romania	Higher risk weights (100%) and stricter criteria than in the CRR for commercial real estate exposures of SA institutions. The measure has been introduced in the national legislation starting 1/1/2007 and has been maintained by exercising the national option under the CRR. Compulsory reciprocation under Article 124(5) of the CRR.
Sweden	Continuation of practice since 2007 to apply a risk weight of 100% for exposures secured by mortgages on commercial immovable property.
United Kingdom	Risk weights: 100% for exposures fully secured by mortgages on commercial immovable property. Dependent on annual average loss rates for commercial mortgage lending in the United Kingdom.
United Kingdom	Risk weights: stricter criteria for loans secured by commercial property located in a jurisdiction that is not in the EU. Applied to domestic banks, building societies and designated investment firms using the SA.

Source: ESRB overview

Table 7: Implementation of Article 124 of the CRR — risk weights on residential real estate

Country	Description measure
Croatia	Stricter definition of residential property for preferential risk weighting, and a risk weight of 35% may be assigned provided the owner of the residential property is the owner of no more than two residential properties.
Ireland	Stricter criteria for preferential weighting of residential mortgage loans: the property needs to be owner-occupied and the loan-to-value must not exceed 75%. These are a continuation of previous policies that have been in place since 2007.
Liechtenstein	In accordance with Article. 124(2) of Regulation (EU) No 575/2013, Liechtenstein has exercised the option to apply the following risk weights: (a) 35% for residential properties with an LTV up to 66 2/3%; (b) 50% for residential properties with an LTV between 66 2/3% and 80%.
Malta	Continuation of practice since 2008 for exposures secured by mortgages on residential property and attracting a risk weight of 35%, which is not to exceed 70% of the market value of that property (based on Article 124).

¹⁰ https://www.esrb.europa.eu/national_policy/systemic/html/index.en.html

Country	Description measure
Poland	Risk weights: 150% for exposures secured by mortgages on residential real estate where the principal or interest instalments depend on changes in the exchange rate of one or more foreign currencies that differ from the borrower's income currency.
Slovenia	Applying stricter criteria than those set out in Article 125(2) of the CRR on exposures fully and completely secured by mortgages on residential property: for the purpose of Article 125(2d), the LTV ratio is set to 60%. Continuation of an existing measure. Exposures secured on commercial immovable property retain a risk weight of 50% and are thus unchanged.

Source: ESRB overview

49. A more straightforward implementation — which would avoid complexity — is to calculate the output floor RWAs on the basis of the SA calculation, including any effects of Article 124 of the CRR (assuming the discretion will continue to be available once the revised SA framework is implemented). While there may be some impact on some of the jurisdictions mentioned above, just like with the SRB, a potential change in how the discretion is implemented on a jurisdiction-wide basis may be possible (albeit not in a perfectly offsetting way).
50. A similar argument can be made for those adjustments made under Article 458(2)(d)(vi) and (vii) of the CRR that affect the RWAs under the SA. In particular, whenever the RWAs under the SA are increased as a result of the application of Article 458 of the CRR, they should be taken as the basis for the output floor calculation.

Recommendation OF 6: Article 124(2) and the calculation of the output floor

The legislation implementing the revised Basel III framework should clarify that the calculation of the standardised approach RWAs for the purposes of the output floor should take into account any higher risk weights set at the level of a Member State in accordance with the discretion provided under Article 124(2) of the CRR.

3.2 Calculation of RWAs at granular level

51. The revised Basel III standards require that institutions disclose two sets of risk-weighted capital ratios — a set with and a set without the capital floor — in the calculation of RWAs. This means that institutions will also have two values of RWAs — a value with and a value without application of the floor.
52. The floor is calculated at the fully aggregated level, including all RWAs for all types of risks. This aggregated calculation makes it possible to net out the effects of the application of the floor between different portfolios and different types of risks. As a consequence, questions may arise on the appropriate value of RWAs for a given type of risk or a given portfolio. To ensure a harmonised application and comparability of RWAs between institutions at a granular level, this aspect will have to be further clarified in the implementation of the revised Basel III standards in the EU.
53. While only the aggregated value of RWAs is needed in the calculation of capital ratios, it is necessary to determine representative values of the underlying RWAs at a more granular

level, as they are needed for the purposes of disclosure, reporting, general risk management, and the determination of certain buffer requirements.¹¹ The example in Table 8 presents potential issues related to the disaggregation of overall floored RWAs by specific types of risks and portfolios.

Table 8: Example illustrating the calculation of RWAs at granular level

A	B	C	D	E	F
	RWA_{IM}	RWA_{SA}	72.5% of RWA_{SA}	RWA_{OF} — simple disaggregation (multiplier of 1.07 = 145/135)	Final RWA — proposal
Credit risk	100	170	123.3	107.4	100
sovereigns	5	0	0.0	5.4	5
institutions	5	10	7.3	5.4	5
corporates	30	60	43.5	32.2	30
retail mortgages	20	50	36.3	21.5	20
other retail	40	50	36.3	43.0	40
Market risk	20	15	10.9	21.5	20
Operational risk	10	10	7.3	10.7	10
Other RWAs	5	5	3.6	5.4	15
other add-ons	5	5	3.6	5.4	5.0
output floor add-on				0.0	10.0
Total	135	200	145.0	145.0	145.0

54. Column E presents the results of a simple disaggregation of the floored RWAs, taking into account the netting effects. This disaggregation is based on a single multiplier increasing the RWAs due to the application of the floor. While this calculation does not affect the overall ranking of risk as assessed based on internal models, it does lead to some counterintuitive results. One particularly counterintuitive result is that the already conservatively estimated RWA_{IM} for market risk (in this example, it is credit risk that is modelled aggressively) are further increased based on the output floor multiplier.
55. For these reasons, it is recommendable that institutions in which the value at the granular level needs to be assessed would include the non-floored RWAs as important reference values. The inclusion of non-floored RWAs would ensure simplicity and continuity in how the RWAs are reported, in accordance with current supervisory reporting practices. In addition, for full transparency, SA RWAs for exposures on a granular level should also be reported and disclosed, in accordance with the revised BCBS standard. Moreover, the capacity to calculate RWAs in accordance with the SA should be in place for the calculation of the output floor.

