

Basel Committee on Banking Supervision

CRE

Calculation of RWA for credit risk

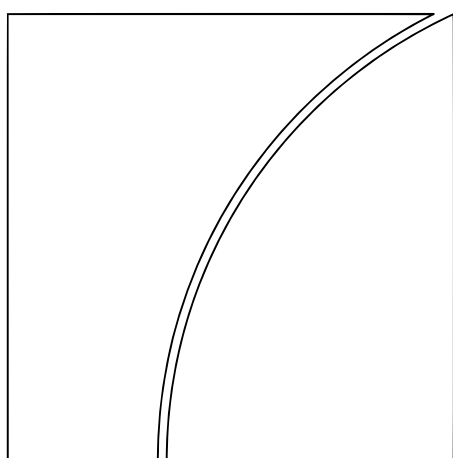
CRE30

IRB approach: overview and asset class definitions

This chapter sets out an overview of the internal ratings-based approach to credit risk, including the categorisation of exposures, a description of the available approaches and the roll-out requirements.

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BANK FOR INTERNATIONAL SETTLEMENTS

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Overview

30.1

This chapter describes the internal ratings-based (IRB) approach for credit risk. Subject to certain minimum conditions and disclosure requirements, banks that have received supervisory approval to use the IRB approach may rely on their own internal estimates of risk components in determining the capital requirement for a given exposure. The risk components include measures of the probability of default (PD), loss given default (LGD), the exposure at default (EAD), and effective maturity (M). In some cases, banks may be required to use a supervisory value as opposed to an internal estimate for one or more of the risk components.

30.2

The IRB approach is based on measures of unexpected losses (UL) and expected losses. The risk-weight functions, as outlined in [CRE31](#), produce capital requirements for the UL portion. Expected losses are treated separately, as outlined in [CRE35](#).

30.3

In this chapter, first the asset classes (eg corporate exposures and retail exposures) eligible for the IRB approach are defined. Second, there is a description of the risk components to be used by banks by asset class. Third, the requirements that relate to a bank's adoption of the IRB approach at the asset class level and the related roll-out requirements are outlined. In cases where an IRB treatment is not specified, the risk weight for those other exposures is 100%, except when a 0% risk weight applies under the standardised approach, and the resulting risk-weighted assets are assumed to represent UL only. Moreover, banks must apply the risk weights referenced in [CRE20.32](#) to [CRE20.34](#) of the standardised approach to the exposures referenced in those paragraphs (that is, investments that are assessed against certain materiality thresholds).

30.4

For the purposes of minimum capital requirement and disclosure requirement a scaling factor of 1.06 must be applied to the risk weighted assets calculated under the IRB approach.

Categorisation of exposures

30.5

Under the IRB approach, banks must categorise banking-book exposures into broad classes of assets with different underlying risk characteristics, subject to the definitions set out below. The classes of assets are (a) corporate, (b) sovereign, (c) bank, (d) retail, and (e) equity. Within the corporate asset class, five sub-classes of specialised lending are separately identified. Within the retail asset class, three sub-classes are separately identified. Within the corporate and retail asset classes, a distinct treatment for purchased receivables may also apply provided certain conditions are met.

30.6

The classification of exposures in this way is broadly consistent with established bank practice. However, some banks may use different definitions in their internal risk management and measurement systems. While it is not the intention of the Committee to require banks to change the way in which they manage their business and risks, banks are required to apply the

appropriate treatment to each exposure for the purposes of deriving their minimum capital requirement. Banks must demonstrate to supervisors that their methodology for assigning exposures to different classes is appropriate and consistent over time.

Definition of corporate exposures

30.7

In general, a corporate exposure is defined as a debt obligation of a corporation, partnership, or proprietorship. Banks are permitted to distinguish separately exposures to small or medium-sized entities (SMEs), as defined in [CRE31.9](#).

30.8

Within the corporate asset class, five sub-classes of specialised lending (SL) are identified. Such lending possesses all the following characteristics, either in legal form or economic substance:

1. The exposure is typically to an entity (often a special purpose entity, or SPE) which was created specifically to finance and/or operate physical assets;
2. The borrowing entity has little or no other material assets or activities, and therefore little or no independent capacity to repay the obligation, apart from the income that it receives from the asset(s) being financed;
3. The terms of the obligation give the lender a substantial degree of control over the asset(s) and the income that it generates; and
4. As a result of the preceding factors, the primary source of repayment of the obligation is the income generated by the asset(s), rather than the independent capacity of a broader commercial enterprise.

