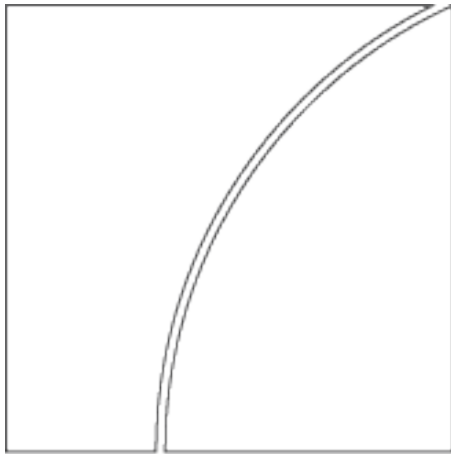


Basel Committee on Banking Supervision

CRE

Calculation of RWA for credit risk

This standard describes how to calculate capital requirements for credit risk.



BANK FOR INTERNATIONAL SETTLEMENTS

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CRE20

Standardised approach: individual exposures

This chapter sets out the standardised approach for credit risk as it applies to individual claims.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Introduction

20.1 Banks can choose between two broad methodologies for calculating their risk-based capital requirements for credit risk. The first is the standardised approach, which is set out in chapters [CRE20](#) to [CRE22](#):

- (1) The standardised approach assigns standardised risk weights to exposures as described in this chapter, [CRE20](#). Risk weighted assets are calculated as the product of the standardised risk weights and the exposure amount. Exposures should be risk-weighted net of specific provisions (including partial write-offs).
- (2) To determine the risk weights in the standardised approach for certain exposure classes, banks may use assessments by external credit assessment institutions that are recognised as eligible for capital purposes by national supervisors. The requirements covering the use of external ratings are set out in chapter [CRE21](#).¹
- (3) The credit risk mitigation techniques that are permitted to be recognised under the standardised approach are set out in chapter [CRE22](#).

Footnotes

¹ *The notations in [CRE20](#) to [CRE22](#) follow the methodology used by one institution, S&P. The use of S&P credit ratings is an example only; those of some other external credit assessment institutions could equally well be used. The ratings used throughout this document, therefore, do not express any preferences or determinations on external assessment institutions by the Committee.*

20.2 The second risk-weighted capital treatment for measuring credit risk, the internal ratings-based (IRB) approach, allows banks to use their internal rating systems for credit risk, subject to the explicit approval of the bank's supervisor. The IRB approach is set out in chapters [CRE30](#) to [CRE36](#).

20.3 The treatment of the following exposures is addressed in separate chapters of the credit risk standard:

- (1) Equity investments in funds are addressed in [CRE60](#).
- (2) Securitisation exposures are addressed in [CRE40](#) to [CRE44](#).
- (3) Exposures to central counterparties are addressed in [CRE54](#).

- (4) Exposures arising from failed trades and non-delivery-versus-payment transactions, are addressed in [CRE70](#).

Claims on sovereigns

20.4 Claims on sovereigns and their central banks will be risk weighted as follows:

Credit Assessment	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
Risk Weight	0%	20%	50%	100%	150%	100%

20.5 At national discretion, a lower risk weight may be applied to banks' exposures to their sovereign (or central bank) of incorporation denominated in domestic currency and funded² in that currency.³ Where this discretion is exercised, other national supervisory authorities may also permit their banks to apply the same risk weight to domestic currency exposures to this sovereign (or central bank) funded in that currency.

Footnotes

² This is to say that the bank would also have corresponding liabilities denominated in the domestic currency.

³ This lower risk weight may be extended to the risk weighting of collateral and guarantees set out in [CRE22](#).

20.6 For the purpose of risk weighting claims on sovereigns, supervisors may recognise the country risk scores assigned by Export Credit Agencies (ECAs). To qualify, an ECA must publish its risk scores and subscribe to the Organisation for Economic Cooperation and Development's (OECD) agreed methodology. Banks may choose to use the risk scores published by individual ECAs that are recognised by their supervisor, or the consensus risk scores of ECAs participating in the "Arrangement on Officially Supported Export Credits".⁴ The OECD agreed methodology establishes eight risk score categories associated with minimum export insurance premiums. These ECA risk scores will correspond to risk weight categories as detailed below.

ECA risk scores	0-1	2	3	4 to 6	7
Risk weight	0%	20%	50%	100%	150%

Footnotes

⁴ The consensus country risk classifications of the Participants to the Arrangement on Officially Supported Export Credits are available on the OECD's website (<http://www.oecd.org>).