¹¹ For the SRB calculation, which under CRD V may apply to just a subset of an institution's exposures, it would be necessary to calculate the RWAs associated with those exposures. Similarly, for the calculation of the weighted average cross-country countercyclical buffer rate, it needs to be determined how much of the total RWAs is situated in which jurisdiction.

Recommendation OF 7: Disclosure/calculation of RWA at granular level

The calculation of RWA at granular level (e.g. exposure class/portfolio level) should maintain a continued role for pre-floor RWA for some specific elements in the prudential framework, such as the calculation of buffer requirements for a subset of exposures. There should be a separate disclosure of the RWA add-on stemming from the calculation of the output floor on an aggregate level. In addition, for transparency purposes, pre-floor RWA and standardised RWA should be reported and disclosed for exposures on a granular level, as laid down under the revised Basel III standards.

3.3 Scope of application of the output floor

56. A further issue in the implementation of the output floor relates to the question of whether it applies only at the highest level of consolidation in the EU or whether it applies at individual and subconsolidated levels as well. In its quantitative analysis, the EBA has not comprehensively assessed the potential impact of the implementation of the output floor at each level, as the data collected are mostly based on the highest level of consolidation in the EU. However, it is possible that the sum of RWA add-ons stemming from the floor at individual levels is higher than the RWA add-ons when measured at only the highest level of consolidation in the EU.
57. In groups in which many entities are authorised to use internal approaches (e.g. regional banks in cooperative groups), the cumulative impact of RWA add-ons due to the application of the output floor at the individual level could be notably higher than the impact measured at the highest level of consolidation in the EU. Such an impact would be driven not only by the calibration of the internal models, but also by group structure and whether or not capital at subsidiary level is raised internally or externally.
58. The difficulty of the trade-off is that the application at the individual level may introduce distortions in the internal risk allocation across banking groups and may lead to higher overall requirements dependent on group structure. It may particularly imply that implementation at the individual level does not keep business model neutrality, especially for business models that are inherently structured on the basis of many (local) units of limited size. Given this, an application at the highest level of application would be in line with a fully European approach to capital allocation.
59. However, all the existing capital requirements in the CRR are applied at individual level, including the leverage ratio, which is also a type of backstop measure and in this respect is similar to the output floor. A decision to apply the output floor at only a consolidated level would therefore represent a departure from the current application of capital requirements

in the EU. An application of the output floor solely at consolidated level would not prevent the possibility of economic risks present at individual level being underestimated and not sufficiently covered by appropriate capital requirements reflecting the underlying risk of the exposures present in the individual entity.

60. Equally, it seems that, where there is a rationale to apply the output floor at a consolidated level (to constrain risk-weight variability and reduce the difference between RWA_{IM} and RWA_{SA}), there is also a rationale at an individual level. In this vein, it could be argued that an application on an individual level could further help to bring about the objective of addressing undue difference in RWAs at individual level and could additionally achieve a more even playing field between (subsidiaries of) large institutions and medium-sized/small institutions that do not consist of multiple solo entities. In this regard, note that the QIS in Table 1 indicates that, already at a consolidated level, the impact of the output floor is particularly concentrated among large institutions.
61. Applying the output floor at the consolidated level may help to prevent individual entities at all levels from deriving excessive capital benefits from their use of internal models. In this regard, assuming that the capital required on a consolidated basis is allocated adequately across group entities (as set out, for example, in the EBA Guidelines on SREP), individual institutions should maintain a proportionate 'fair share' of the (floored) capital required on a consolidated basis.
62. In terms of the ability of CAs to waive the application of the output floor on an individual level, there is the general capital requirement waiver of Article 7 of the CRR as well as that of Article 10 for credit institutions permanently affiliated to a central body. However, it needs to be considered that this waiver, when triggered, currently waives the application of the RWA ratio as well as leverage ratio requirement. Accordingly, after the implementation of the output floor, this waiver could be expected to apply equally across the board (i.e. waiving pre-floor RWAs, floored RWAs and the leverage ratio combined) and, therefore, would not deal with a potential situation in which it could be considered that just the output floor would have an unintended effect. It should also be noted that the aforementioned waiver is not available in situations where the individual institution and its parent institution are established in different Member States.
63. Against the backdrop of these considerations, the following further drivers of the impact of the output floor, specifically on an individual level, have been identified:
64. The first impact driver is the inability to net the constraining effects that the output floor may intrinsically have on certain exposures (mortgages) with those exposures that tend not to contribute to a constraining floor. Banks may have most/all portfolios for which $RWA_{IM} < 72.5\% \times RWA_{SA}$ in entities separate from the entities with portfolios for which $72.5\% \times RWA_{SA} > RWA_{IM}$. In the case of cooperative groups, this situation could, for example, materialise if local cooperative bank entities are mostly exposed to residential mortgages

with low RWAs in accordance with internal models, and specialised subsidiaries and foreign subsidiaries use standardised approaches.

65. However, this effect is not unique to the implementation of the output floor. From a theoretical perspective, drawing a parallel with the leverage ratio, which is implemented at all levels in the CRR, an equivalent situation arises in which a bank has all low risk-weight density portfolios in solo entities that are separate from those solo entities with portfolios of high risk-weight density, with relatively high leverage ratio MRC as a result of the low risk-weight density entities that cannot be offset with those entities in which the leverage ratio is not constraining (and the RWA-based requirement is).
66. As a second driver, impact can result from the amount of intragroup exposures that a banking group has (which by definition do not show up on a consolidated level). However, in this regard it would need to be noted that, at an individual level, CAs have the ability to waive, under certain conditions, the application of risk weights on the basis of Article 113(6) of the CRR for intragroup exposures in a consolidated group. While the use of this provision is not measured in the QIS, the existence of this waiver could allow this second driver to be mitigated.¹² However, again, this waiver is not available if individual institutions have exposures to counterparties in their group that are established in a different Member State.
67. This second impact driver may be more pronounced for cooperative banks that use internal modelling, which due to their business model tend to have high intragroup exposures. However, as previously mentioned, cooperative groups may resort, under certain circumstances, to Article 10 of the CRR. It is to be noted that, in the QIS sample, the majority of 'savings and loan associations/cooperative banks' use only the SA and are therefore not affected by the output floor (70% of the 34 institutions in the sample grouped in the 'savings and loan associations/cooperative banks' business model use only the SA). This confines the focus to those banks with this business model that do apply the IRB Approach. Some of these banks may have a large number of entities that are authorised to use internal modelling.
68. For those 'savings and loan associations/cooperative banks' that use internal modelling, the QIS data (see Figure 6) indicate that, at a consolidated level at least, almost none of them would be constrained by the floor. This could imply that this business model would have a reasonable starting position to absorb this additional impact (if not too big). However, it may not reflect those institutions classified under different business models that may also have cooperative group characteristics. In addition, in the absence of any comprehensive quantitative impact data, it is difficult to estimate the dimension of the impact, considering that the effects as mentioned in paragraph 64 are not visible at consolidated level.
69. At an individual level, QIS data are available for 15 institutions, as shown in Table 9, which tentatively indicates that there could be a somewhat more notable impact from the output floor at an individual level than at a consolidated level (see Table 1). However, it should be