30.9

The five sub-classes of SL are project finance (PF), object finance (OF), commodities finance (CF), income-producing real estate (IPRE), and high-volatility commercial real estate (HVCRE). Each of these sub-classes is defined below.

Project finance

30.10

PF is a method of funding in which the lender looks primarily to the revenues generated by a single project, both as the source of repayment and as security for the exposure. This type of financing is usually for large, complex and expensive installations that might include, for example, power plants, chemical processing plants, mines, transportation infrastructure, environment, and telecommunications infrastructure. Project finance may take the form of financing of the construction of a new capital installation, or refinancing of an existing installation, with or without improvements.

30.11

In such transactions, the lender is usually paid solely or almost exclusively out of the money generated by the contracts for the facility's output, such as the electricity sold by a power plant. The borrower is usually an SPE that is not permitted to perform any function other than

developing, owning, and operating the installation. The consequence is that repayment depends primarily on the project's cash flow and on the collateral value of the project's assets. In contrast, if repayment of the exposure depends primarily on a well-established, diversified, credit-worthy, contractually obligated end user for repayment, it is considered a secured exposure to that end-user.

Object finance

30.12

OF refers to a method of funding the acquisition of physical assets (eg ships, aircraft, satellites, railcars, and fleets) where the repayment of the exposure is dependent on the cash flows generated by the specific assets that have been financed and pledged or assigned to the lender. A primary source of these cash flows might be rental or lease contracts with one or several third parties. In contrast, if the exposure is to a borrower whose financial condition and debt-servicing capacity enables it to repay the debt without undue reliance on the specifically pledged assets, the exposure should be treated as a collateralised corporate exposure.

Commodities finance

30.13

CF refers to structured short-term lending to finance reserves, inventories, or receivables of exchange-traded commodities (eg crude oil, metals, or crops), where the exposure will be repaid from the proceeds of the sale of the commodity and the borrower has no independent capacity to repay the exposure. This is the case when the borrower has no other activities and no other material assets on its balance sheet. The structured nature of the financing is designed to compensate for the weak credit quality of the borrower. The exposure's rating reflects its self-liquidating nature and the lender's skill in structuring the transaction rather than the credit quality of the borrower.

30.14

The Committee believes that such lending can be distinguished from exposures financing the reserves, inventories, or receivables of other more diversified corporate borrowers. Banks are able to rate the credit quality of the latter type of borrowers based on their broader ongoing operations. In such cases, the value of the commodity serves as a risk mitigant rather than as the primary source of repayment.

Income-producing real estate

30.15

IPRE refers to a method of providing funding to real estate (such as, office buildings to let, retail space, multifamily residential buildings, industrial or warehouse space, and hotels) where the prospects for repayment and recovery on the exposure depend primarily on the cash flows generated by the asset. The primary source of these cash flows would generally be lease or rental payments or the sale of the asset. The borrower may be, but is not required to be, an SPE, an operating company focused on real estate construction or holdings, or an operating company with sources of revenue other than real estate. The distinguishing characteristic of IPRE versus other corporate exposures that are collateralised by real estate is the strong positive correlation between the prospects for repayment of the exposure and the prospects

for recovery in the event of default, with both depending primarily on the cash flows generated by a property.

High-volatility commercial real estate

30.16

HVCRE lending is the financing of commercial real estate that exhibits higher loss rate volatility (ie higher asset correlation) compared to other types of SL. HVCRE includes:

1. Commercial real estate exposures secured by properties of types that are categorised by the national supervisor as sharing higher volatilities in portfolio default rates;
2. Loans financing any of the land acquisition, development and construction (ADC) phases for properties of those types in such jurisdictions; and
3. Loans financing ADC of any other properties where the source of repayment at origination of the exposure is either the future uncertain sale of the property or cash flows whose source of repayment is substantially uncertain (eg the property has not yet been leased to the occupancy rate prevailing in that geographic market for that type of commercial real estate), unless the borrower has substantial equity at risk. Commercial ADC loans exempted from treatment as HVCRE loans on the basis of certainty of repayment or borrower equity are, however, ineligible for the additional reductions for SL exposures described in [CRE33.4](#).