20.7 Claims on the Bank for International Settlements, the International Monetary Fund, the European Central Bank, the European Union, the European Stability Mechanism and the European Financial Stability Facility may receive a 0% risk weight.

Claims on non-central government public sector entities (PSEs)

20.8 Claims on domestic PSEs will be risk-weighted at national discretion, according to either option 1 or option 2 for claims on banks (see [CRE20.14](#)).⁵ When option 2 is selected, it is to be applied without the use of the preferential treatment for short-term claims.

Footnotes

⁵ This is regardless of the option chosen at national discretion for claims on banks of that country. It therefore does not imply that when one option has been chosen for claims on banks, the same option should also be applied to claims on PSEs.

20.9 Subject to national discretion, claims on certain domestic PSEs may also be treated as claims on the sovereigns in whose jurisdictions the PSEs are established.⁶ Where this discretion is exercised, other national supervisors may allow their banks to risk weight claims on such PSEs in the same manner.

Footnotes

6

The following examples outline how PSEs might be categorised when focusing on one specific feature, namely revenue raising powers. However, there may be other ways of determining the different treatments applicable to different types of PSEs, for instance by focusing on the extent of guarantees provided by the central government:

- (a) Regional governments and local authorities could qualify for the same treatment as claims on their sovereign or central government if these governments and local authorities have specific revenue raising powers and have specific institutional arrangements the effect of which is to reduce their risks of default.*
- (b) Administrative bodies responsible to central governments, regional governments or to local authorities and other non-commercial undertakings owned by the governments or local authorities may not warrant the same treatment as claims on their sovereign if the entities do not have revenue raising powers or other arrangements as described above. If strict lending rules apply to these entities and a declaration of bankruptcy is not possible because of their special public status, it may be appropriate to treat these claims in the same manner as claims on banks.*
- (c) Commercial undertakings owned by central governments, regional governments or by local authorities may be treated as normal commercial enterprises. However, if these entities function as a corporate in competitive markets even though the state, a regional authority or a local authority is the major shareholder of these entities, supervisors should decide to consider them as corporates and therefore attach to them the applicable risk weights.*

Claims on multilateral development banks (MDBs)

20.10 The risk weights applied to claims on MDBs will generally be based on external credit assessments as set out under option 2 for claims on banks but without the possibility of using the preferential treatment for short-term claims. A 0% risk weight will be applied to claims on highly rated MDBs that fulfil to the Committee's satisfaction the criteria provided below.⁷ The Committee will continue to evaluate eligibility on a case-by-case basis. The eligibility criteria for MDBs risk weighted at 0% are:

- (1) very high quality long-term issuer ratings, ie a majority of an MDB's external assessments must be AAA;
- (2) shareholder structure is comprised of a significant proportion of sovereigns with long-term issuer credit assessments of AA- or better, or the majority of the MDB's fund-raising are in the form of paid-in equity/capital and there is little or no leverage;
- (3) strong shareholder support demonstrated by the amount of paid-in capital contributed by the shareholders; the amount of further capital the MDBs have the right to call, if required, to repay their liabilities; and continued capital contributions and new pledges from sovereign shareholders;
- (4) adequate level of capital and liquidity (a case-by-case approach is necessary in order to assess whether each MDB's capital and liquidity are adequate); and,
- (5) strict statutory lending requirements and conservative financial policies, which would include among other conditions a structured approval process, internal creditworthiness and risk concentration limits (per country, sector, and individual exposure and credit category), large exposures approval by the board or a committee of the board, fixed repayment schedules, effective monitoring of use of proceeds, status review process, and rigorous assessment of risk and provisioning to loan loss reserve.

Footnotes

⁷ MDBs currently eligible for a 0% risk weight are: the World Bank Group comprised of the International Bank for Reconstruction and Development, the International Finance Corporation, the Multilateral Investment Guarantee Agency and the International Development Association, the Asian Development Bank, the African Development Bank, the European Bank for Reconstruction and Development, the Inter-American Development Bank, the European Investment Bank, the European Investment Fund, the Nordic Investment Bank, the Caribbean Development Bank, the Islamic Development Bank, the Council of Europe Development Bank, the International Finance Facility for Immunization and the Asian Infrastructure Investment Bank.