¹² It is to be noted that the same waiver to not apply risk weights to exposures can also be waived for the purposes of the application of the leverage ratio exposure calculation.

noted that the sample is not representative of the whole EU banking sector, given the limited number of reporting institutions. The European Commission has therefore asked the EBA to further analyse the impact of the application at the individual level.¹³

Table 9: Cumulative results for subsidiaries participating in the QIS data collection

	Number of banks	Δ SA	Δ IRB	Δ CCP	Δ SEC	Δ MKT	Δ OP	Δ CVA	Δ LR	Δ OF	Δ Total
All banks	15	1.42%	3.64%	-0.05%	0.80%	3.09%	0.75%	3.41%	-0.63%	13.34%	25.75%
Large	13	1.42%	4.08%	-0.05%	0.84%	3.24%	0.74%	3.57%	-0.66%	13.96%	27.12%
Of which O-SII	13	1.42%	4.08%	-0.05%	0.84%	3.24%	0.74%	3.57%	-0.66%	13.96%	27.12%
Medium	2	1.32%	-5.66%	0.00%	0.00%	0.00%	0.87%	0.00%	0.00%	0.00%	-3.46%

Sources: EBA 2018-Q2 QIS data and EBA calculations.

Notes: Based on a sample of 15 banks. SA, standardised approach to credit risk; IRB, internal rating-based approach to credit risk; CCP, central counterparty; SEC, securitisation; MKT, market risk; OP, operational risk; CVA, credit valuation adjustment; LR, leverage ratio; OF, output floor. Calculation in accordance with the central reform scenario as in section 2.4 of the CfA Summary Report (e.g. unchanged P2R and SRB percentages).

70. Furthermore, Table 10 indicates how, out of the 15 subsidiaries, there are 9 IRB institutions, of which 5 would be constrained by the output floor. On aggregate, 88.6% of the total RWs of these 15 institutions would be held by an institution constrained by the output floor.

Table 10: Constraint analysis (IRB banks)

	RWs	LR	OF		RWs	LR	OF
Baseline	6	3	0	9	46.3%	53.7%	0.0%
Revised	3	1	5		10.2%	1.3%	88.6%

Sources: EBA 2018-Q2 QIS data and EBA calculations.

Notes: Based on a sample of 9 banks. RWs, for risk weights; LR, leverage ratio; OF, output floor

71. For the reasons mentioned above that may mitigate the impact, as well as the general principle that capital requirements — including the leverage ratio — apply at an individual level and that the rationale to implement the output floor should equally exist at an individual level, it is generally recommended that the output floor is applied at all levels, including individual and sub-consolidated levels.

Recommendation OF 8: Scope of application of the output floor

The output floor requirement should generally apply at all levels, just like other prudential requirements. Competent authorities should consider the impact of the implementation of the

¹³<https://eba.europa.eu/documents/10180/2886101/Ares-2019-4569387.pdf/89d0edf0-056d-4684-b066-c70cd0f03674>

output floor at different levels and consider neutrality in respect of business models in their waiver policy.

3.4 Role of provisions in the calculation of the output floor

72. The EBA has assessed the differences in the treatment of provisions between the SA and the IRB approach, and its potential impact on the output floor calculation. This request relates to the IRB shortfall/excess mechanism inherent in the calculation of available own funds of IRB banks, which is a mechanism for adjusting own funds that does not exist for SA banks and is based on the IRB logic to split up the loss function into an expected part that is deducted from own funds and an unexpected part that is captured in RWAs. In the own funds calculation, this works in such way that the expected loss based on IRB parameters is compared with provisions made (based on the accounting framework). When the IRB expected loss is higher, the difference leads to a deduction in CET1, and, when the IRB expected loss is lower, then the difference leads to an addition to tier 2 (capped at 0.6% RWAs).
73. In this context, the important question regarding banks bound by the output floor, which by its nature limits the effects of IRB models and is ultimately based on the SA risk weights (multiplied by 72.5%), is whether the IRB shortfall/excess mechanism is still appropriate or whether it should be cancelled out. To the extent that it could be considered inappropriate, two main options for cancelling out the IRB shortfall/excess mechanism were initially described in a 2014 BCBS consultative document.¹⁴ However, note that, ultimately, with the publication of the December 2017 revised framework, the BCBS did not include an adjustment.
74. The first option from the BCBS consultative document is to revert the CET1 deduction and tier 2 addition in the numerator of the floored RWA-based capital ratio for output-floor-bound banks, leading to an amount of own funds as if the bank were an SA bank. A second option discussed in the 2014 BCBS consultative document is to cancel out the effect of the IRB shortfall/excess mechanism via the denominator of the ratio, namely by adjusting the RWAs (instead of own funds) on the basis of multiplying the IRB shortfall and excess (the latter up to the 0.6% RWA cap of additional tier 2) by a certain number (e.g. a 12.5 multiplier).
75. In this context, it is to be noted that the implementation of International Financial Reporting Standard 9 (IFRS9), on average, reduces the IRB shortfall and increases the IRB excess, as a result of more forward-looking provisions. In particular, the 20 December 2018 EBA report on first observations on the impact and implementation of IFRS9 by EU institutions indicates that, based on June 2018 COREP data, IFRS9 has a significantly higher impact on CET1 for banks using the SA than for banks using the IRB approach. This could be mainly attributed to

¹⁴ <https://www.bis.org/bcbs/publ/d306.htm>

the IRB shortfall mechanism for IRB banks, which implies that regulatory expected losses exceeding the accounting provisions were already reflected in CET1.