30.17

Where supervisors categorise certain types of commercial real estate exposures as HVCRE in their jurisdictions, they are required to make public such determinations. Other supervisors need to ensure that such treatment is then applied equally to banks under their supervision when making such HVCRE loans in that jurisdiction.

Definition of sovereign exposures

30.18

This asset class covers all exposures to counterparties treated as sovereigns under the standardised approach. This includes sovereigns (and their central banks), certain public sector entities (PSEs) identified as sovereigns in the standardised approach, multilateral development banks (MDBs) that meet the criteria for a 0% risk weight under the standardised approach, and the entities referred to in [CRE20.7](#).

Definition of bank exposures

30.19

This asset class covers exposures to banks and those securities firms outlined in [CRE20.16](#) of the standardised approach. Bank exposures also include claims on domestic PSEs that are treated like claims on banks under the standardised approach, and MDBs that do not meet the criteria for a 0% risk weight under the standardised approach.

Definition of retail exposures

30.20

An exposure is categorised as a retail exposure if it meets all of the criteria set out in [CRE30.21](#) (which relate to the nature of the borrower and value of individual exposures) and all of the criteria set out in [CRE30.22](#) (which relate to the size of the pool of exposures).

30.21

The criteria related to the nature of the borrower and value of the individual exposures are as follows:

1. Exposures to individuals — such as revolving credits and lines of credit (eg credit cards, overdrafts, and retail facilities secured by financial instruments) as well as personal term loans and leases (eg instalment loans, auto loans and leases, student and educational loans, personal finance, and other exposures with similar characteristics) — are generally eligible for retail treatment regardless of exposure size, although supervisors may wish to establish exposure thresholds to distinguish between retail and corporate exposures.
2. Residential mortgage loans (including first and subsequent liens, term loans and revolving home equity lines of credit) are eligible for retail treatment regardless of exposure size so long as the credit is extended to an individual that is an owner-occupier of the property (with the understanding that supervisors exercise reasonable flexibility regarding buildings containing only a few rental units – otherwise they are treated as corporate). Loans secured by a single or small number of condominium or co-operative residential housing units in a single building or complex also fall within the scope of the residential mortgage category. National supervisors may set limits on the maximum number of housing units per exposure.
3. Loans extended to small businesses and managed as retail exposures are eligible for retail treatment provided the total exposure of the banking group to a small business borrower (on a consolidated basis where applicable) is less than €1 million. Small business loans extended through or guaranteed by an individual are subject to the same exposure threshold.
4. It is expected that supervisors provide flexibility in the practical application of such thresholds such that banks are not forced to develop extensive new information systems simply for the purpose of ensuring perfect compliance. It is, however, important for supervisors to ensure that such flexibility (and the implied acceptance of exposure amounts in excess of the thresholds that are not treated as violations) is not being abused.

30.22

The criteria related to the size of the pool of exposures are as follows:

1. The exposure must be one of a large pool of exposures, which are managed by the bank on a pooled basis.
2. Small business exposures below €1 million may be treated as retail exposures if the bank treats such exposures in its internal risk management systems consistently over time and in the same manner as other retail exposures. This requires that such an exposure be originated in a similar manner to other retail exposures. Furthermore, it must not be managed individually in a way comparable to corporate exposures, but rather as part of a portfolio segment or pool of exposures with similar risk characteristics for purposes of risk assessment and quantification. However, this does not preclude retail exposures from being treated individually at some stages of the risk management process. The fact that an exposure is rated individually does not by itself deny the eligibility as a retail

exposure.

30.23

Within the retail asset class category, banks are required to identify separately three sub-classes of exposures:

1. exposures secured by residential properties as defined above,
2. qualifying revolving retail exposures, as defined in the following paragraph, and
3. all other retail exposures.

Definition of qualifying revolving retail exposures

30.24

All of the following criteria must be satisfied for a sub-portfolio to be treated as a qualifying revolving retail exposure (QRRE). These criteria must be applied at a sub-portfolio level consistent with the bank's segmentation of its retail activities generally. Segmentation at the national or country level (or below) should be the general rule.