Claims on banks

20.11 There are two options for claims on banks. National supervisors will apply one option to all banks in their jurisdiction. No claim on an unrated bank, except for self-liquidating letters of credit, may receive a risk weight lower than that applied to claims on its sovereign of incorporation.

20.12 Under the first option, all banks incorporated in a given country will be assigned a risk weight one category less favourable than that assigned to claims on the sovereign of that country. However, for claims on banks in countries with sovereigns rated BB+ to B- and on banks in unrated countries the risk weight will be capped at 100%.

20.13 The second option bases the risk weighting on the external credit assessment of the bank itself with claims on unrated banks being risk-weighted at 50%. Under this option, a preferential risk weight that is one category more favourable may be applied to claims with an original maturity⁸ of three months or less, subject to a floor of 20%. This treatment will be available to both rated and unrated banks, but not to banks risk weighted at 150%.

Footnotes

⁸ Supervisors should ensure that claims with (contractual) original maturity under 3 months which are expected to be rolled over (ie where the effective maturity is longer than 3 months) do not qualify for this preferential treatment for capital adequacy purposes.

20.14 The two options are summarised in the tables below.⁹

Option 1

Credit assessment of Sovereign	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
Risk weight under Option 1	20%	50%	100%	100%	150%	100%

Option 2

Credit assessment of Banks	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
Risk weight under Option 2	20%	50%	50%	100%	150%	50%
Risk weight for short-term claims under Option 2	20%	20%	20%	50%	150%	20%

Footnotes

⁹ Short-term claims in Option 2 are defined as having an original maturity of three months or less. These tables do not reflect the potential preferential risk weights for domestic currency claims that banks may be allowed to apply based on [CRE20.15](#).

20.15 When the national supervisor has chosen to apply the preferential treatment for claims on the sovereign as described in [CRE20.5](#), it can also assign, under both options 1 and 2, a risk weight that is one category less favourable than that assigned to claims on the sovereign, subject to a floor of 20%, to claims on banks of an original maturity of 3 months or less denominated and funded in the domestic currency.

Claims on securities firms

20.16 Claims on securities firms may be treated as claims on banks provided these firms are subject to supervisory and regulatory arrangements comparable to those under this Framework (including, in particular, risk-based capital requirements).¹⁰ Otherwise such claims would follow the rules for claims on corporates.

Footnotes

[10](#)

That is, capital requirements that are comparable to those applied to banks in this Framework. Implicit in the meaning of the word “comparable” is that the securities firm (but not necessarily its parent) is subject to consolidated regulation and supervision with respect to any downstream affiliates.

Claims on corporates

20.17 The table provided below illustrates the risk weighting of rated corporate claims, including claims on insurance companies. The standard risk weight for unrated claims on corporates will be 100%. No claim on an unrated corporate may be given a risk weight preferential to that assigned to its sovereign of incorporation.

Credit assessment	AAA to AA-	A+ to A-	BBB+ to BB-	Below BB-	Unrated
Risk weight	20%	50%	100%	150%	100%

20.18 Supervisory authorities should increase the standard risk weight for unrated claims where they judge that a higher risk weight is warranted by the overall default experience in their jurisdiction. As part of the supervisory review process, supervisors may also consider whether the credit quality of corporate claims held by individual banks should warrant a standard risk weight higher than 100%.

20.19 At national discretion, supervisory authorities may permit banks to risk weight all corporate claims at 100% without regard to external ratings. Where this discretion is exercised by the supervisor, it must ensure that banks apply a single consistent approach, ie either to use ratings wherever available or not at all. To prevent “cherry-picking” of external ratings, banks should obtain supervisory approval before utilising this option to risk weight all corporate claims at 100%.

Claims included in the regulatory retail portfolios

20.20 Claims that qualify under the criteria listed in [CRE20.21](#) may be considered as retail claims for regulatory capital purposes and included in a regulatory retail portfolio. Exposures included in such a portfolio may be risk-weighted at 75%, except as provided in [CRE20.26](#) for past due loans.

