

COMPLETION OF BASEL III POST-CRISIS REFORMS: OVERVIEW
AND ANALYSIS OF KEY FEATURES

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Abstract

In December 2017, the Basel Committee published the final revisions to the Basel III regulatory framework. The main objective of these revisions – the outstanding Basel III post-crisis reforms – was to reduce the excessive variability of risk-weighted assets. To further this purpose, a number of extensive changes were introduced to the existing regulatory standards, including the two available approaches for credit risk (the standardised approach and the internal ratings-based approach), the operational risk framework, the credit valuation adjustment framework, and the leverage ratio, among others. In addition, a more robust, risk-sensitive aggregate output floor based on the revised standardised approaches was added to the framework. In parallel, the Basel Committee completed its review of the regulatory treatment of sovereign exposures without changes to the current rules at this stage. This paper provides a general overview of all these developments along with more detailed explanations of their key features, rationale and workings.

1 Introduction

The Basel framework is a central international standard in the regulation and supervision of banks. These standards include a broad variety of elements such as minimum capital requirements, supervisory guidelines and disclosure requirements, among others. The international financial crisis of 2007-09 revealed a number of weaknesses and vulnerabilities which have severely affected the stability of most financial systems around the globe. In the face of this, the international reaction was to launch a series of initiatives aimed at tackling the problems identified. These responses included an extensive reform of the global standards on financial regulation and supervision.

The general outline of the reforms was shaped at the first summit of the G20 leaders in Washington in November 2008, with more details being added following the second summit held in London in April 2009. The reforms covered three key areas. First, changes to prudential banking regulation involving revisions to microprudential requirements and the development of new macroprudential instruments. Second, other regulatory reforms such as harmonising international accounting standards, and improving regulation and monitoring of non-banking sectors. Finally, a new institutional framework for the international coordination of financial regulation was developed. This framework included regular annual G20 meetings and the creation of the Financial Stability Board as the successor to the Financial Stability Forum.

In accordance with the G20 mandate, the Basel Committee on Banking Supervision (BCBS) was in charge of developing those reforms necessary for the strengthening of the global regulatory and supervisory standards for banks. The key objectives guiding the reforms of the existing standards ('Basel II') were two-fold: to increase the resilience of the financial system and to reduce the impact of the financial crisis on the economy.

The reforms were developed gradually over a period of years. The first steps were taken in 2009 with several measures regarding the treatment of banks' trading book exposures, securitisations and re-securitisations. The bulk of the reforms of the Basel standards, however, began in 2010 and 2011, with the publication of Basel III, and was finalized in a second phase and published in 2017.

The first stage of the reforms was focused on increasing minimum capital requirements and setting up adequate capital ‘buffers’ (to be used in stressed periods), while also improving the definition and quality of regulatory capital (i.e. the numerator of the existing capital ratios). Simultaneously, a minimum leverage ratio requirement was outlined and new standards were set out on large exposures limits and on liquidity risk (a short-term minimum ratio and a complementary medium-term ratio). In addition, the standards for market risk,¹ counterparty credit risk and securitisation were also revised. Finally, for the first time since the creation of the Basel standards, new macroprudential elements (for the treatment of systemically important financial institutions and to address systemic risks stemming from excessive credit growth) were included as part of the framework.

In the second stage, following the aforementioned reforms, the focus of the Basel work turned to one other key aspect revealed by the crisis: the calculation of risk-weighted assets (RWAs), the denominator of the minimum capital ratios in the Basel standards. This was also a response to the shortcomings identified during the financial crisis regarding the existing architecture of the regulatory framework. Supported by its own analysis and the views of a broad range of stakeholders, the BCBS recognised the need to improve the standards in three dimensions: risk sensitivity, simplicity and comparability [BCBS (2015b and 2013a)]. Striking the right balance between these dimensions was an important challenge underlying most of the revisions being envisaged.

In addition, a key motivation for this second wave of reforms – also known as the ‘finalisation of Basel III post-crisis regulatory reforms’ – was to restore the credibility, brought into question during the crisis, of banks’ capital ratios. Evidence from the recent crisis suggested that the observed variation in RWAs might not entirely reflect actual differences in banks’ risk-taking [see for example Bank of England (2011)]. It also aimed to improve comparability between capital ratios of different banks. Additionally, it was decided that the revisions to this end should be carried out without significantly increasing overall capital requirements.

The completion of the Basel III post-crisis reforms involved several areas of the Basel standards and a broad range of regulatory measures, including restrictions on the use of internal models and enhancements to the robustness and risk sensitivity of the existing standardised approaches. In particular, the two available approaches for credit risk, the standardised approach (SA) and the approach based on internal models (the internal rating based approach, IRB) were subject to extensive revisions. In addition, substantial changes and recalibrations were proposed to the operational risk framework along with other revisions to the framework for credit valuation adjustment (CVA) and to the leverage ratio, among others. Among all these revisions, a key element of the Basel III post-crisis reforms was also put forward: an aggregate output floor to limit the benefits that banks can derive from using internal models to calculate minimum capital requirements. This ‘output floor’ replaced the existing floor in the Basel II standards with a more robust, risk-sensitive design based on the revised standardised approaches.

¹ In January 2016 the Basel Committee published the new standard for market risk, known as the Fundamental Review of the Trading Book.

On 7 December 2017, following a period of intense work and discussions, the finalisation of the Basel III post-crisis reforms was endorsed by the Group of Central Bank Governors and Heads of Supervision (GHS), the BCBS's oversight body [BCBS (2017a)]. In this manner, the agreed raft of measures broadly concluded the large-scale set of reforms initiated in response to the 2007-2009 financial crisis.

At the same time as the Basel III reforms were announced and the revised standards were published, the Basel Committee also produced a Discussion Paper (DP) on the regulatory treatment of sovereign exposures [BCBS (2017b)]. The DP noted that at that stage the Basel Committee had not reached a consensus to make any changes to the current treatment of sovereign exposures.

Against this background, the purpose of this paper is to introduce the recently announced post-crisis reforms of Basel III and to explain their main rationale and workings. To this end, the paper is organised as follows. First, it describes the main revisions introduced to the credit risk (Section 2) and operational risk (Section 3) frameworks. Section 4 describes other revisions which include the CVA framework and the leverage ratio. Next, Section 5 analyses the output floor and other backstop measures adopted. Section 7 introduces the agreed timeline for the implementation of the revised standards. Finally, Section 6 briefly describes the Basel Committee's work regarding the regulatory treatment of sovereign exposures and Section 8 concludes by describing the next steps in the Basel Committee's agenda.

2 Credit risk: the standardised approach and the internal ratings-based approach

Credit risk generally constitutes the largest part of banks' capital requirements and is a primary source of variations in risk-weighted assets (RWAs) – the denominator of the capital ratio. In line with the overall objectives of the reforms, the Basel Committee introduced revisions to the two available approaches for the treatment of credit risk in the Basel standards: the standardised approach for credit risk (SA) and the approach based on banks' internal models (the internal ratings based approach or IRB).

2.1 REFORMS OF THE STANDARDISED APPROACH

The general objectives of the revisions to the SA were: i) to enhance risk sensitivity by introducing better risk drivers and further granularity to reflect risks more accurately; ii) to reduce excessive reliance on external credit ratings (as mandated by the FSB),² and iii) to improve risks assessments by providing specific treatments of certain portfolios.³

This review is especially important since the SA is widely used by entities across jurisdictions and will be the basis for the calculation of the new output floor (see Section 5).⁴ In this regard, the comparability of capital requirements under the SA and the IRB has also been enhanced by aligning their definitions and taxonomy whenever possible.

The changes introduced can be separated by the different portfolios covered in the credit risk framework, namely: exposures to banks, corporates, specialised lending, equity, real estate and other retail.

² *Principles for Reducing Reliance on CRA Ratings* [FSB (2010)].

³ BCBS (2016d).

⁴ BCBS (2014a), *Capital floors: the design of a framework based on standardised approaches*.

**EXTERNAL CREDIT RISK ASSESSMENT APPROACH (ECRA):
RWS FOR BANK EXPOSURES (%)**

TABLE 1

RWs in jurisdictions where the ratings approach is permitted	AAA to AA–	A+ to A–	BBB+ to BBB–	BB+ to BB–	Below B–
RW	20	30	50	100	150
RW short-term exposures	20	20	20	50	150

SOURCE: Basel Committee on Banking Supervision (2017a).

**STANDARDISED CREDIT RISK ASSESSMENT APPROACH (SCRA):
RWS FOR BANK EXPOSURES (%)**

TABLE 2

RWs where the ratings approach is not permitted and for unrated exposures	Grade A	Grade B	Grade C
RW	40 (a)	75	150
RW short-term exposures	20	50	150

SOURCE: Basel Committee on Banking Supervision (2017a).

a Under the SCRA, exposures to banks without an external credit rating may receive a risk weight of 30%, provided that the counterparty bank has a CET1 ratio which meets or exceeds 14% and a Tier 1 leverage ratio which meets or exceeds 5%. The counterparty bank must also satisfy all the requirements for Grade A classification.