1. The exposures are revolving, unsecured, and uncommitted (both contractually and in practice). In this context, revolving exposures are defined as those where customers' outstanding balances are permitted to fluctuate based on their decisions to borrow and repay, up to a limit established by the bank.
2. The exposures are to individuals.
3. The maximum exposure to a single individual in the sub-portfolio is €100,000 or less.
4. Because the asset correlation assumptions for the QRRE risk-weight function are markedly below those for the other retail risk-weight function at low PD values, banks must demonstrate that the use of the QRRE risk-weight function is constrained to portfolios that have exhibited low volatility of loss rates, relative to their average level of loss rates, especially within the low PD bands. Supervisors will review the relative volatility of loss rates across the QRRE subportfolios, as well as the aggregate QRRE portfolio, and intend to share information on the typical characteristics of QRRE loss rates across jurisdictions.
5. Data on loss rates for the sub-portfolio must be retained in order to allow analysis of the volatility of loss rates.
6. The supervisor must concur that treatment as a qualifying revolving retail exposure is consistent with the underlying risk characteristics of the sub-portfolio.

Definition of equity exposures

30.25

In general, equity exposures are defined on the basis of the economic substance of the instrument. They include both direct and indirect ownership interests, whether voting or non-voting, in the assets and income of a commercial enterprise or of a financial institution that is not consolidated or deducted pursuant to [CAP30](#). An instrument is considered to be an equity exposure if it meets all of the following requirements:

1. It is irredeemable in the sense that the return of invested funds can be achieved only by the sale of the investment or sale of the rights to the investment or by the liquidation of

- the issuer;
- 2. It does not embody an obligation on the part of the issuer; and
- 3. It conveys a residual claim on the assets or income of the issuer.

30.26

Additionally any of the following instruments must be categorised as an equity exposure:

1. An instrument with the same structure as those permitted as Tier 1 capital for banking organisations.
2. An instrument that embodies an obligation on the part of the issuer and meets any of the following conditions:
 1. The issuer may defer indefinitely the settlement of the obligation;
 2. The obligation requires (or permits at the issuer's discretion) settlement by issuance of a fixed number of the issuer's equity shares;
 3. The obligation requires (or permits at the issuer's discretion) settlement by issuance of a variable number of the issuer's equity shares and (*ceteris paribus*) any change in the value of the obligation is attributable to, comparable to, and in the same direction as, the change in the value of a fixed number of the issuer's equity shares; or,
 4. The holder has the option to require that the obligation be settled in equity shares, unless either (i) in the case of a traded instrument, the supervisor is content that the bank has demonstrated that the instrument trades more like the debt of the issuer than like its equity, or (ii) in the case of non-traded instruments, the supervisor is content that the bank has demonstrated that the instrument should be treated as a debt position. In cases (i) and (ii), the bank may decompose the risks for regulatory purposes, with the consent of the supervisor.

30.27

Debt obligations and other securities, partnerships, derivatives or other vehicles structured with the intent of conveying the economic substance of equity ownership are considered an equity holding. This includes liabilities from which the return is linked to that of equities. Conversely, equity investments that are structured with the intent of conveying the economic substance of debt holdings or securitisation exposures would not be considered an equity holding.

30.28

The national supervisor has the discretion to re-characterise debt holdings as equities for regulatory purposes and to otherwise ensure the proper treatment of holdings under the supervisory review process standard [SRP](#).

Definition of eligible purchased receivables

30.29

Eligible purchased receivables are divided into retail and corporate receivables as defined below.

Retail receivables

30.30

Purchased retail receivables, provided the purchasing bank complies with the IRB rules for retail exposures, are eligible for the top-down approach as permitted within the existing standards for retail exposures. The bank must also apply the minimum operational requirements as set forth in [CRE34](#) and [CRE36](#).

Corporate receivables

30.31

In general, for purchased corporate receivables, banks are expected to assess the default risk of individual obligors as specified in [CRE31](#) (starting with [CRE31.3](#)) consistent with the treatment of other corporate exposures. However, the top-down approach may be used, provided that the purchasing bank's programme for corporate receivables complies with both the criteria for eligible receivables and the minimum operational requirements of this approach. The use of the top-down purchased receivables treatment is limited to situations where it would be an undue burden on a bank to be subjected to the minimum requirements for the IRB approach to corporate exposures that would otherwise apply. Primarily, it is intended for receivables that are purchased for inclusion in asset-backed securitisation structures, but banks may also use this approach, with the approval of national supervisors, for appropriate on-balance sheet exposures that share the same features.