20.21 To be included in the regulatory retail portfolio, claims must meet the following four criteria:

- (1) Orientation criterion: The exposure is to an individual person or persons or to a small business;
- (2) Product criterion: The exposure takes the form of any of the following: revolving credits and lines of credit (including credit cards and overdrafts), personal term loans and leases (eg instalment loans, auto loans and leases, student and educational loans, personal finance) and small business facilities and commitments. Securities (such as bonds and equities), whether listed or not, are specifically excluded from this category. Mortgage loans are excluded to the extent that they qualify for treatment as claims secured by residential property (see [CRE20.23](#)).
- (3) Granularity criterion: The supervisor must be satisfied that the regulatory retail portfolio is sufficiently diversified to a degree that reduces the risks in the portfolio, warranting the 75% risk weight. One way of achieving this may be to set a numerical limit that no aggregate exposure to one counterpart¹¹ can exceed 0.2% of the overall regulatory retail portfolio.
- (4) Low value of individual exposures: The maximum aggregated retail exposure to one counterpart cannot exceed an absolute threshold of €1 million.

Footnotes

¹¹ *Aggregated exposure means gross amount (ie not taking any credit risk mitigation into account) of all forms of debt exposures (eg loans or commitments) that individually satisfy the three other criteria. In addition, "to one counterpart" means one or several entities that may be considered as a single beneficiary (eg in the case of a small business that is affiliated to another small business, the limit would apply to the bank's aggregated exposure on both businesses).*

20.22 National supervisory authorities should evaluate whether the risk weights in [CRE20.20](#) are considered to be too low based on the default experience for these types of exposures in their jurisdictions. Supervisors, therefore, may require banks to increase these risk weights as appropriate.

Claims secured by residential property

- 20.23** Lending fully secured by mortgages on residential property that is or will be occupied by the borrower, or that is rented, will be risk weighted at 35%. In applying the 35% weight, the supervisory authorities should satisfy themselves, according to their national arrangements for the provision of housing finance, that this concessionary weight is applied restrictively for residential purposes and in accordance with strict prudential criteria, such as the existence of substantial margin of additional security over the amount of the loan based on strict valuation rules. Supervisors should increase the standard risk weight where they judge the criteria are not met.
- 20.24** National supervisory authorities should evaluate whether the risk weights in [CRE20.23](#) are considered to be too low based on the default experience for these types of exposures in their jurisdictions. Supervisors, therefore, may require banks to increase these risk weights as appropriate.

Claims secured by commercial real estate

- 20.25** In view of the experience in numerous countries that commercial property lending has been a recurring cause of troubled assets in the banking industry over the past few decades, the Committee holds to the view that mortgages on commercial real estate do not, in principle, justify other than a 100% weighting of the loans secured.^{[12](#)}

Footnotes

[12](#)

The Committee, however, recognises that, in exceptional circumstances for well-developed and long-established markets, mortgages on office and/or multi-purpose commercial premises and/or multi-tenanted commercial premises may have the potential to receive a preferential risk weight of 50% for the tranche of the loan that does not exceed the lower of 50% of the market value or 60% of the mortgage lending value of the property securing the loan. Any exposure beyond these limits will receive a 100% risk weight. This exceptional treatment will be subject to very strict conditions. In particular, two tests must be fulfilled, namely that: (i) losses stemming from commercial real estate lending up to the lower of 50% of the market value or 60% of loan-to-value based on mortgage-lending-value must not exceed 0.3% of the outstanding loans in any given year; and that (ii) overall losses stemming from commercial real estate lending must not exceed 0.5% of the outstanding loans in any given year. This is, if either of these tests is not satisfied in a given year, the eligibility to use this treatment will cease and the original eligibility criteria would need to be satisfied again before it could be applied in the future. Countries applying such a treatment must publicly disclose that these conditions are met. When claims benefiting from such an exceptional treatment have fallen past due, they will be risk-weighted at 100%.

Past due loans

20.26 The unsecured portion of any loan (other than a qualifying residential mortgage loan) that is past due for more than 90 days, net of specific provisions (including partial write-offs), will be risk-weighted as follows: [13](#)

- (1) 150% risk weight when specific provisions are less than 20% of the outstanding amount of the loan;
- (2) 100% risk weight when specific provisions are no less than 20% of the outstanding amount of the loan;
- (3) 100% risk weight when specific provisions are no less than 50% of the outstanding amount of the loan, but with supervisory discretion to reduce the risk weight to 50%.

Footnotes

13

Subject to national discretion, supervisors may permit banks to treat non-past due loans extended to counterparties subject to a 150% risk weight in the same way as past due loans described in [CRE20.26](#) to [CRE20.28](#).