Regarding exposures to *banks*, the revised framework introduces two options based on whether the claims on banks are rated or not. Both methods require banks to undertake a self-assessment of the risk through a mandatory due diligence process:⁵

- i) For rated exposures and for jurisdictions that allow the use of external credit ratings for regulatory purposes, the external credit risk assessment approach (ECRA) assigns risk weights (RWs) according to the corresponding external ratings (Table 1). Such ratings should not incorporate assumptions of implicit government support. Also, due diligence analysis should never result in the application of a lower RW than that determined by the external rating.
- ii) For unrated exposures and for jurisdictions that do not allow the use of external ratings for regulatory purposes,⁶ the standardised credit risk assessment approach (SCRA) assigns RWs according to three grades based on the counterparty's creditworthiness and the level of compliance with the Basel regulatory minimum requirements, including capital buffers but excluding liquidity risk requirements (Table 2). The risk-weighted treatment for unrated exposures is more granular than the existing flat risk weight.

Another enhancement to the risk sensitivity of the framework is the development of a specific treatment for covered bonds exposures.

⁵ Banks have to perform due diligence to ensure that they have an adequate understanding, at origination and thereafter on a regular basis (at least annually), of the risk profile and characteristics of their counterparties. Banks should take reasonable and adequate steps to assess the operating and financial performance levels and trends through internal credit analysis and/or other analytics outsourced to a third party, as appropriate for each counterparty.

⁶ In particular, the United States do not allow the use of credit ratings in banking regulation.

The Committee also tried to limit the use of external ratings for the treatment of exposures to *corporates*. However, to develop a standardised risk weighting methodology completely independent of external ratings was found to be particularly difficult. This was due to the material differences identified in business models and accounting practices, in addition to specific industry factors in different jurisdictions. Given the various limitations in place and the objectives of the reforms, the Committee agreed to maintain references to external ratings where available and/or possible, but required their use to be complemented with banks' mandatory due diligence processes. In addition, the granularity of the RWs for rated exposures was also increased. For corporate exposures of banks in jurisdictions where the use of external ratings for regulatory purposes is not allowed, banks have to assign a 100% risk weight to all corporate exposures, with the exception of those identified as 'investment grade'.⁷

For *specialised lending* (i.e. exposures to project finance, object finance and commodities finance) a standalone treatment was proposed. In this approach, a RW will be assigned based on the type of specialised lending category and the use or not of external ratings. If there is a rating available and permitted, the treatment is as for general corporates. If a rating is not available or is not permitted, the RWs for project finance are 130% for the operational phase and 100% for the pre-operational phase, except for high quality project finance exposures that are risk-weighted at 80%.⁸ For object and commodity finance there is a single RW of 100%.

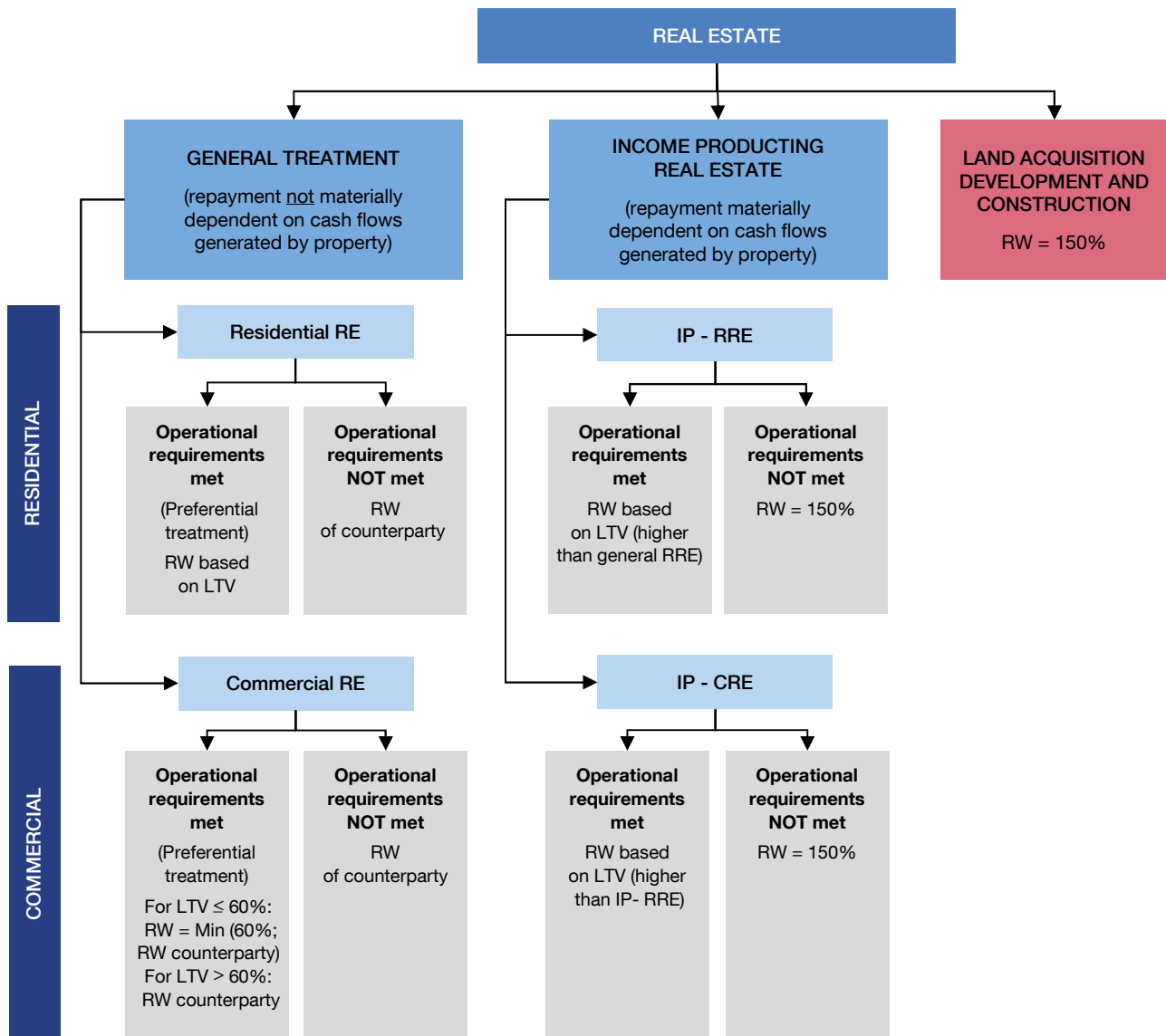
Previous to the reforms, there was no standalone regulatory treatment for *equity exposures* and they received a flat 100% RW. The revised SA has introduced a specific category for equity exposures risk-weighted at 250%, a 400% RW for speculative unlisted equity exposures and a RW of 150% for subordinated debt. In addition, equity exposures are defined on the basis of the economic substance of the instrument and according to the criteria prescribed in the IRB framework. The new RWs for equity exposures (and the prohibition on the use of the IRB approach for these exposures, see Section 2.2) should be introduced progressively with a five-year linear phase-in from January 2022.

Regarding *real estate* exposures, a fundamental change in the framework is that all the exposures backed by real estate assets are now grouped under a single real estate category. In addition, a more risk-sensitive approach was developed: RWs now vary according to the LTV ratio of the mortgage with more granularity (under Basel II only two buckets were considered and under the revised standards they are increased to six).

Risk-sensitivity for real estate has also been enhanced by providing a differentiated regulatory treatment depending on whether the real estate asset is to be occupied for housing purposes (residential real estate, RRE) or is to be used for commercial purposes

7 An "investment grade" corporate is defined in the new standards (paragraph 42) as a "corporate entity that has adequate capacity to meet its financial commitments in a timely manner and its ability to do so is assessed to be robust against adverse changes in the economic cycle and business conditions." Additional requirements are also specified for banks when classifying a corporate as investment grade (banks should take into account the complexity of the business model, performance relative to industry and peers, and risks posed by the entity's operating environment) and the corporate (or its parent company) should have securities outstanding on a recognised securities exchange.

8 High quality project finance exposure refers to an exposure to a project finance entity that is able to meet its financial commitments in a timely manner and its ability to do so is assessed to be robust against adverse changes in the economic cycle and business conditions. In addition, conditions set out in paragraph 48 of the standardised approach for credit risk framework as part of Basel III: Finalising post-crisis reforms (2017) have to be met to qualify for the 80% RW.