76. These effects mean that adjustments (such as those under either option 1 or option 2) may not have a notable positive impact on the calculation of the capital ratio for output floor bound banks. It would even be unfavourable for some banks in which there is an IRB excess and a limited or no IRB shortfall (particularly under option 2).
77. In addition, it would be appropriate to further evaluate situations in which the IRB shortfall may be particularly relevant in the context of the output floor. For example, banks with large non-performing loan portfolios under the IRB approach could have a notable IRB shortfall deducted from CET1 and would have a 0% risk weight for defaulted exposures in the RWA calculation (if under Foundation IRB). It is to be noted that, in cases of a binding output floor, the RWA calculation would be effectively replaced by a measure calculated on the basis of the SA (with 100% or 150% risk weight).
78. To put these kind of cases into the right context and to allow a comparative analysis between capital requirements and approaches, Annex 1.2 provides a summary table of the calculation of the numerator/denominator for non-defaulted/defaulted exposures in terms of provisioning. Judging from this overview, a few relevant observations can be made:
- a) For defaulted exposures in the Foundation IRB approach (FIRB), the entire treatment is in the own funds measure, which is accounting provisions adjusted with the IRB shortfall/excess (calculated on the basis of a prescribed loss given default (LGD)), whereas in the denominator there is a 0% RWA. A driver of an IRB shortfall, leading to an expected loss higher than provisions, could then become the FIRB-prescribed LGDs (e.g. 45%). Under a binding output floor, there would also be a shift in the denominator from a 0% RWA to a 100% or 150% risk weight (subsequently multiplied by 72.5% in the floor calculation).
 - b) To understand whether or not this shift in the denominator would be appropriate, it may be weighted against the objective of the output floor of narrowing the divergence between IRB and SA banks by assuming a more conservative risk weight. Equally, it should be noted that, also in the Advanced IRB (AIRB), the RWA is 12.5 multiplied by $(LGD - EL_{BE})$,¹⁵ which if calculated with a reasonable margin of conservatism may not compare unfavourably with the output floor calculation (72.5% of 100% or 150%).
 - c) Furthermore, also in the case of leverage ratios, IRB banks use the tier 1 measure in the numerator that is affected by the IRB shortfall/excess calculation. There is no correction made for this in the numerator, and only a very minor adjustment is made in the

¹⁵ EL_{BE} is expected loss best estimate.

denominator (the IRB shortfall is deducted¹⁶ in accordance with Article 429(6) of the CRR as well as the revised Basel framework).

79. In addition to these observations, the EBA has estimated the impact of option 2 of the 2014 BCBS consultative document on the bindingness of the output floor. The results of this analysis, which only takes into account those (63) banks in the QIS that have implemented IFRS9 without transitional arrangements, are shown in Table 11. These results indicate that, out of the 40 banks that are bound by the output floor, there would be 5 that would not be bound any more if option 2 were implemented, owing to the correction of a notable IRB shortfall.
80. At the same time, the implementation of option 2 of the 2014 BCBS consultative document would result in 2 banks that are not bound by the floor (out of the 21 banks that were initially not bound by the floor) becoming bound by the floor, owing to the correction of a notable IRB excess. These banks are subject to the disadvantage of option 2, as mentioned in paragraph 76.

Table 11: Constraint analysis under Basel III central scenario and scenario with adjustment for IRB shortfall/excess, as per option 2 of 2014 BCBS consultative document

	LR	OF	RW	Total baseline scenario
LR	2	0	0	2
OF	0	35	5	40
RW	0	2	19	21
Total constrain w/ adj.	2	37	24	63

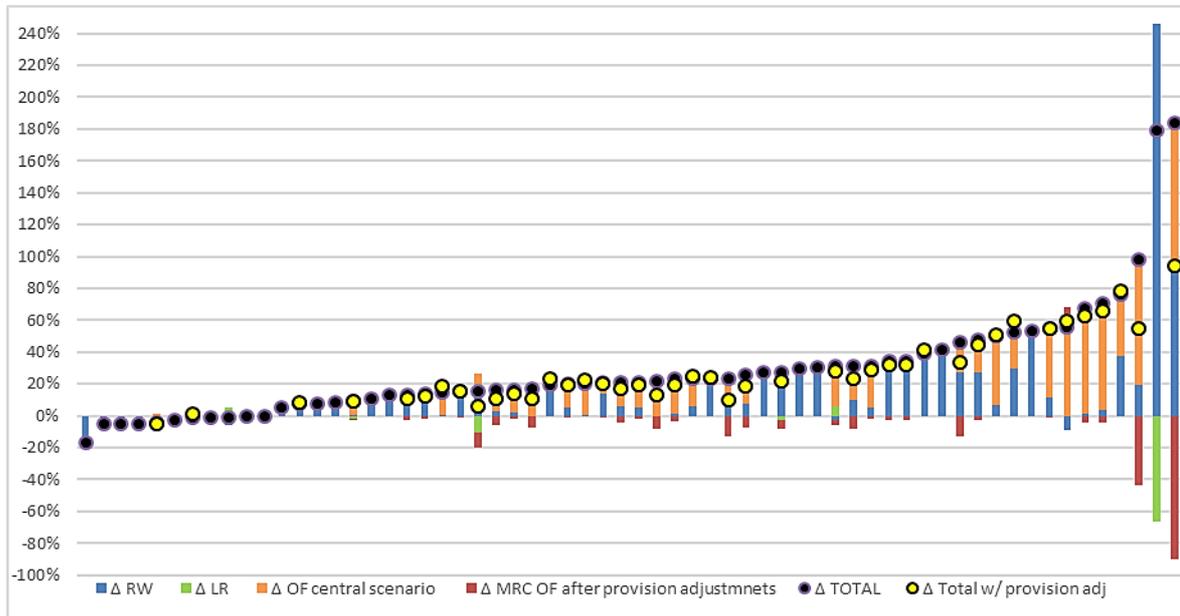
Sources: EBA 2018-Q2 QIS data and EBA calculations.