- 20.27** For the purpose of defining the secured portion of the past due loan, eligible collateral and guarantees will be the same as for credit risk mitigation purposes (see chapter [CRE22](#)). Past due retail loans are to be excluded from the overall regulatory retail portfolio when assessing the granularity criterion specified in [CRE20.21](#), for risk-weighting purposes.
- 20.28** In addition to the circumstances described in [CRE20.26](#), where a past due loan is fully secured by those forms of collateral that are not recognised in [CRE22.37](#) and [CRE22.39](#), a 100% risk weight may apply when provisions reach 15% of the outstanding amount of the loan. These forms of collateral are not recognised elsewhere in the standardised approach. Supervisors should set strict operational criteria to ensure the quality of collateral.
- 20.29** In the case of qualifying residential mortgage loans, when such loans are past due for more than 90 days they will be risk weighted at 100%, net of specific provisions. If such loans are past due but specific provisions are no less than 20% of their outstanding amount, the risk weight applicable to the remainder of the loan can be reduced to 50% at national discretion.

Higher-risk categories

20.30 The following claims will be risk weighted at 150% or higher:

- (1) Claims on sovereigns, PSEs, banks, and securities firms rated below B-.
- (2) Claims on corporates rated below BB-.
- (3) Past due loans as set out in [CRE20.26](#).

20.31 National supervisors may decide to apply a 150% or higher risk weight reflecting the higher risks associated with some other assets.

Other assets

20.32 The risk weight for investments in significant minority- or majority-owned and – controlled commercial entities is determined according to two materiality thresholds:

- (1) for individual investments, 15% of the bank's capital; and
- (2) for the aggregate of such investments, 60% of the bank's capital.

20.33 Investments in significant minority- or majority-owned and –controlled commercial entities below the materiality thresholds in [CRE20.32](#) must be risk-weighted at 100%. Investments in excess of the materiality thresholds must be risk-weighted at 1250%.

20.34 A deduction treatment is specified in [CAP30.32](#) for the following exposures: significant investments in the common shares of unconsolidated financial institutions, mortgage servicing rights, and deferred tax assets that arise from temporary differences. The exposures are deducted in the calculation of Common Equity Tier 1 (CET1) if they exceed the thresholds set out in [CAP30.32](#) and [CAP30.33](#). As specified in [CAP30.34](#), the amount of the items that are not deducted in the calculation of CET1 will be risk weighted at 250%.

20.35 The standard risk weight for all other assets will be 100%.¹⁴ Investments in equity or regulatory capital instruments issued by banks or securities firms will be risk weighted at 100%, unless deducted from the capital base according [CAP30](#).

Footnotes

¹⁴ *However, at national discretion, gold bullion held in own vaults or on an allocated basis to the extent backed by bullion liabilities can be treated as cash and therefore risk-weighted at 0%. In addition, cash items in the process of collection can be risk-weighted at 20%.*

FAQ

FAQ1

In 2016, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) revised the accounting for lease transactions. Both require that most leases will be reflected on a lessee's balance sheet as an obligation to make lease payments (a liability) and a related right-of-use (ROU) asset (an asset). According to FAQ2 of [CAP30.7](#), an ROU asset should not be deducted from regulatory capital so long as the underlying asset being leased is a tangible asset. When the ROU asset is not deducted from regulatory capital, should it be included in RWA and, if so, what risk weight should apply?

Yes, the ROU asset should be included in RWA. The intent of the revisions to the lease accounting standards was to more appropriately reflect the economics of leasing transactions, including both the lessee's obligation to make future lease payments, as well as an ROU asset reflecting the lessee's control over the leased item's economic benefits during the lease term. The ROU asset should be risk-weighted at 100%, consistent with the risk weight applied historically to owned tangible assets and to a lessee's leased assets under leases accounted for as finance leases in accordance with existing accounting standards.

Off-balance sheet items

20.36 Off-balance-sheet items under the standardised approach will be converted into credit exposure equivalents through the use of credit conversion factors (CCF). Counterparty risk weightings for over-the-counter (OTC) derivative transactions will not be subject to any specific ceiling.

20.37 Commitments with an original maturity up to one year and commitments with an original maturity over one year will receive a CCF of 20% and 50%, respectively. However, any commitments that are unconditionally cancellable at any time by the bank without prior notice, or that effectively provide for automatic cancellation due to deterioration in a borrower's creditworthiness, will receive a 0% CCF.^{[15](#)}

Footnotes

^{[15](#)}

In certain countries, retail commitments are considered unconditionally cancellable if the terms permit the bank to cancel them to the full extent allowable under consumer protection and related legislation.