SOURCE: Basel Committee on Banking Supervision (2016d and 2017a).

a Operational requirements include, for example, that the property securing the exposure is fully completed (finished property), there is legal enforceability or a prudent valuation of the property.

(commercial real estate, CRE), with the latter attracting higher RWs. In the same vein, two different treatments within these two categories will be applied to the exposures. This has been based on whether servicing the loan depends materially on the cash flows generated by the property securing the loan (the exposure is then classified according to the income producing real estate treatment, IP-RRE and IP-CRE and attracts higher RWs) or whether it depends on the underlying capacity of the borrower to service the debt from other sources (the general treatment will be applied to the exposure).

Moreover, the new SA framework requires banks to assign in general a higher risk weight of 150% to credit facilities that finance the acquisition, development, or construction (ADC) of real property. This is the highest RW in the real estate category. *Scheme 1* provides a summary of the revised regulatory treatment for real estate exposures.

An important revision to the framework was that, subject to national discretion, banks can be allowed to use an alternative method – the ‘loan-splitting approach’ – to compute the RW for general residential and commercial real estate exposures. Under the loan-splitting approach, banks can split a mortgage into two separate exposures: a secured exposure and an unsecured exposure.⁹ This treatment – which already existed under the European Capital Requirements Regulation (CRR) – was not considered originally in the Consultative Document published by the Committee in 2016 (BCBS, 2016d).

For *other retail* exposures, a more granular treatment was introduced. The regulatory retail portfolio now distinguishes between revolving facilities (where credit is typically drawn upon) and transactors (where the facility is used to facilitate transactions rather than a source of credit).

For *off-balance sheet items*, the credit conversion factors (CCFs),¹⁰ which are used to determine the amount of an exposure to be risk-weighted, are now more risk-sensitive. The scope of unconditionally cancellable commitments (UCCs) (for example, credit cards which the bank can cancel at any time without prior notice) has been better specified by introducing a clearer definition of commitment. Another enhancement was the introduction of positive CCFs for UCCs (they have been increased from 0% to 10%). A 0% CCF for UCCs was found inadequate since consumer protection laws, risk management capabilities and reputational risk considerations frequently constrain banks’ ability to cancel such commitments in practice.

The *credit risk mitigation (CRM) framework* has been considered too complex and to have permitted too much flexibility for banks applying the SA.¹¹ As such, this was identified as a possible source of undue divergence in capital requirements across banks applying the SA. In consequence, the revised CRM framework removed the existing internal modelling approaches for the calculation of capital charges for certain exposures backed by financial collateral. The proposal also introduces an alternative approach which, without explicitly relying on external ratings, aims to limit the eligibility of financial collateral and guarantees to what is commonly referred to as “investment grade”. As a result, depending on whether external ratings are used or not in a given jurisdiction, the proposal contains two sets of eligibility criteria for defining financial collateral and eligible guarantors. And it also includes two separate tables with the supervisory haircuts applicable to each case.

2.2 REFORMS OF THE IRB FRAMEWORK

The use of internal models is one of the key features of the risk-based approach followed in the Basel framework. During the last few years, the BCBS has performed analysis focused on assessing drivers of material differences in the RWAs of the banking book calculated with internal models.¹² These studies show that while a share of the variation

9 The way to calculate loan splitting for a residential real estate exposure is to assign a 20% risk weight to the part of the loan representing up to 55% of the residential property’s value, and assign the remaining balance of the loan a risk weight based on the creditworthiness of the counterparty, as it was an unsecured exposure. For example, for a loan of €70,000 to an individual secured on a property valued at €100,000, the bank will apply a risk weight of 20% to €55,000 of the exposure and a risk weight of 75% to the residual exposure of €15,000. This gives total risk weighted assets for the exposure of €22,250 = (20% * €55,000) + (75% * €15,000).

10 Off-balance sheet exposures are amounts committed but not drawn (including, for example, credit lines or guarantees). Therefore, the bank does not have a direct exposure but there is a certain probability that these off-balance sheet exposures become direct exposures of the bank. The CCF is the regulatorily estimated probability of the conversion of these exposures. The CCF multiplied by the committed but undrawn amount gives the credit exposure equivalent for off-balance sheet items. Afterwards, these credit exposure equivalents will be multiplied by the respective RW depending on the category or portfolio under which they are classified.

11 The CRM framework sets requirements on CRM techniques (such as guarantees and collateral) which an institution must meet in order to qualify for a reduction of the capital requirements generated by exposures.

12 BCBS (2013 and 2016c).

was explained by underlying differences in the risk composition of banks' assets, there was also a material amount of variability of RWAs that could not be explained by risk-based differences (i.e. fundamental risk factors such as portfolio mix or asset quality). Other studies also arrived at similar conclusions [see for example EBA (2016) and Trucharte *et al.* (2015)].

Overall, most studies suggested that part of the variation in RWAs could be attributable to 'practice-based' drivers. These drivers include not only supervisory choices allowed under the framework or deviations in national implementation of the Basel framework, but also differences derived from banks' choices under the IRB framework e.g. bank modelling choices including reference data or methodological differences such as the definition of default or other adjustments.

To illustrate the magnitude of this issue, a 2013 BCBS analysis on RWAs for credit risk in the banking book found that 25% of the observed variability of RWAs could not have been explained by the underlying differences in the risk composition of banks' assets. This study was based on a hypothetical portfolio exercise comprising a subset of common wholesale obligors. The purpose was to identify practice-based differences in banks' internal estimates of the IRB parameters (e.g. PDs, LGDs).

In sum, the findings of these studies – further to evidence collected during the pre-crisis period – raised serious doubts regarding the robustness of modelling certain asset classes. As a result, the BCBS decided to introduce a number of changes to the available IRB approaches for credit risk (the advanced and the foundation approach) as a central element of its reform programme. The measures to constrain the use of internal models would work in tandem with the aggregate output floor and the minimum leverage ratio requirement as backstop measures (Section 5).

In particular, the revisions to the IRB sought to restore confidence in the accuracy of internal models for the calculation of RWAs, as well as to improve the comparability of banks' capital ratios by constraining the use of the internal models and placing limits on certain inputs that are used to calculate capital requirements for credit risk ('input floors'). Despite these revisions, the Committee was also mindful of the need to ensure that the capital framework remains sufficiently risk-sensitive.

Main revisions to the IRB approach: constraints on the use of internal models

A prerequisite for regulators to be able to rely confidently on banks' internal models, is that the risk under consideration can be modelled. In the analysis conducted by the BCBS [BCBS (2013b)], the low-default nature of the portfolios assessed and the consequent lack of adequate data for risk parameter estimation, were found as possible factors leading to differences in banks' internal estimates. In such cases, banks' internal estimates of loss given default (LGD) and credit conversion factors (CCF) are likely to be scattered.¹³ In general, banks and large corporates are typical asset classes where there is insufficient data for reliable LGD estimates. As a result, the Committee decided to remove the advanced-IRB approaches for exposures in these portfolios.¹⁴ Implicit in this decision was a trade-off between the benefits of internal models to produce capital requirements that

¹³ In the case of LGD and CCFs only defaulted observations are relevant for the estimation. Thus, banks have less relevant data for modelling LGD and EAD than they do for PD modelling, and the difference in data availability is particularly large in portfolios where defaults are infrequent.

¹⁴ Under the Advanced IRB (AIRB) banks are allowed to provide internal estimates of PD (probability of default), LGD (loss given default), exposure at default (EAD) and maturity (M). In turn, under the foundation IRB (FIRB) banks are only allowed to estimate PDs.

Portfolio/Exposure	Basel II: available approaches	Basel III: available approaches
Large and mid-sized corporates (consolidated revenues > €500m)	A-IRB, F-IRB, SA	F-IRB, SA
Banks and other financial institutions	A-IRB, F-IRB, SA	F-IRB, SA
Equities	Various IRB approaches	SA
Specialised lending	A-IRB, F-IRB, slotting, SA	A-IRB, F-IRB, slotting, SA

SOURCE: Basel Committee on Banking Supervision (2017a).

better reflect the underlying risks and the costs of a possible capital outcome that may be not adequate or comparable.

Further to this, to improve simplicity, consistency and comparability, the Committee decided to remove the two IRB approaches (AIRB and FIRB) for *exposures to equities*. This means that the SA is the only approach left for equities. For most equities, particularly publicly traded ones, it was considered unlikely that banks would have more or better specific knowledge on the issuer than that available in public data. If all banks base their risk assessments on the same data, differences in the resulting capital requirements may be difficult to justify. As commented above, to smooth the impact of these revisions the use of the IRB approaches for equities will be phased out over five years starting in 2022.