Note: Based on a sample of 63 banks.

81. As can be seen in Figure 7, the positive and negative effects can be found in more detail (impact on the MRC). In figure, it can be seen that, for the subset of 63 banks in the sample (which use internal models but do not apply IFRS9 transitional arrangements), option 2 would imply a decrease in the MRC for 30 banks and an increase in the MRC for 12 banks.

¹⁶ Note that this adjustment is a simple deduction of the IRB shortfall and is different from the adjustment under option 2 of the 2014 BCBS consultative document, which applies a multiplier of 12.5.

Figure 7: Percentage change in T1 MRC (relative to total current T1 MRC), central Basel III scenario vs. scenario with adjustment for IRB shortfall/excess



Sources: EBA 2018-Q2 QIS data and EBA calculations.

Note: Based on a sample of 77 banks. Calculation in accordance with the central reform scenario as in section 2.4 of the CfA Summary Report (e.g. unchanged P2R and SRB percentages).

82. Altogether, considering these observations, it seems that while the impact of the output floor may be somewhat alleviated under the various options, there also may be considerable drawbacks and inconsistencies with the broader prudential framework. For these reasons, an implementation without any adjustment¹⁷ strongly appears to be the most appropriate way forward, particularly given that developments, such as the implementation of IFRS9, are ongoing and work is still being performed on the BCBS regarding the consistency in the treatment of provisions.

Recommendation OF 9: Provisioning and the calculation of the output floor

Make no adjustments to the output floor based on accounting provisions, in line with the Basel Committee on Banking Supervision standards.

¹⁷ Apart from the regular adjustment of the exposure value of the SA for special credit risk adjustments (Article 111(1) of the CRR) in the calculation of the floored RWA, as in line with the Basel framework.

3.5 Transitional measures regarding the output floor

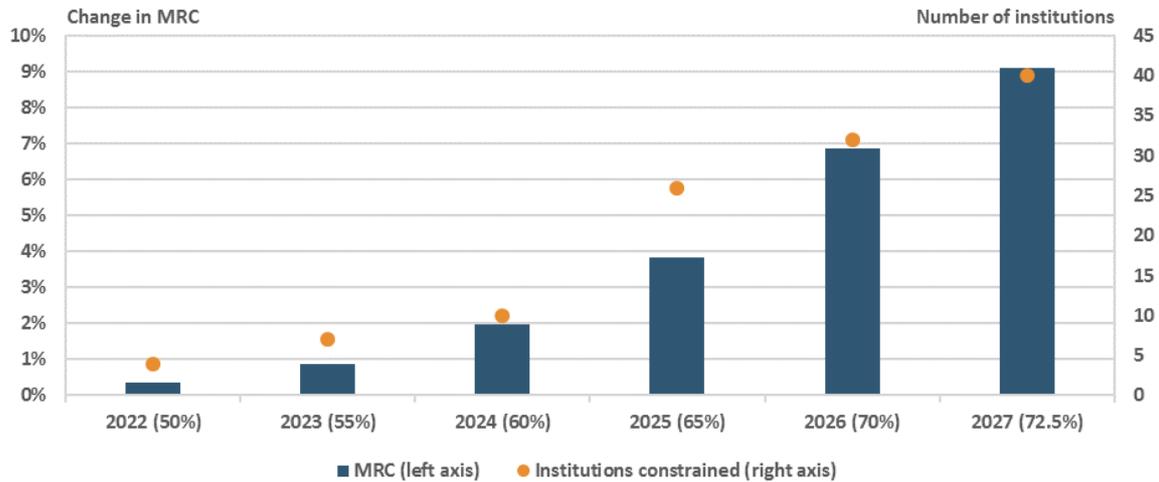
83. In terms of transitional measures for the implementation of the output floor, the BCBS envisages a 5-year transitional path starting in 2022 (see Table 11) for institutions to adjust to the new requirement, as well as the possibility of a ‘transitory cap’ that temporarily prevents a higher than 25% increase in RWAs. While achieving the objectives of the output floor relatively soon would be welcome, it would be appropriate to consider the merits of spreading out the impact gradually over the 5-year period set out in the revised Basel framework, as well as the ability of institutions to build up the potential additional own funds needed.

Table 12: Phased-in implementation of the output floor (December 2017 revised BCBS standards)

	1 January 2022	1 January 2023	1 January 2024	1 January 2025	1 January 2026	1 January 2027
Calibration	50%	55%	60%	65%	70%	72.5%

84. As stated earlier, the implementation of the full 72.5% output floor is a notable impact driver and contributes approximately 9% to the EU-average increase in total MRC. As this impact is concentrated in a subset of internal modelling banks (see Figure 7, it would be inappropriate to require full implementation straightaway.
85. Instead, taking into account that, with current capital levels, some institutions would already be affected at a 50% calibration of the output floor and that it would be desirable to provide an achievable implementation timeline for these institutions as well, it may be appropriate to stick to the 5-year transitional path laid out in the revised Basel framework. As can be seen from Figure 8, with a gradual increase in the output floor calibration, the impact is more spread out, even though most banks bound by the output floor would be bound only from a 60% calibration upwards (leading to an acceleration of impact from 2025 onwards).
86. Similarly, this would also allow time for CAs/DAs to duly take into account the effects of the output floor and its potential interaction with other own funds requirements, such as P2R and the SRB. As indicated in Section 3.1.1, both these requirements are expected to be subject to adjustment when necessary, just like the SREP Guidelines, to remove inconsistencies and unnecessary overlaps.