30.32

Supervisors may deny the use of the top-down approach for purchased corporate receivables depending on the bank's compliance with minimum requirements. In particular, to be eligible for the proposed 'top-down' treatment, purchased corporate receivables must satisfy the following conditions:

1. The receivables are purchased from unrelated, third party sellers, and as such the bank has not originated the receivables either directly or indirectly.
2. The receivables must be generated on an arm's-length basis between the seller and the obligor. (As such, intercompany accounts receivable and receivables subject to contra-accounts between firms that buy and sell to each other are ineligible.)
3. The purchasing bank has a claim on all proceeds from the pool of receivables or a pro-rata interest in the proceeds.
4. National supervisors must also establish concentration limits above which capital charges must be calculated using the minimum requirements for the bottom-up approach for corporate exposures. Such concentration limits may refer to one or a combination of the following measures: the size of one individual exposure relative to the total pool, the size of the pool of receivables as a percentage of regulatory capital, or the maximum size of an individual exposure in the pool.

30.33

The existence of full or partial recourse to the seller does not automatically disqualify a bank from adopting this top-down approach, as long as the cash flows from the purchased corporate receivables are the primary protection against default risk as determined by the rules in [CRE34.4](#) to [CRE34.7](#) for purchased receivables and the bank meets the eligibility criteria and operational requirements.

Foundation and advanced approaches

30.34

For each of the asset classes covered under the IRB framework, there are three key elements:

1. Risk components: estimates of risk parameters provided by banks some of which are supervisory estimates.
2. Risk-weight functions: the means by which risk components are transformed into risk-weighted assets and therefore capital requirements.
3. Minimum requirements: the minimum standards that must be met in order for a bank to use the IRB approach for a given asset class.

30.35

For many of the asset classes, the Committee has made available two broad approaches: a foundation and an advanced approach. Under the foundation approach, as a general rule, banks provide their own estimates of PD and rely on supervisory estimates for other risk components. Under the advanced approach, banks provide more of their own estimates of PD, LGD and EAD, and their own calculation of M, subject to meeting minimum standards. For both the foundation and advanced approaches, banks must always use the risk-weight functions provided in this Framework for the purpose of deriving capital requirements. The full suite of approaches is described below.

Corporate, sovereign and bank exposures

30.36

Under the foundation approach, banks must provide their own estimates of PD associated with each of their borrower grades, but must use supervisory estimates for the other relevant risk components. The other risk components are LGD, EAD and M.

30.37

Under the advanced approach, banks must calculate the effective maturity (M) and provide their own estimates of PD, LGD and EAD.

30.38

There is an exception to this general rule for the five sub-classes of assets identified as SL.

The SL categories: PF, OF, CF, IPRE, and HVCRE

30.39

Banks that do not meet the requirements for the estimation of PD under the corporate foundation approach for their SL assets are required to map their internal risk grades to five supervisory categories, each of which is associated with a specific risk weight. This version is termed the 'supervisory slotting criteria approach'.

30.40

Banks that meet the requirements for the estimation of PD are able to use the foundation

approach to corporate exposures to derive risk weights for all classes of SL exposures except HVCRE. At national discretion, banks meeting the requirements for HVCRE exposure are able to use a foundation approach that is similar in all respects to the corporate approach, with the exception of a separate risk-weight function as described in [CRE31.12](#).

30.41

Banks that meet the requirements for the estimation of PD, LGD and EAD are able to use the advanced approach to corporate exposures to derive risk weights for all classes of SL exposures except HVCRE. At national discretion, banks meeting these requirements for HVCRE exposure are able to use an advanced approach that is similar in all respects to the corporate approach, with the exception of a separate risk-weight function as described in [CRE31.12](#).

Retail exposures

30.42

For retail exposures, banks must provide their own estimates of PD, LGD and EAD. There is no distinction between a foundation and advanced approach for this asset class.