Table 3 compares the revised scope of approaches available under Basel III for certain asset classes with those under the Basel II framework. With respect to *specialised lending*, banks will be permitted to continue using the AIRB and the FIRB while the Committee reviews the current ‘slotting approach’ for specialised lending.¹⁵

Overall, compared to the 2016 Consultative Document [BCBS (2016b)] the scope of approaches available in the standards agreed in December 2017 is larger. The new standards now allow the FIRB to be used for exposures to banks and large and mid-sized corporates, and they also allow either the AIRB or the FIRB to be used for specialised lending exposures.

For those risks and portfolios where internal models were allowed, the Committee has introduced constraints on the internal parameters that banks estimate. These constraints were set at the exposure level and are known as ‘input floors’.

The *input floors* help to mitigate the intrinsic ‘model risk’ in the model-based approaches as result, for example, of uncertainty regarding banks’ parameter estimates. Also, they limit the capital relief that a credit institution may obtain from using internal models for regulatory capital estimation. The Committee set the input floors at relatively low levels in order to avoid the possibility of pushing banks with very low risk exposures towards

¹⁵ The “slotting approach” is a regulatory approach whereby banks have to assign different standardised RWs to loans, classifying the loans into different categories which are defined uniformly for all banks based on the underlying credit risk of the loans. Thus, in essence, it works like a hybrid between a standardised approach and internal models.

	Probability of default (PD)	Loss-given-default (LGD)		Exposure at default (EAD)
		Unsecured	Secured	
Corporate	5 bp	25%	Varying by collateral type: – 0% financial – 10% receivables – 10% commercial or residential real estate – 15% other physical	EAD subject to a floor that it is the sum of: i) the on-balance sheet exposures, and ii) 50% of the off-balance sheet exposure using the applicable Credit Conversion Factor (CCF) in the standardised approach
Retail classes:				
Mortgages	5 bp	N/A	5%	
QRRE transactors	5 bp	50%	N/A	
QRRE revolvers	10 bp	50%	N/A	
Other retail	5 bp	30%	Varying by collateral type: – 0% financial – 10% receivables – 10% commercial or residential real estate – 15% other physical	

SOURCE: Basel Committee on Banking Supervision (2017a).

riskier counterparties and to avoid affecting excessively the risk sensitivity of the framework.

Under Basel II, there was a single PD floor of 3 bp which applies at exposure level. In the revised framework this floor has been increased to 5 bp.¹⁶ In addition, the existing 10% floor for residential mortgages which was set at the sub-segment level was replaced by a LGD floor of 5% applicable at the exposure level. This level of granularity works most effectively at tackling abnormally low input values since it does not allow offsetting among exposures (i.e. using an input floor at the sub-segment level with a weighted average could result in a non-binding floor just because the shortage of exposures with very low estimated LGDs can be offset against the surplus of exposures with higher estimated LGDs). *Table 4* includes a summary of the minimum parameter values introduced in the revised IRB framework.¹⁷

In general, the calibration of LGD input floors for loans secured by different types of collateral was reduced in comparison with the floors proposed in the 2016 Consultative Document [BCBS (2016b)]. It is worth keeping in mind that the aim of these input floors is to serve as a backstop for low-risk exposures.

Exposures guaranteed by sovereigns are exempt from input floors. The exemption should only apply to the part of the exposure that is guaranteed. The current treatment of sovereign exposures has been reviewed separately (see Section 6).

Annex 1 describes some additional enhancements that were introduced in the IRB approach.

¹⁶ Except for qualifying revolving retail exposure (QRRE) revolvers, for which it has been set at 1% based on supervisory experience that has identified revolvers as showing a significantly higher default rate than transactors. For this purpose, transactor has been defined.

¹⁷ CCF floors will also apply for the proposed narrow types of facilities that may still be modelled under the AIRB.

In the Basel II framework, banks that adopt the IRB approach were required to do so for all material asset classes, subject to a roll-out period (i.e. a plan for a sequential implementation of the IRB approach to the different asset classes within a bank). The purpose of this requirement was to reduce the chances that banks may embark on 'cherry-picking' by switching between standardised and IRB approaches in order to lower the resulting capital requirements.

In an attempt to curb the negative effects, the Committee modified the roll-out requirement so that it is only mandatory on a portfolio basis. That is, banks would not be required to roll out the IRB across all material exposures within the bank. Instead, the IRB approach will have to be rolled out to all exposures within each of the banks' portfolios. For example, if banks are using the IRB for their corporate exposures they would be required to roll out the IRB across all their material corporate exposures. Banks would not be required to roll out the IRB for their retail or bank exposures, even if such exposures are material.

More generally, a jurisdiction which does not implement some or all of the internal modelled approaches, but instead uses exclusively the standardised approaches available in the framework, will still be compliant with the Basel standards.

A final point to note is that the Basel II framework applies a scaling factor of 1.06 to the RWAs determined by the IRB approach to credit risk. This scaling factor increases the capital requirements resulting from the use of the IRB approaches by 6 pp. Given the enhancements to the IRB framework and the introduction of an aggregate output floor (see Section 5), the Committee has decided to remove the scaling factor of 1.06.

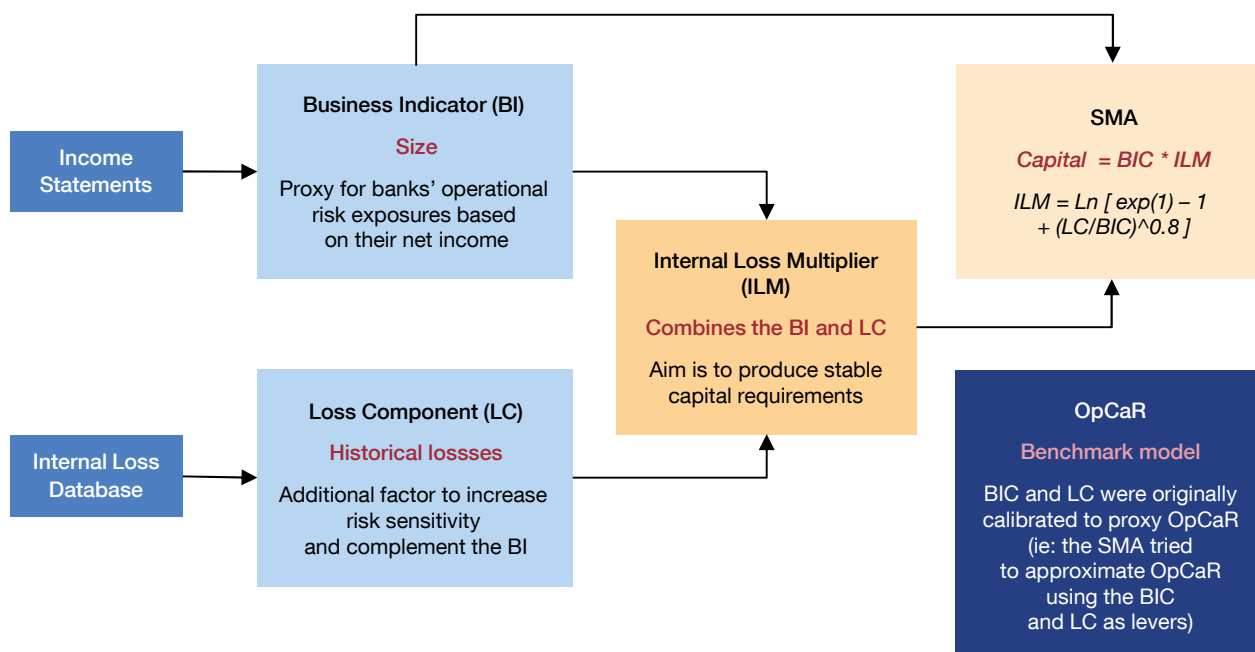
3 Operational Risk

The Basel II framework introduced a menu of approaches to operational risk, including both standardised approaches and internal models. The financial crisis revealed some weaknesses in the simpler approaches, including capital requirements that were not conservative enough for some banks. This resulted in a review of the simpler approaches and a new standardised approach (NSA) which was introduced in 2014.

The BCBS also developed a sophisticated quantitative model based on banks' internal loss data, known as Operational risk Capital at Risk (OpCaR) [see BCBS (2014b)]. This model was not proposed as a possible approach for banks to meet their minimum capital requirements for operational risk. The OpCaR model was used by the Committee to help choose some suitable proxy indicators of banks' capital needs for operational risk and to calibrate the coefficients applied to the selected indicators. As a result of this work, in 2016 the BCBS consulted on withdrawing the option of using internal models for the estimation of regulatory capital (which was allowed for banks using the advanced measurement approach, AMA), proposing instead a single standardised approach known as the standardised measurement approach (SMA) [BCBS (2016e)]. The SMA was developed to better align the operational risk framework with the results obtained by the OpCaR model and to provide a workable standardised alternative for banks using the AMA.