- 20.38** Direct credit substitutes, eg general guarantees of indebtedness (including standby letters of credit serving as financial guarantees for loans and securities) and acceptances (including endorsements with the character of acceptances) will receive a CCF of 100%.
- 20.39** Sale and repurchase agreements and asset sales with recourse,^{[16](#)} where the credit risk remains with the bank will receive a CCF of 100%.

Footnotes

^{[16](#)} *These items are to be weighted according to the type of asset and not according to the type of counterparty with whom the transaction has been entered into.*

- 20.40** A CCF of 100% will be applied to the lending of banks' securities or the posting of securities as collateral by banks, including instances where these arise out of repo-style transactions (ie repurchase/reverse repurchase and securities lending /securities borrowing transactions). See [CRE22.37](#) to [CRE22.80](#) for the calculation of risk-weighted assets where the credit converted exposure is secured by eligible collateral. This paragraph does not apply to posted collateral that is treated under either the standardised approach to counterparty credit risk ([CRE52](#)) or the internal models method for counterparty credit risk ([CRE53](#)) calculation methods in the counterparty credit risk framework.
- 20.41** Forward asset purchases, forward forward deposits and partly-paid shares and securities^{[17](#)}, which represent commitments with certain drawdown will receive a CCF of 100%.

Footnotes

^{[17](#)} *These items are to be weighted according to the type of asset and not according to the type of counterparty with whom the transaction has been entered into.*

- 20.42** Certain transaction-related contingent items (eg performance bonds, bid bonds, warranties and standby letters of credit related to particular transactions) will receive a CCF of 50%.
- 20.43** Note issuance facilities and revolving underwriting facilities will receive a CCF of 50%.

20.44

For short-term self-liquidating trade letters of credit arising from the movement of goods (eg documentary credits collateralised by the underlying shipment), a 20% CCF will be applied to both issuing and confirming banks.

20.45 Where there is an undertaking to provide a commitment on an off-balance sheet item, banks are to apply the lower of the two applicable CCFs.

Exposures that give rise to counterparty credit risk

20.46 For exposures that give rise to counterparty credit risk according to [CRE51.4](#) (ie OTC derivatives, exchange-traded derivatives, long settlement transactions and securities financing transactions), the exposure amount to be used in the determination of RWA is to be calculated under the rules set out in [CRE50](#) to [CRE54](#).

CRE21

Standardised approach: use of external ratings

This chapter sets out for the standardised approach to credit risk the conditions to recognise an external credit assessment institution and related implementation considerations.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

External credit assessment

The recognition process

21.1 National supervisors are responsible for determining on a continuous basis whether an external credit assessment institution (ECAI) meets the criteria listed in the paragraph below. National supervisors should refer to the International Organization of Securities Commission's (IOSCO) Code of Conduct Fundamentals for Credit Rating Agencies when determining ECAI eligibility. The assessments of ECAs may be recognised on a limited basis, eg by type of claims or by jurisdiction. The supervisory process for recognising ECAs should be made public to avoid unnecessary barriers to entry.

Eligibility criteria

21.2 An ECAI must satisfy each of the following six criteria.

- (1) **Objectivity:** The methodology for assigning credit assessments must be rigorous, systematic, and subject to some form of validation based on historical experience. Moreover, assessments must be subject to ongoing review and responsive to changes in financial condition. Before being recognised by supervisors, an assessment methodology for each market segment, including rigorous backtesting, must have been established for at least one year and preferably three years.
- (2) **Independence:** An ECAI should be independent and should not be subject to political or economic pressures that may influence the rating. The assessment process should be as free as possible from any constraints that could arise in situations where the composition of the board of directors or the shareholder structure of the assessment institution may be seen as creating a conflict of interest.
- (3) **International access/Transparency:** The individual assessments, the key elements underlining the assessments and whether the issuer participated in the assessment process should be publicly available on a non-selective basis, unless they are private assessments. In addition, the general procedures, methodologies and assumptions for arriving at assessments used by the ECAI should be publicly available.