Figure 8: Contribution of the output floor to total EU-average MRC impact and number of internal model institutions constrained along the transitional period

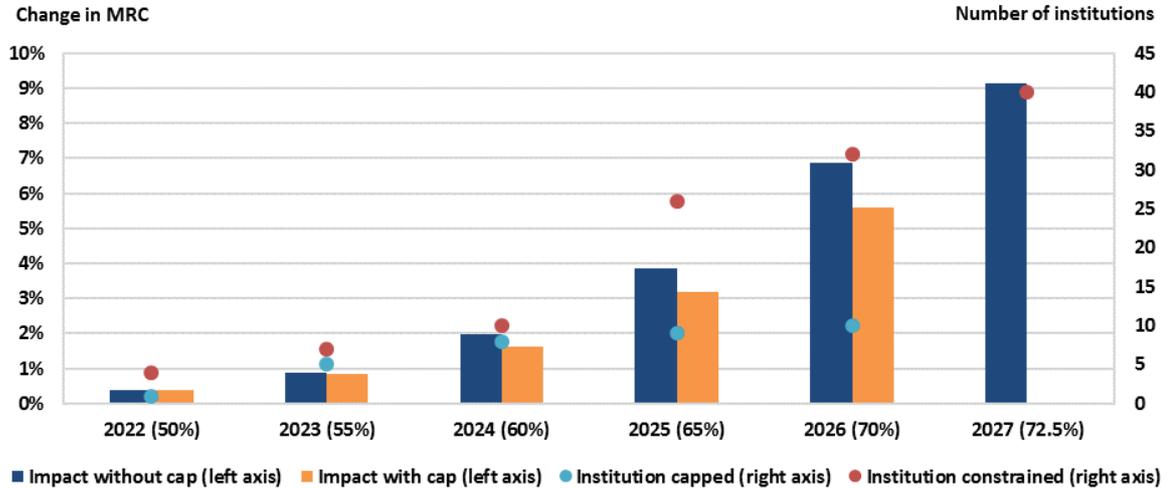


Sources: EBA 2018-Q2 QIS data and EBA calculations.

Note: Based on a sample of 189 banks. Calculation in accordance with the central reform scenario as in section 2.4 of the CfA Summary Report (e.g. unchanged P2R and SRB percentages).

87. In addition, taking into account that the impact of the output floor would be notably higher for some institutions than for others, it may be appropriate to also implement the transitional cap, preventing a higher than 25% increase until the end of 2026. As is evident from Figure 9, there would be 10 banks in the sample that are expected to benefit from such a cap in 2026 (with a 70% calibration). The transitional cap helps to achieve a smoother transitional path, delaying the full implementation of the output floor to 2027. However, the cap will result in a delayed impact between 2026 and 2027 for those banks benefiting from the cap.

Figure 9: Contribution of the output floor to total EU-average MRC impact with and without application of the transitional cap and number of internal model institutions that could benefit from the cap



Sources: EBA 2018-Q2 QIS data and EBA calculations.

Note: Based on a sample of 189 banks. Calculation in accordance with the central reform scenario as in section 2.4 of the Cfa Summary Report (e.g. unchanged P2R and SRB percentages).

88. Furthermore, the capital shortfalls that will need to be addressed by institutions will be notable, as indicated in Table 13, which shows how CET1, tier 1 and total capital shortfall amounts would develop during the transitional implementation of the output floor. The amounts represent the aggregate shortfalls with the institutions within the sample of 189 institutions that would face a shortfall (institutions that currently have sufficient own funds to meet the increases in the MRC do not affect these amounts). The total impact due to the revised Basel framework and the shortfall due to the introduction of the floor are provided in separate columns.

Table 13: Capital shortfall (EUR billion): contribution of the output floor to the shortfall during the transitional period

Year (floor)	CET1 due to OF	CET1 w/o OF	Total CET1	T1 due to OF	T1 w/o OF	Total T1	TC due to OF	TC w/o OF	Total TC
2022 (50%)	1.5	46.2	47.6	2.1	71.4	73.5	2.1	78.4	80.6
2023 (55%)	2.2	46.2	48.3	3.3	71.4	74.6	2.8	78.4	81.2
2024 (60%)	8.3	46.2	54.4	10.5	71.4	81.9	9.9	78.4	88.4
2025 (65%)	18.4	46.2	64.5	23.0	71.4	94.3	23.0	78.4	101.5
2026 (70%)	33.1	46.2	79.2	40.4	71.4	111.8	40.5	78.4	118.9
2027 (72.5%)	45.0	46.2	91.1	56.2	71.4	127.6	56.7	78.4	135.1

Sources: EBA 2018-Q2 QIS data and EBA calculations.

Note: Based on a sample of 189 banks. Calculation in accordance with the central reform scenario as in section 2.4 of the Cfa Summary Report (e.g. unchanged P2R and SRB percentages).

89. As a reminder, these shortfall estimates are based on conservative assumptions regarding P2R and the SRB, assuming that the requirements in terms of percentage remain unchanged.

These requirements are hard to predict, with potential offsetting effects that are currently non-quantified, and therefore an alternative measure of impact, which may be more straightforward to determine, is that of the impact of the revised framework on the MRC requirements from the Pillar 1 minima, the capital conservation buffer and the G-SII buffer (when applicable). Against this more restricted definition of MRC, it is estimated that the implementation of the output floor would lead to a less notable capital shortfall of EUR 24.7 billion in tier 1 (see Table 14).

Table 14: Capital ratio and shortfall of the Basel III revised framework (restricted definition of MRC)

	CET1 capital			T1 capital			TC capital		
	Current Ratio	Revised Ratio	Shortfall (EUR bn)	Current Ratio	Revised Ratio	Shortfall (EUR bn)	Current Ratio	Revised Ratio	Shortfall (EUR bn)
All banks	14.4%	11.5%	9.9	15.3%	12.3%	24.7	17.9%	14.3%	39.9

Sources: EBA 2018-Q2 QIS data and EBA calculations.