The reforms of Basel III agreed in December 2017 included a revised version of the SMA with various important changes with respect to the 2016 Consultative Document.

The capital requirement under the SMA is determined as a function of two indicators: the business indicator (BI) and the loss component (LC). Based on the findings from the use of



SOURCE: Banco de España.

the OpCaR model, both indicators were considered to be associated with the level of operational risk faced by banks. The SMA combines the BI and the LC using an *ad hoc* function named the internal loss multiplier (ILM) (see Scheme 2).

The BI is a composite measure of banks' net income. It is meant to work as a proxy of the banks' business volume: higher business volume is considered to be associated with higher operational risk losses. More specifically, the BI is the sum of three components: a) the interest, leases and dividend component (i.e. it includes different sources of banks' income/expenses associated with typical credit intermediation activities such as granting loans and taking deposits); b) the services component (i.e. it reflects income/expenses received/paid for providing/receiving advice and services, plus other operating income/expenses), and c) the financial component (i.e. it includes net profits or losses on the banks' trading activities in both their banking and trading book).¹⁸

The resulting BI is then multiplied by a set of three marginal coefficients (12%, 15%, 18%) each one corresponds to a different tranche of the banks' BI (€0 to €1 billion; €1 to €30 billion; more than €30 billion, respectively). Each of the consecutive tranches of the BI is multiplied by its corresponding marginal coefficient, the total sum of which is named the business indicator component (BIC).¹⁹ The BIC was designed analogously to a progressive taxation system to avoid cliff-edge effects between buckets. The increasing coefficients were justified based on empirical analysis. As result of additional analysis performed

¹⁸ The BI includes an adjustment to the first component (the interest part of the interest, leases and dividend) to limit the influence of net interest income (mostly affecting banks' business models with high interest rate margins). 'High margin' banks are defined as those with a net interest margin (NIM) larger than 2.25%, where the NIM is calculated as the net interest income (interest income minus interest expense) divided by the interest-earning assets.

¹⁹ For example, the BIC for banks with a BI of € 40 billion is 6.27. This is the sum of the following terms: 1st BI tranche: $1 \times 0.12 = 0.12$; 2nd BI tranche: $(30 - 1) \times 0.15 = 4.35$; and 3rd BI tranche: $(40 - 30) \times 0.18 = 1.8$.

during the consultation period, the final structure decided for the BIC had fewer buckets and lower marginal coefficients than the structure proposed in the 2016 Consultative Document [BCBS (2016e)].

The LC is set as a multiple of banks' average historical annual losses over the preceding ten years (the assumption is that the banks' historical losses are informative of the possibility of incurring similar operational risks in the future). That is, the average historical annual losses over the past ten years are multiplied by a given number (the 'loss multiplier') that has been set equal to 15. This design of the LC implies that historical losses in any given year would have an effect on the banks' capital requirements during the subsequent ten years. This was expected to create incentives for banks to improve their operational risk management since doing so would gradually result in a lower track record of losses being captured by the database used for the LC calculations (and thus having an impact on capital requirements).

In contrast to the final design proposed for the LC where there is only one factor determining the LC contribution to the capital requirement (the average historical annual losses over the past ten years), the LC structure proposed in the 2016 CD included a three-factor structure. In that design, there was one multiplier applicable to the total average annual loss, one multiplier for the average annual loss only including loss events above €10 million, and one for the average annual loss only including loss events above €100 million. This structure allowed the LC to differentiate between banks with different historical loss characteristics, for example banks with small but recurring losses and banks with large but infrequent losses.

Banks using the LC in their capital calculations should meet some minimum standards on loss data collection to ensure adequate data quality. Banks should also follow a series of criteria for the identification and treatment of the losses they include in the dataset to calculate their average annual losses. The minimum threshold for including a loss event in the dataset has been set at €20,000. This threshold may be raised at national discretion to €100,000 for banks with a BI greater than €1 billion (i.e. banks in the BI buckets 2 and 3). The minimum threshold for losses was €10,000 in the 2016 CD with the possibility of using a €20,000 threshold in some cases for banks moving for the first time to the SMA. The changes introduced and the options available aim to allow more adequate coverage of relevant losses. For example, they help to reflect the fact that small and predictable recurring losses are usually embedded in banks' internal business practices as part of their normal activity and, therefore, their effects are considered in banks' pricing decisions.

The SMA combines the BI and the LC using an ad-hoc function named the internal loss multiplier (ILM). The ILM is set as a function of the LC/BIC ratio and is concave (the ILM increases with the LC/BIC ratio but at a decreasing rate). The functional form of the ILM approved in December 2017 is as follows:

$$ILM = \ln \left[\exp(1) - 1 + \left(\frac{LC}{BIC} \right)^{0.8} \right] \quad [1]$$

The ILM helps to smooth the effect of the LC on the resulting capital requirements and serves to scale them up or down depending on the relationship between the BIC and the

LC. Where the BIC is greater than the LC, the ILM is also greater than one, which increases the resulting capital requirement (the rate of the increases in the capital requirement is decreasing due to the concave shape of the ILM). Where the BIC is lower than the LC, the ILM is lower than one, which reduces the capital requirement. Finally, where the BIC is equal to the LC, the ILM is equal to one and thus the capital requirement is only determined by the BIC.²⁰

Compared with the ILM proposed in the 2016 CD, the only change in its functional form is that it now includes a ‘dampening’ factor. This factor has been set at 0.8 and has been added to the ILM as an exponent to the LC/BIC ratio. The purpose of the dampening factor is to soften even further the potential effects that large losses may have on the resulting capital requirements.

Subject to national discretion, the ILM may be set equal to 1 for all banks in a given jurisdiction. That is, historical losses would not be used for the calculation of capital requirements under the revised Pillar 1 framework for operational risk. As commented above, differences in banks’ business models may lead, for instance, to different risk profiles which are difficult to capture by the one-factor structure in the LC. These differences in banks’ risk profiles may also have an effect on the way that the LC and the BIC interact within the ILM formula. Also, the use of historical losses may make the LC more prone to exposure to cyclical effects. To obviate or mitigate these and other possible cases where national authorities may consider it appropriate, the latter may decide to exercise such discretion. In that event, banks would still be subject to the disclosure requirements provided for in the standards for historical losses.

The last step to calculating the minimum capital requirement for operational risk consists in multiplying the BIC by the ILM:

$$\text{Minimum capital requirement} = \text{BIC} \times \text{ILM} \quad [2]$$

In addition to the requirements explained above, the agreed framework comprises a series of disclosure templates requiring information on banks’ operational risk management frameworks, their historical losses, their BIC and subcomponents thereof, and the resulting minimum operational risk capital requirements.

4 Other reforms

In addition to the reforms described in the previous sections, the Committee has agreed to review two additional areas of the framework: capital requirements related to Credit Valuation Adjustment (CVA) and the leverage ratio framework.

4.1 MINIMUM CAPITAL REQUIREMENTS FOR CVA RISK

CVA refers to the adjustment made to the fair value of a derivative transaction to consider the current value of expected future losses caused by counterparty default. Therefore, CVA reflects the market value of counterparty default risk, which depends both on counterparties’ credit spread and market risk factors driving the actual exposure. The CVA adjustments have a direct impact on the P&L account. As such, CVA has an impact on banks’ results and also on regulatory capital ratios. Given the impact of these

²⁰ For banks in the first BI bucket ($BI \leq \text{€}1$ billion), the historical losses do not enter into the capital calculation. This means that the ILM is set to be equal to 1 and, therefore, the resulting capital requirement is the resulting BIC (in this case $12\% \cdot BI$). However, banks in the first bucket may still be allowed to use losses in the calculation of the capital requirements at national discretion.

adjustments on banks' results during the last financial crisis and that this risk was not captured by the Basel II framework, the Committee decided to introduce CVA capital charges in the Basel III framework. The capital charges were set to address variability in CVA for derivative transactions not transacted directly with a qualified central counterparty and securities financing transactions fair-valued for accounting purposes.²¹

The revisions to the CVA framework endorsed in December 2017 used the same range of measures as in the rest of the standards. First, the possibility of using internal modelling approaches for CVA was removed, thus contributing to the effort to improve comparability and simplicity of the framework. At present under the revised framework banks can use two alternative methods: the basic approach (BA-CVA), which simplifies the calculation of capital requirements and sensitivities.²² Or they can use the standardised approach (SA-CVA), for which supervisory approval is required. Further, a materiality threshold was established with the aim of simplifying capital requirements for banks with a reduced notional amount of non-centrally cleared derivatives (\leq €100 billion). In those cases, the CVA capital required would be equal to 100% of banks' capital requirements for counterparty credit risk.