- (4) Disclosure: An ECAI should disclose the following information: its code of conduct; the general nature of its compensation arrangements with assessed entities; its assessment methodologies, including the definition of default, the time horizon, and the meaning of each rating; the actual default rates experienced in each assessment category; and the transitions of the assessments, eg the likelihood of AA ratings becoming A over time.
- (5) Resources: An ECAI should have sufficient resources to carry out high quality credit assessments. These resources should allow for substantial ongoing contact with senior and operational levels within the entities assessed in order to add value to the credit assessments. Such assessments should be based on methodologies combining qualitative and quantitative approaches.
- (6) Credibility: To some extent, credibility is derived from the criteria above. In addition, the reliance on an ECAI's external credit assessments by independent parties (investors, insurers, trading partners) is evidence of the credibility of the assessments of an ECAI. The credibility of an ECAI is also underpinned by the existence of internal procedures to prevent the misuse of confidential information. In order to be eligible for recognition, an ECAI does not have to assess firms in more than one country.

Implementation considerations

The mapping process

- 21.3** Supervisors will be responsible for assigning eligible ECAIs' assessments to the risk weights available under the standardised risk weighting framework, ie deciding which assessment categories correspond to which risk weights. The mapping process should be objective and should result in a risk weight assignment consistent with that of the level of credit risk reflected in the tables above. It should cover the full spectrum of risk weights.
- 21.4** When conducting such a mapping process, factors that supervisors should assess include, among others, the size and scope of the pool of issuers that each ECAI covers, the range and meaning of the assessments that it assigns, and the definition of default used by the ECAI. In order to promote a more consistent mapping of assessments into the available risk weights and help supervisors in conducting such a process, [Standardised approach - implementing the mapping process \(April 2019\)](#) provides guidance as to how such a mapping process may be conducted.

21.5

Banks must use the chosen ECAIs and their ratings consistently for each type of claim, for both risk weighting and risk management purposes. Banks will not be allowed to “cherry-pick” the assessments provided by different ECAIs and to arbitrarily change the use of ECAIs.

Multiple assessments

- 21.6** If there is only one assessment by an ECAI chosen by a bank for a particular claim, that assessment should be used to determine the risk weight of the claim.
- 21.7** If there are two assessments by ECAIs chosen by a bank which map into different risk weights, the higher risk weight will be applied.
- 21.8** If there are three or more assessments with different risk weights, the assessments corresponding to the two lowest risk weights should be referred to and the higher of those two risk weights will be applied.

Issuer versus issues assessment

- 21.9** Where a bank invests in a particular issue that has an issue-specific assessment, the risk weight of the claim will be based on this assessment. Where the bank’s claim is not an investment in a specific assessed issue, the following general principles apply.
 - (1) In circumstances where the borrower has a specific assessment for an issued debt — but the bank’s claim is not an investment in this particular debt — a high quality credit assessment (one which maps into a risk weight lower than that which applies to an unrated claim) on that specific debt may only be applied to the bank’s unassessed claim if this claim ranks *pari passu* or senior to the claim with an assessment in all respects. If not, the credit assessment cannot be used and the unassessed claim will receive the risk weight for unrated claims.

- (2) In circumstances where the borrower has an issuer assessment, this assessment typically applies to senior unsecured claims on that issuer. Consequently, only senior claims on that issuer will benefit from a high quality issuer assessment. Other unassessed claims of a highly assessed issuer will be treated as unrated. If either the issuer or a single issue has a low quality assessment (mapping into a risk weight equal to or higher than that which applies to unrated claims), an unassessed claim on the same counterparty that ranks pari passu or is subordinated to either the senior unsecured issuer assessment or the exposure assessment will be assigned the same risk weight as is applicable to the low quality assessment.

21.10 Whether the bank intends to rely on an issuer- or an issue-specific assessment, the assessment must take into account and reflect the entire amount of credit risk exposure the bank has with regard to all payments owed to it. For example, if a bank is owed both principal and interest, the assessment must fully take into account and reflect the credit risk associated with repayment of both principal and interest.

21.11 In order to avoid any double counting of credit enhancement factors, no supervisory recognition of credit risk mitigation techniques will be taken into account if the credit enhancement is already reflected in the issue specific rating ([CRE22.5](#)).

Domestic currency and foreign currency assessments

21.12 Where unrated exposures are risk weighted based on the rating of an equivalent exposure to that borrower, the general rule is that foreign currency ratings would be used for exposures in foreign currency. Domestic currency ratings, if separate, would only be used to risk weight claims denominated in the domestic currency.¹

Footnotes

¹ However, when an exposure arises through a bank's participation in a loan that has been extended, or has been guaranteed against convertibility and transfer risk, by certain multilateral development banks (MDBs), its convertibility and transfer risk can be considered by national supervisory authorities to be effectively mitigated. To qualify, MDBs must have preferred creditor status recognised in the market and be included in the footnote to [CRE20.10](#). In such cases, for risk weighting purposes, the borrower's domestic currency rating may be used instead of its foreign currency rating. In the case of a guarantee against convertibility and transfer risk, the local currency rating can be used only for the portion that has been guaranteed. The portion of the loan not benefiting from such a guarantee will be risk-weighted based on the foreign currency rating.