Equity exposures

30.43

There are two broad approaches to calculate risk-weighted assets for equity exposures not held in the trading book: a market-based approach and a PD/LGD approach. These are set out in full in [CRE31.26](#) to [CRE31.45](#).

30.44

The PD/LGD approach to equity exposures remains available for banks that adopt the advanced approach for other exposure types.

Eligible purchased receivables

30.45

The treatment potentially straddles two asset classes. For eligible corporate receivables, both a foundation and advanced approach are available subject to certain operational requirements being met. For eligible retail receivables, as with the retail asset class, there is no distinction between a foundation and advanced approach.

Adoption of the IRB approach across asset classes

30.46

Once a bank adopts an IRB approach for part of its holdings, it is expected to extend it across the entire banking group with the exception of the banking group's exposures to central counterparties (CCPs) treated under [CRE54](#). The Committee recognises however, that, for many banks, it may not be practicable for various reasons to implement the IRB approach across all material asset classes and business units at the same time. Furthermore, once on IRB, data limitations may mean that banks can meet the standards for the use of own

estimates of LGD and EAD for some but not all of their asset classes/business units at the same time.

30.47

As such, supervisors may allow banks to adopt a phased rollout of the IRB approach across the banking group. The phased rollout includes (i) adoption of IRB across asset classes within the same business unit (or in the case of retail exposures across individual sub-classes); (ii) adoption of IRB across business units in the same banking group; and (iii) move from the foundation approach to the advanced approach for certain risk components. However, when a bank adopts an IRB approach for an asset class within a particular business unit (or in the case of retail exposures for an individual sub-class), it must apply the IRB approach to all exposures within that asset class (or sub-class) in that unit.

30.48

A bank must produce an implementation plan, specifying to what extent and when it intends to roll out IRB approaches across significant asset classes (or sub-classes in the case of retail) and business units over time. The plan should be exacting, yet realistic, and must be agreed with the supervisor. It should be driven by the practicality and feasibility of moving to the more advanced approaches, and not motivated by a desire to adopt an approach that minimises its capital charge. During the roll-out period, supervisors will ensure that no capital relief is granted for intra-group transactions which are designed to reduce a banking group's aggregate capital charge by transferring credit risk among entities on the standardised approach, foundation and advanced IRB approaches. This includes, but is not limited to, asset sales or cross guarantees.

30.49

Some exposures in non-significant business units as well as asset classes (or sub-classes in the case of retail) that are immaterial in terms of size and perceived risk profile may be exempt from the requirements in the previous two paragraphs, subject to supervisory approval. Capital requirements for such operations will be determined according to the standardised approach, with the national supervisor determining whether a bank should hold more capital under the supervisory review process standard [SRP](#) for such positions.

30.50

Notwithstanding the above, once a bank has adopted the IRB approach for all or part of any of the corporate, bank, sovereign, or retail asset classes, it will be required to adopt the IRB approach for its equity exposures at the same time, subject to materiality. Supervisors may require a bank to employ one of the IRB equity approaches if its equity exposures are a significant part of the bank's business, even though the bank may not employ an IRB approach in other business lines. Further, once a bank has adopted the general IRB approach for corporate exposures, it will be required to adopt the IRB approach for the SL sub-classes within the corporate exposure class.

30.51

Banks adopting an IRB approach are expected to continue to employ an IRB approach. A voluntary return to the standardised or foundation approach is permitted only in extraordinary circumstances, such as divestiture of a large fraction of the bank's credit-related business, and must be approved by the supervisor.

30.52

Given the data limitations associated with SL exposures, a bank may remain on the supervisory slotting criteria approach for one or more of the PF, OF, CF, IPRE or HVCRE sub-classes, and move to the foundation or advanced approach for other sub-classes within the corporate asset class. However, a bank should not move to the advanced approach for the HVCRE sub-class without also doing so for material IPRE exposures at the same time.

30.53

Irrespective of the materiality, exposures to CCPs arising from OTC derivatives, exchange traded derivatives transactions and SFTs must be treated according to the dedicated treatment laid down in [CRE54](#). When assessing the materiality for the purposes of [CRE30.49](#), the IRB coverage measure used must not be affected by the bank's amount of exposures to CCPs treated under [CRE54](#) – ie such exposures must be excluded from both the numerator and the denominator of the IRB coverage ratio used.