Second, the risk-sensitivity of the standardised approach was enhanced. In particular, the revised framework considers changes to the exposure component derived from market risk factors, which is an important driver of CVA risk, and also hedges associated with these risk factors. These proposals try to align capital requirements with the underlying economic risk, which creates hedging incentives for banks.

Third, the changes introduced by the Committee sought to ensure consistency between the CVA framework and the revised market risk framework.²³ This was particularly necessary given that the accounting CVA is fair-valued and depends on the same underlying risk factors as those positions held in the trading book. Therefore, capital charges in both frameworks should be closely linked. For example, the SA-CVA is based on sensitivities to market risk factors while the BA-CVA is benchmarked to the SA-CVA.

4.2 CHANGES RELATED TO THE LEVERAGE RATIO

Together with the rest of the reforms, the Basel Committee announced in December 2017 the introduction of a leverage ratio buffer for Global Systemically Important Banks (G-SIBs). This new buffer is in addition to the 3% minimum Tier 1 leverage ratio requirement established by the Committee in January 2016 [GHS (2106)].

The objective of this additional requirement based on the existing minimum leverage ratio was two-fold. The first objective was to constrain the build-up of leverage in the banking sector. The last financial crisis made it clear that leverage in the banking systems was excessive. As a result of market pressures when the crisis unfolded, banks were forced to make sharp adjustments to deleverage their balance sheets creating further pressure on asset prices, all of which resulted in a significant credit contraction in the real economy. To help avoid these dynamics, the minimum leverage ratio establishes a maximum level of leverage that banks can assume. This complements the risk-based capital ratios. The leverage ratio can contribute to preventing excessive leverage which

²¹ During the financial crisis, banks faced important losses on their OTC derivatives portfolios which were mostly explained by CVA adjustments to the fair value of these transactions [BCBS (2015a)].

²² Two versions of the BA-CVA could be applied by banks: an "abridged" version designed to simplify the implementation of this method for less sophisticated banks that do not hedge CVA; and a "full version" that recognised counterparty spread hedges.

²³ Fundamental Review of the Trading Book [BCBS (2016a)].

may not be fully captured in the risk-based capital ratios, for example as a result of large concentrations in low risk-weighted exposures. The second objective was to serve as a general backstop to risk-based requirements (see Section 5). The leverage ratio is a simple and non-risk based measure which helps to safeguard against model risk and measurement error.

Given that the existing surcharges on G-SIBs were solely founded on risk-based capital ratios, the Committee considered it necessary to ensure consistency between the incentives created by the leverage ratio and the G-SIBs framework. To this end, it was decided that the leverage-based G-SIB buffer should be met with tier 1 capital²⁴ and its calibration set as the result of multiplying the G-SIB risk-based buffer by a scalar factor of 50%.²⁵ This scalar factor corresponds to the RWA density of a neutral bank between risk-based capital requirements and the T1 leverage ratio. In particular, the leverage ratio could be expressed as follows:

$$\text{Leverage ratio} = \frac{\text{Tier1 capital}}{\text{Exposure}} = \frac{\text{T1}}{\text{RWAs}} \times \frac{\text{RWAs}}{\text{Exposure}} = \text{T1 ratio} \times \text{Density} \quad [3]$$

It can be seen from this equation that considering the existing minimum T1 risk-based capital requirement of 6% and the 3% T1 leverage ratio requirement, the neutral RWA density would be equal to 50% (3% LR = 6% T1 ratio × 50% Density). In other words, banks whose RWA density equals 50% (defined as RWA divided by the leverage exposure) would require the same amount of capital under both capital requirements. To ensure that this relationship is maintained for the G-SIB buffers (i.e. the same neutral RWA density applies considering additional requirements established for G-SIBs), the Basel Committee introduced an additional leverage ratio into the G-SIB buffer requirement. For example, a G-SIB with a risk-based buffer requirement of 2% would be subject to an additional leverage ratio buffer of 1% (= 50% * 2%).²⁶

The design of the leverage-based G-SIB buffer and the consequences of breaching it are the same as for the risk-based buffer. In particular, the buffer is divided into five ranges and capital distribution restrictions will depend on the position of the banks' leverage ratio within them. This implies that automatic distribution restrictions to capital distribution for G-SIBs will now depend both on their CET1 risk-based ratio and their T1 leverage ratio. For example, a G-SIB which meets its minimum CET1 risk-based requirements plus buffers (4.5% minimum; 2.5% capital conservation buffer; and the G-SIB buffer) but does not meet its T1 leverage ratio requirements (3% plus its leverage ratio buffer) will be subject to the distribution constraints referenced to the leverage ratio. When it fails to meet both, the higher restriction would apply.

As an illustration, *Table 5* shows the minimum conservation requirements for the CET1 risk-based ratio and the T1 leverage ratio for banks with a 1% risk-based G-SIB buffer.

²⁴ While RWA-based G-SIB buffers should be met with CET1, leverage ratio G-SIB requirements are based on Tier 1 (though given that for the minimum LR of 3% there is no limit to AT1 capital, the effect of having imposed a leverage ratio G-SIB buffer would have been minimal).

²⁵ Reviewed and published annually by the BCBS and Financial Stability Board (FSB).

²⁶ Nevertheless, the leverage ratio framework does not take into consideration the other capital buffers or Pillar 2 requirements, which decrease the neutral RWA-density (and therefore make the leverage ratio requirement less binding).

CET1 risk-weighted ratio	Tier 1 leverage ratio	Minimum capital conservation ratios (expressed as a percentage of earnings)
4.5 - 5.375%	3 - 3.125%	100%
> 5.375 - 6.25%	> 3.125 - 3.25%	80%
> 6.25 - 7.125%	> 3.25 - 3.375%	60%
> 7.125 - 8%	> 3.375 - 3.50%	40%
> 8.0%	> 3.50%	0%

SOURCE: Basel Committee on Banking Supervision (2017a).

In addition to the G-SIB buffer, the Committee has also revised some aspects of the design of the denominator of the leverage ratio. Some of these changes sought to improve the consistency between the leverage ratio framework and other Basel standards. For example, the measurement of derivative transactions was adapted to consider the new standardised approach for measuring counterparty credit risk exposures (SA-CCR), albeit with some modifications to ensure that the principle of not recognising collateral, guarantees or other credit risk mitigation techniques are taken into account.²⁷ Additionally, the treatment of off-balance sheet exposures was also modified to ensure consistency with the standardised approach for credit risk (described in Section 2.1).

Finally, the Committee has introduced a national discretion to exempt central bank reserves from the leverage exposure measure on a temporary basis under exceptional macroeconomic circumstances. Jurisdictions that apply this discretion should recalibrate accordingly the minimum requirement to ensure robustness of the requirement in relation to the rest of the balance sheet. This exemption was introduced to address a possible problem created by the leverage ratio in some circumstances where, for example, the central bank applies an expansionary policy. Banks' balance sheets would increase as a result of using these facilities and leverage ratios would fall. In this context there are incentives for banks to divest other assets to compensate for the reduction in their leverage ratios or even to limit the use of central bank facilities.

5 Backstop measures: the output floor

The Basel Committee has introduced a new output floor whereby RWAs are bound to a minimum of 72.5% of total RWAs calculated using the available standardised approaches in the Basel framework.

This new floor substitutes that included in the Basel II standards. The Basel II floor was found to be implemented inconsistently by jurisdictions and it was based on capital requirements under Basel I (instead of the revised standardised approaches, which are more risk-sensitive). The original objective of the Basel II floor was also different to that of the new floor. Its purpose was to limit a rapid fall in capital requirements as a result of the introduction of internal models. To avoid this, it was originally devised as a transitional and decreasing floor. Nevertheless, the Basel Committee finally decided to keep the floor in place after the transitional period (beyond end-2009).²⁸

The Committee introduced the new aggregate output floor by first clarifying the design and workings of the measure. As commented above, the spirit of the new floor was similar

²⁷ The SA-CCR was published in March 2014, after the publication of the initial leverage ratio framework.

²⁸ BCBS press release, 13 July 2009, <https://www.bis.org/press/p090713.htm>.

	Pre-floor RWAs	Standardised RWAs	72.5% of standardised RWAs
Credit risk	40	90	65.25
IRB exposures	30	80	58.00
SA exposures	10	10	7.25
Market risk (IMA)	2	4	2.90
Operational risk (SMA)	10	10	7.25
Total RWA	52	104	75.40

SOURCE: Banco de España.

to that of the Basel II floor, but their design and objectives are different. While the output floor also seeks to ensure a minimum level of capital, its objectives are to improve the credibility of capital ratios and support their comparability, therefore contributing to ensure a level playing field between banks using internal models and banks applying the standardised approaches. Regarding their design, the main difference with the Basel II floor is that the new output floor is based on the available standardised approaches in the Basel framework. This makes the measure more risk-sensitive (as explained above, the Basel II floor was based on the Basel I framework, which was significantly less risk sensitive than the revised standardised approaches).²⁹

Capital requirements under the new output floor are calculated as the higher of:

- Current total RWA calculated under the approaches approved by supervisors (for example, using the IRB for credit risk exposures or the Internal Model Approach (IMA) for market risk exposures); and
- 72.5% of the total RWA calculated using only standardised approaches (for example, the SA for credit risk exposure or the standardised approach for market risk).