Notes: Based on a sample of 189 banks

90. A realistic assessment of any future development of capital shortfall should take into account that profit-generating institutions will retain profits to gradually rebuild their capital base and, when possible, fully cover the regulatory shortfall as it arises. Even more realistic, based on previously observed stylised facts on the behavioural reaction of EU banks to the regulatory environment, is the assumption that, from the first date of the transitional period (i.e. 2022), institutions may front-load profit retention to prepare for the regulatory capital shortfall they expect to incur at any point during the transition.
91. Under this front-loading assumption, and assuming that the amount of profits available for retention every year for each institution would at least equal its 2014-2018 average annual profits, it can be expected that only around 40% of the regulatory shortfall of EUR 135 billion in total capital (as per the conservative shortfall scenario) will materialise in 2027. The outstanding steady-state shortfall of EUR 59 billion would be incurred almost entirely by those institutions that are unable to retain profits during the transition, as they did not generate profits during the 2014-2018 period.

Table 15: Evolution of TC shortfall (EUR billion) during phase-in implementation of the output floor, under profit retention assumption

		1 Jan 2022	1 Jan 2023	1 Jan 2024	1 Jan 2025	1 Jan 2026	1 Jan 2027
Profit-generating institutions	Before retention	48.7	49.0	51.8	58.1	68.2	78.6
	After retention	14.9	5.8	1.1	1.2	1.9	2.2
Zero profit institutions	Before retention	31.4	31.8	36.2	43.0	50.7	56.5
	After retention	31.4	31.8	36.2	43.0	50.7	56.5
All banks	Before retention	80.1	80.7	88.0	101.1	118.9	135.1
	After retention	46.3	37.5	37.3	44.3	52.6	58.7

Sources: EBA 2018-Q2 QIS data and EBA calculations.

Notes: Based on a sample of 189 banks. Banks are assumed to retain all their profits from the first date of the phase-in period to cover their shortfall. Calculation in accordance with the central reform scenario as in section 2.4 of the CfA Summary Report (e.g. unchanged P2R and SRB percentages).

92. EU institutions' capability of retaining profits and rebuilding their capital base during the transitional implementation of the reform is likely to outperform the 2014-2018 average profitability measure used in this analysis, given the gradual improvements that — among other aspects — have occurred in recent years in relation to the risk reduction objective and the EU macroeconomy. The shortfall coverage prospects outlined here should therefore be considered a conservative scenario.
93. Furthermore, in addition to the possibility of strengthening their capital base via retained earnings, banks have time to adapt their balance sheet. Moreover, the capital shortfall of EUR 135 billion is the outcome of the main scenario, and, as mentioned above, it can be expected that, due to a trade-off with the output floor, P2R and SRB requirements will be adjusted downwards.
94. A potential concern associated with transitional arrangements is that they could increase the complexity of the framework, as they would require somewhat more complex calculations and would therefore have to be taken into account in the determination of the P2R as well as the SRB.

Recommendation OF 10: Application of transitional measures

The implementation of the output floor should follow the transitional measures laid out in the revised Basel framework, including both the 5-year transitional path and the transitional cap of 25% increase in RWA.

Annexes

Annex 1: Output floor

Annex 1.1

96. From a theoretical perspective, a further approach could also be conceived under which the MRC is determined by the higher of two parallel stacks of requirements. In particular:

RWA_{IM} -based requirement: the capital requirement resulting from the application of all capital requirements (including P2R and the SRB) and the RWA stemming from internally modelled approaches referred to as RWA_{IM} .

Output floor requirement: the capital requirement resulting from the application of the capital ratios that are mentioned in the Basel text (minimum capital requirements, capital conservation buffer, countercyclical capital buffer and G-SII buffer) and the floored RWA (RWA_{OF}). This would ignore the SRB and P2R.

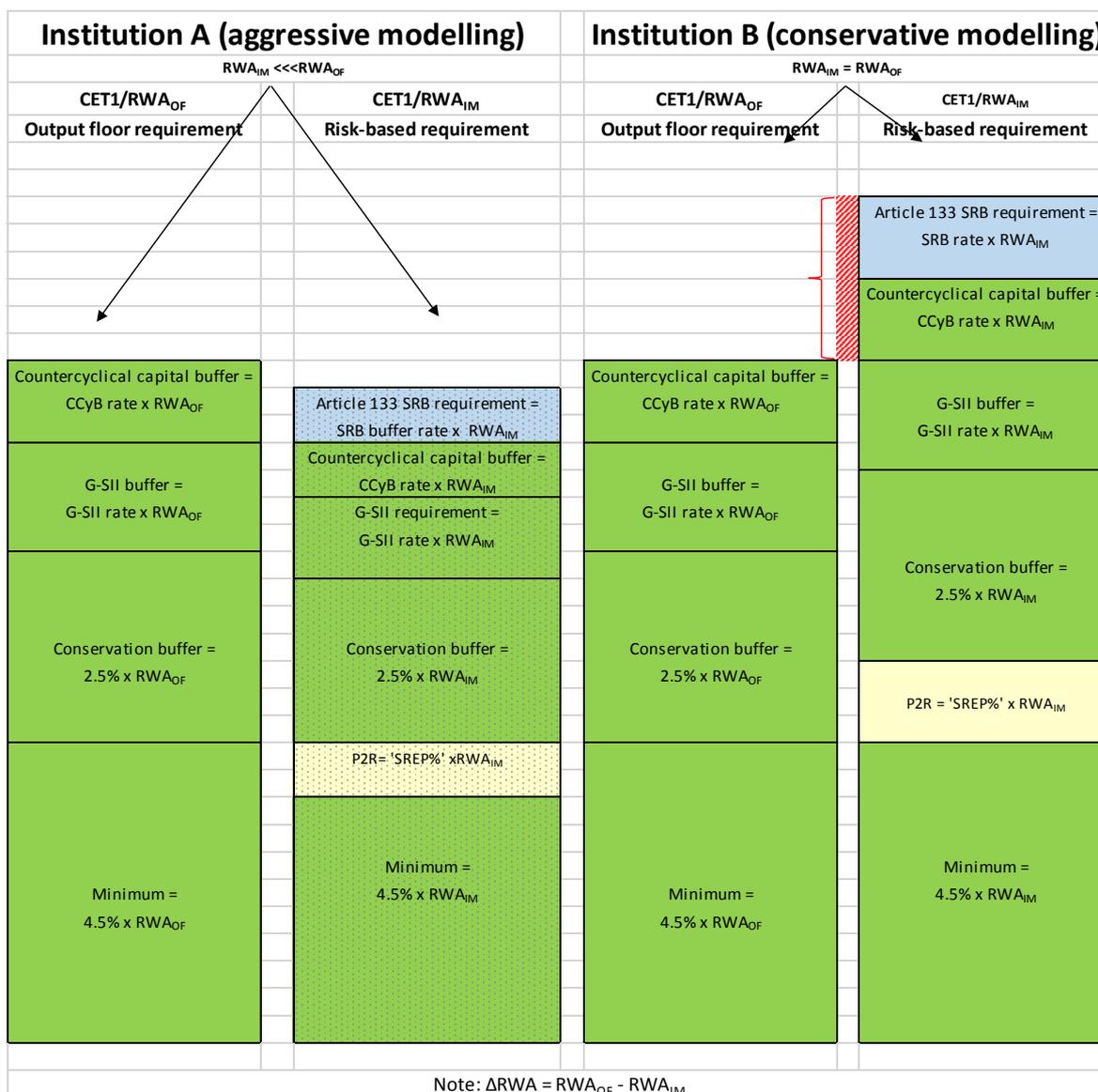
97. This interpretation results in only a very minor role for the output floor requirement, with the RWA_{IM} -based requirement continuing to be based on the RWA resulting from internal-model-based approaches (and does not take the floored RWA into account).
98. The following formula is a stylised illustration of this approach:

$$MRC^{parallel\ stacks} = \max \left\{ RWA_{IM} \cdot \begin{matrix} SRB \\ G - SII \\ CCyB \\ 2.5\% CCB \\ P2R \\ Min. Req. \end{matrix}, RWA_{OF} \cdot \begin{matrix} G - SII \\ CCyB \\ 2.5\% CCB \\ Min. Req. \end{matrix} \right\}$$

99. Firstly, it has to be noted that this approach is not in compliance with the Basel agreement, as it is based on a comparison of two amounts of capital requirements, whereas the Basel text is clear that the capital requirements should be applied to the institution's RWA (RWA_{OF} in this case). Instead, this approach derives its impact from the difference between two stacks of requirements. Furthermore, this approach can be considered a circumvention of the floor, as the RWA_{IM} -based requirement is likely to exceed the output floor requirement for most institutions.
100. Conversely, for institutions for which the output floor requirement leads to the highest amount of capital requirements, there may be no changes in capital requirement stemming from the introduction of EU-specific buffers. This would render these buffer requirements irrelevant, and hence this approach may incentivise institutions to pursue aggressive modelling techniques, in contradiction to what the output floor aims to achieve. Furthermore, it seems that this stacks approach would create confusion about trigger levels,

such as that of the AT1 or those associated with the MDA, as these levels would be calculated both in the RWA_{IM} stack as well as in the RWA_{OF} stack.

Figure 10: Components of capital requirements: parallel stacks



101. Figure 10 illustrates in a stylised manner the parallel stacks of requirements for two types of institutions: institution A adopts an aggressive modelling style whereby $RWA_{IM} \ll RWA_{OF}$ and institution B adopts a conservative modelling style whereby $RWA_{IM} = RWA_{OF}$. For institution A, the output floor requirement results in higher requirements than the RWA_{IM} -based requirement, such that the output floor is binding. This is because the risk-based requirement takes all the buffers into account, but it is based on a much lower RWA ($RWA_{IM} \ll RWA_{OF}$), such that the total stack of capital requirements under the RWA_{IM} -based approach is still lower than the ones that are based on the output floor requirement.

102. However, the RWA_{IM} -based requirements are binding for institution B, because this stack of requirements also includes P2R and the SRB, whereas the RWAs are the same. Institution B is therefore an example of the circumvention of the output floor. It should be noted that the most representative situation would be somewhere in between the ones depicted for institution A and institution B — that is, an institution's RWAs stemming from internally modelled approaches are usually below the floored RWA ($RWA_{IM} < RWA_{OF}$) — but, given that the RWA_{IM} -based requirement also includes P2R and the SRB, the risk-based requirement is likely to exceed the output floor requirement. This means that, under this interpretation of the output floor, in most cases, the output floor will not have any effect.

Annex 1.2

To illustrate and help aim for consistency between approaches, the following high-level table summarises treatments.

Table 16: High-level summary of treatment of provisions

	AIRB	FIRB	SA (for SA banks)	OF ¹⁸	LR (for IRB banks) ¹⁸	
Non-defaulted	Numerator	Difference between accounting provisions and (IRB) expected loss amount (Articles 158 and 159 of the CRR) leads to an IRB shortfall and a deduction from CET1 if negative, and an IRB excess and T2 increase (up to 0.6% RWA) if positive.	As in AIRB, except for prescribed LGD	IRB shortfall/excess not applicable	See AIRB or FIRB column.	See AIRB or FIRB column.
	Denominator	RWA (= RW*EAD where RW is according to Article 153 or 154 of the CRR). Applicable IRB formula.	As in AIRB, except for prescribed LGD	RWA _{SA} (as in Chapter 2 of Title II of Part Three of the CRR)	72.5% × RWA _{SA}	LR exposure ≈ total assets – (specific deductions + IRB shortfall)
Defaulted	Numerator	As for non-defaulted, except that — PD = 1, — LGD should be LGD-in-default, as specified in Article 181(1)(h) of the CRR.	As in AIRB, except for prescribed LGD	IRB shortfall/excess not applicable	See AIRB or FIRB column (as applicable).	See AIRB or FIRB column (as applicable).
	Denominator	RWA = RWx EAD where RW = max {0, 12.5 × (LGD – EL _{BE})} Article 153(1) or 154(1) of the CRR	RWA = 0% (Article 153(1) of the CRR)	RWA _{SA} is 100% or 150% risk weight if unsecured (Article 127 of the CRR). Lower if secured (Chapter 4 of the CRR) (specific provisions are deducted)	72.5% of RWA _{SA}	LR exposure ≈ total assets – (specific deductions + IRB shortfall)

¹⁸ For the IRB, output floor (OF) and LR columns, there is the simplifying assumption that all the banks' assets are under IRB (e.g. a 72.5% × RWA_{SA} calculation therefore applies to the OF).



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