The simplified example in Table 6 helps to illustrate how the output floor would work in practice:

As the output floor is calculated at the aggregate level (i.e. by totalling all the different types of risks covered in the Basel standards) it permits offsetting between different portfolios and risks in a given bank. This implies that the ‘effective output floor’ (the floor that would apply to only the part of the RWAs calculated using internal models) would be lower, the higher the amount of RWA calculated using standardised approaches. Following on from the example above, this means that although the aggregate output floor is calibrated at 72.5%, the effective output floor relative to the portion calculated using internal models would be 65.95%.³⁰

²⁹ Additionally, the Basel II floor included an adjustment related to the recognition of general provisions in Tier 2 for exposures under the SA. The new output floor does not apply any adjustment related to the different treatment of provisions under the IRB (where total provisions are compared with the estimated expected loss and the shortfall (excess) should be deducted (added) to CET1 (Tier 2 with some limits)) and the SA (where RWAs are calculated using exposures net of specific provisions while general provisions can be recognised in Tier 2 with some limits).

³⁰ The effective output floor is the implicit calibration that would ensue if the floor were established only relative to RWA estimated using internal models (i.e. excluding RWAs actually calculated using standardised approaches).

An alternative design could have been a more granular output floor (e.g. by risk, portfolio or even exposure). However, this alternative would have required a different calibration to consider the specificities of each segment and may have further constrained the risk-sensitivity of the framework.

5.1 RATIONALE AND INTERACTIONS OF THE OUTPUT FLOOR WITH OTHER MEASURES

The last financial crisis showed that market participants had lost confidence in the risk-based capital ratios, particularly when calculated using internal models.³¹ As a consequence, investors' focus changed towards alternative metrics not based on RWAs such as simple leverage ratios. The variability in RWAs densities and therefore in capital requirements was indeed significant. For example, Trucharte *et al.* (2015) found that the use of the IRB approach was more intense in those situations where there was a higher reduction of RWA density with respect to the SA. These authors also found significant variation across countries in terms of their use of the IRB approaches and capital savings.

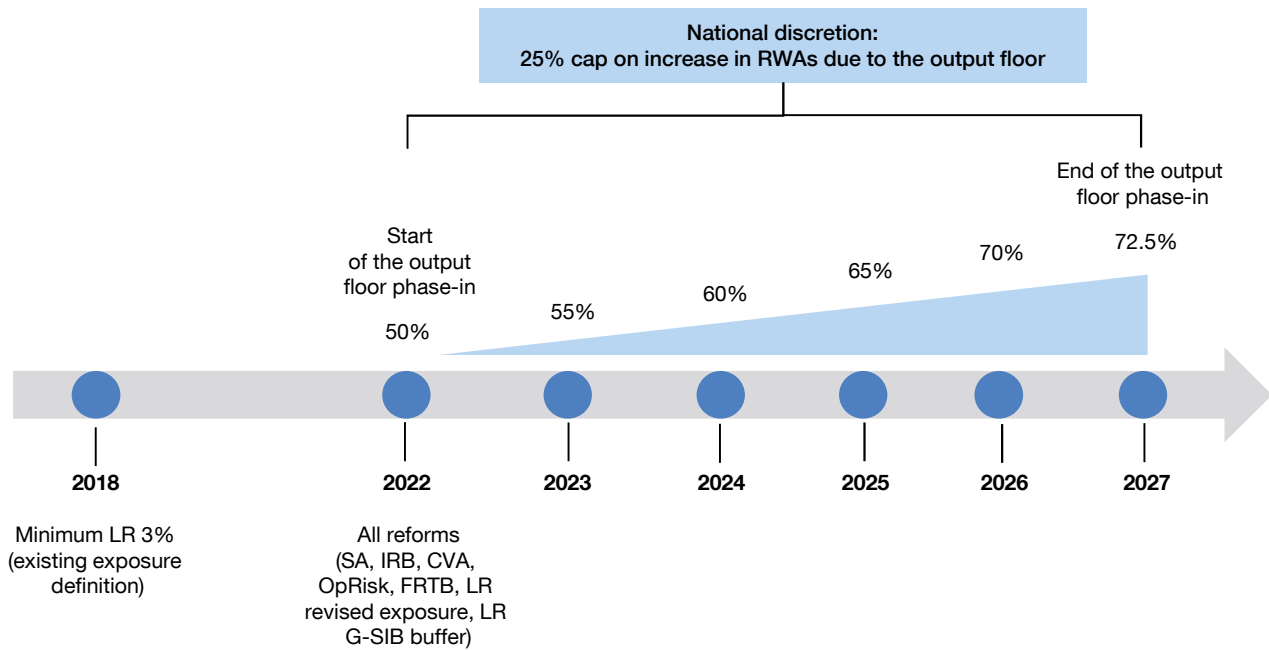
Several observers argued that these differences in RWA densities could not always be explained by underlying risk factors. In response, and as mentioned in Section 2, the Basel Committee performed analyses on the variability of calculations of risk exposures. It was found that an important part of the dispersion in RWAs was not driven either by the underlying risk or by differences in supervisory practices [BCBS (2013b)].

Though various policy measures focused on internal models were adopted (e.g. changes to the IRB approaches for credit risk, revision of the internal models for market risk, or prohibition of the internal models for CVA or operational risk), the introduction of backstop measures to RWAs was still warranted. RWAs calculations can be affected by model risk, gaming risk and measurement error. Consequently, insofar as internal models were used to compute capital requirements, some additional measures were needed to enhance the robustness of the resulting capital requirements. Specifically, the three back-stop measures included in the revised Basel framework complement each other as result of their design and characteristics:

- *Input floors*: as explained in Section 2, these floors determine the minimum level for models' parameters such as PDs and LGDs. Conceptually, these floors help the supervisory review of the internal models and ensure a minimum level of capital even for exposures with very low risk levels.
- *Output floor*: it limits the capital savings that banks can obtain as a result of using internal models. This floor also addresses problems related to higher risk exposures for which input floors are generally not binding. These higher risk exposures could also be affected by undue RWA variability and model risk. At the same time, it contributes to strengthening the comparability of the risk-based capital requirements.
- *Leverage ratio*: it ensures a minimum level of capital for all exposures. It works as a complement to the output floor given that the leverage ratio – unlike the output floor – also serves as a backstop against standardised approaches.

The effective output floor (x%) is obtained by making the impact of the output floor on the banks' RWAs (75.4 – 52) equal to the difference between the floor applied only to RWAs using internal models (x% * RWAs obtained using standardised approaches for those portfolios for which the bank actually uses internal models) and the RWAs using internal models (x% * 84 – 32).

³¹ For example, a survey conducted by Barclays in 2012 found there was quite general lack of confidence in the capital ratios as result of the disparities observed in risk weights [*Financial Times* (2012)].



SOURCE: Banco de España.

The latter could also suffer model risk as it may be inherited in the regulatory methodology that was used to calibrate the standardised approaches. Separately, the output floor applies to RWAs and therefore ensures that the backstop affects all the levels of prudential requirements established under the Basel framework (minimum requirements, buffers and even total loss-absorbing capacity requirements).

Overall, these measures try to ensure a balance between the comparability and consistency of capital requirements across banks (e.g. needed to restore confidence in the risk-based capital ratios) while also retaining enough risk-sensitivity in the framework (e.g. needed to align capital requirements with the underlying risk of the exposures and to create the right incentives for banks).

6 Implementation and disclosures

The Committee sought to avoid a significant increase in the overall capital requirements as a result of post-crisis reforms [GHoS (2016)]. In this respect, the results from the quantitative impact assessment (QIS) performed by the Committee showed that changes in capital ratios were rather insignificant on average [BCBS (2017c)]. Additionally, the Committee established an implementation date and transitional arrangements to ensure that banks will have enough time to adapt to the new standards.

The reforms approved are expected to enter fully into force from 2022 with the exception of the output floor, which will be phased in gradually by 2027 (Scheme 3). Additionally, the Committee introduced national discretion for capping the increase in RWAs resulting from the application of the floor at 25% of total RWAs. Regarding disclosure requirements, banks should start publishing their RWAs using standardised approaches in 2022, which would permit the market to calculate the impact of the output floor under full implementation. In any case, jurisdictions are free to bring forward implementation or to not apply the phase-in provided for the output floor.

In addition, the Committee also decided to delay the implementation date of the new market risk framework (Fundamental Review of the Trading Book - FRTB) until 2022. This was in acknowledgement of certain implementation challenges as a result of the complexity of the revised standards. This deferral gave the Committee time to finalise some revisions to the FRTB related to the relative calibration of the standardised and internal model approaches.

7 Sovereign risk

In January 2015 and in tandem with some of the ongoing work at the time in relation to the post-crisis reforms to Basel III, the BCBS set up a high-level working group to review the existing regulatory treatment of sovereign risk in a careful, holistic and gradual manner [see BCBS (2015b)]. To follow such an approach was pertinent due to the special characteristics and multiple roles of sovereign debt and its interactions with other economic policies. As a result of this work, in December 2017, at the same time as the agreed reforms to the Basel III framework were announced, the Basel Committee published a Discussion Paper (DP) on the regulatory treatment of sovereign exposures [BCBS (2017b)].

The DP began by describing the main characteristics of sovereign risk. Some of these characteristics are related to the frequency and impact of sovereign crises. The empirical evidence in the DP suggests that while the impact of a sovereign crisis may vary significantly across countries and in terms of the type of crisis (for example whether it coincides or not with a banking crisis), the frequency of sovereign debt defaults has been considerably lower than in other asset classes. In addition, the effect of the interconnections between banks and sovereign exposures often depends on a number of factors, including macroeconomic variables and the size of banks' sovereign debt holdings ahead of a shock. Banks' sovereign exposures may work either as a shock absorber or amplifier depending on these factors.

Sovereign debt also performs various roles in the banking system and financial markets, and has important interactions with economic policies. For example, sovereign debt is commonly used as a source of stable collateral for financial markets and the broad economy. Sovereign debt also contributes to making the operationalisation of monetary policy (since central banks' market operations typically involve government debt) and it affects the transmission of monetary policy through financial markets (through the working of sovereign debt repo markets and by serving as a reference to the pricing of financial assets). Finally, sovereign debt interacts directly with fiscal policy. It can contribute, for instance, to the implementation of stabilising fiscal policy strategies during the different phases of the economic cycle.

Against this background, sovereign exposures are treated more favourably than other type of exposures in different parts of the Basel regulatory framework. Whereas sovereign exposures are included in the leverage ratio requirements, they receive preferential treatment in the credit and market risk frameworks, and they are excluded from the large exposures framework. In addition, domestic sovereign exposures can be included without limits in the stock of high-quality liquidity assets (HQLA) as part of the liquidity standards and – depending on supervisory discretion – they can be exempted from the application of haircuts to their value.

As the DP concludes, at this stage the Basel Committee has not reached a consensus to make any changes to the current treatment of sovereign exposures. Nonetheless, the DP outlines potential ideas related to revising the regulatory treatment of sovereign exposures

that have been discussed as part of the Committee's review of the current treatment. The ideas outlined in the DP include the following:

- revisions to the definition of sovereign exposures (e.g. further specification of the definitions of exposures to central banks, central governments and other sovereign entities);
- revisions to the risk weighted framework (e.g. potential removal of the IRB approach for sovereign exposures and mandatory positive standardised risk weights);
- adoption of marginal risk weight add-ons to mitigate concentration risks (i.e. increasing risk weights allocated according to different levels of banks' sovereign exposures concentration calculated in term of their Tier 1 capital resources);
- revisions to the credit risk mitigation framework (e.g. removal of national discretion to apply a zero haircut to sovereign repo-style transactions);
- additional Pillar 2 (e.g. enhanced guidance on monitoring, stress testing and supervisory responses to sovereign risk), and
- additional Pillar 3 disclosures (e.g. richer and more granular information for market participants by including jurisdictional, currency and accounting classification breakdowns).

8 Next steps

The post-crisis reforms completed the main revisions to the Basel regulatory framework which were initiated in 2010. While in the first phase of the reforms the focus was on the numerator of the risk-based capital ratio (capital), the second phase – the finalisation of Basel III post-crisis reforms – focused on its denominator (RWAs). The reforms sought to address several shortcomings identified in the framework and help enhance the resilience of the banking system. The finalisation of Basel III post-crisis reforms, in particular, aimed to restore the credibility of RWAs, therefore contributing to rebuilding market participants' confidence in the risk-based capital ratios.

With the post-crisis reforms now finalised, the Committee's focus is increasingly turning towards ensuring proper implementation of the reforms, the evaluation of their effects, and the assessment of emerging risks and vulnerabilities in the banking system.

In the short and medium term, the Committee will focus its efforts on four main areas. First, it will work on completing the existing policy initiatives such as the revisions to the market risk framework, the regulatory treatment of accounting provisions, and the remaining disclosure requirements.

Second, the focus will be on monitoring emerging risks and evaluating the impact of post-crisis reforms – including whether the reforms are working effectively to reduce excessive variability of RWAs. These efforts should be seen together with the Financial Stability Board's initiative regarding the impact analysis of G20 post-crisis reforms.

Third, the Committee will focus on promoting strong and consistent supervision of banks. The plan includes the development of possible improvements to the supervisory tools and

techniques, such as, for example stress-testing practices, and the assessment of best practices in relation to new emerging risks.

Finally, following the commitment announced by the GHoS in December 2017, the Committee will dedicate its efforts to ensure a full, timely and consistent implementation of the reforms.

Annex 1: Additional enhancements to the IRB approach

The Committee agreed on various additional enhancements to the IRB approaches to further reduce unwarranted RWA variability. These include adjustments to the supervisory parameters in the FIRB approach such as the following: i) for unsecured exposures, the LGD parameter was reduced from 45% to 40% for exposures to non-financial corporates, and ii) for exposures secured by non-financial collateral, the haircuts that apply to the collateral were increased and the LGD parameters were reduced. Table A1 shows the new LGD and haircuts applicable to secured exposures under FIRB

Although the proposed floors for physical and other collateral are lower than in the current FIRB framework, this is justified given that the haircuts applied to non-financial collateral have been increased on the grounds of empirical evidence gathered by supervisors during the loan recovery process.³² In any case, it was considered that haircuts of 40% should still provide sufficient incentives for banks to take collateral.

When considering options for reducing unwarranted RWA variation in EAD estimates, the revised framework set forth a combination of greater use of supervisory CCF estimates together with additional constraints on banks' estimate practices where the possibility of CCF modelling is retained.

As mentioned in the body of the paper, issues from low default are often more common in certain portfolio segments of banks. To ensure that EAD-related RWA differences primarily reflect differences in underlying risk, CCF estimates are only allowed for those portfolios that are not considered low default portfolios for the purpose of LGD estimates. Likewise, the use of supervisory CCFs for non-revolving commitments is required.

Another issue that contributes to RWA variability among banks – and within the same bank – is the use of different time horizons for the estimates. Currently, there are three methods available: fixed-horizon, multiple horizon and cohort estimate approaches. The Committees found merits in reducing associated RWA differences by setting a uniform fixed 12-month horizon approach.

In addition, under the new AIRB framework maturity should be based on the expiry date of the facility. This allows setting the maturity as the maximum residual time that a borrower

³² A haircut is the fixed value that is to be used under the FIRB to determine the proportion of the exposure that is secured (and subject to the relevant prescribed and secured LGD) and the proportion that is unsecured.

LGD AND COLLATERAL HAIRCUTS APPLICABLE ON SECURED EXPOSURES UNDER FIRB TABLE A.1

Type of collateral	LGD	Haircut
Eligible financial collateral	0%	As determined in the comprehensive approach (SA)
Eligible receivables	20%	40%
Eligible residential/commercial real estate	20%	40%
Other eligible physical collateral	25%	40%

SOURCE: Basel Committee on Banking Supervision (2017a).

is allowed to fully discharge its contractual obligations under the terms of the loan agreement.

In keeping with the efforts to identify areas where the complexity of the framework could be reduced and/or comparability improved, the Committee has also introduced changes to the CRM framework. For example, to better align the requirements for eligible guarantees for all banks, it has been specified what unconditional means in terms of guarantees. Under the AIRB, the option to recognise conditional guarantees has been retained but solely in the case of guarantees that only cover the loss remaining after banks have first pursued the original obligor for payment and have completed the workout process.

Another measure to simplify the CRM framework for the AIRB and to reduce divergences in capital requirements, was to remove the recognition of second-to-default and nth-to-default credit derivatives. The main reasons are doubts about the effectiveness of this type of credit protection and the complexity involved in modelling the correlation between the different assets in the basket. In the same vein, the double default treatment has been removed because of its complexity.³³

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³³ This treatment adjusts some assumptions in the formula for setting capital requirements regarding the probability that both the underlying obligor and the protection provider enter into default.