Short-term/long-term assessments

21.13 For risk-weighting purposes, short-term assessments are deemed to be issue-specific. They can only be used to derive risk weights for claims arising from the rated facility. They cannot be generalised to other short-term claims, except under the conditions of [CRE21.15](#). In no event can a short-term rating be used to support a risk weight for an unrated long-term claim. Short-term assessments may only be used for short-term claims against banks and corporates. The table^{2 3} below provides a framework for banks' exposures to specific short-term facilities, such as a particular issuance of commercial paper:

Credit assessment	A-1/P-1	A-2/P-2	A-3/P-3	Others
Risk weight	20%	50%	100%	150%

Footnotes

² The notations follow the methodology used by Standard and Poor's (S&P) and by Moody's Investors Service. The A-1 rating of S&P includes both A-1+ and A-1-.

³ The "others" category includes all non-prime and B or C ratings.

21.14 If a short-term rated facility attracts a 50% risk-weight, unrated short-term claims cannot attract a risk weight lower than 100%. If an issuer has a short-term facility with an assessment that warrants a risk weight of 150%, all unrated claims, whether long-term or short-term, should also receive a 150% risk weight, unless the bank uses recognised credit risk mitigation techniques for such claims.

21.15 In cases where national supervisors have decided to apply option 2 under the standardised approach to short term interbank claims to banks in their jurisdiction (see [CRE20.13](#)), the interaction with specific short-term assessments is expected to be the following:

- (1) The general preferential treatment for short-term claims, as defined under [CRE20.13](#) and [CRE20.15](#), applies to all claims on banks of up to three months original maturity when there is no specific short-term claim assessment.
- (2) When there is a short-term assessment and such an assessment maps into a risk weight that is more favourable (ie lower) or identical to that derived from the general preferential treatment, the short-term assessment should be used for the specific claim only. Other short-term claims would benefit from the general preferential treatment.
- (3) When a specific short-term assessment for a short term claim on a bank maps into a less favourable (higher) risk weight, the general short-term preferential treatment for interbank claims cannot be used. All unrated short-term claims should receive the same risk weighting as that implied by the specific short-term assessment.

21.16 When a short-term assessment is to be used, the institution making the assessment needs to meet all of the eligibility criteria for recognising ECAIs as presented in [CRE21.2](#) in terms of its short-term assessment.

Level of application of the assessment

21.17 External assessments for one entity within a corporate group cannot be used to risk weight other entities within the same group.

Unsolicited ratings

21.18 As a general rule, banks should use solicited ratings from eligible ECAs. National supervisory authorities may, however, allow banks to use unsolicited ratings in the same way as solicited ratings if they are satisfied that the credit assessments of unsolicited ratings are not inferior in quality to the general quality of solicited ratings. However, there may be the potential for ECAs to use unsolicited ratings to put pressure on entities to obtain solicited ratings. Such behaviour, when identified, should cause supervisors to consider whether to continue recognising such ECAs as eligible for capital adequacy purposes.

CRE22

Standardised approach: credit risk mitigation

This chapter sets out the standardised approaches for the recognition of credit risk mitigation, such as collateral and guarantees.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Overarching issues

Introduction

22.1 Banks use a number of techniques to mitigate the credit risks to which they are exposed. For example, exposures may be collateralised by first priority claims, in whole or in part with cash or securities, a loan exposure may be guaranteed by a third party, or a bank may buy a credit derivative to offset various forms of credit risk. Additionally banks may agree to net loans owed to them against deposits from the same counterparty.

General remarks

22.2 The framework set out in this chapter is applicable to the banking book exposures in the standardised approach. For the treatment of credit risk mitigation (CRM) in the internal ratings-based (IRB) approach, see [CRE32](#).

22.3 The comprehensive approach for the treatment of collateral (see [CRE22.21](#) to [CRE22.30](#) and [CRE22.37](#) to [CRE22.76](#)) will also be applied to calculate the counterparty risk charges for repo-style transactions booked in the trading book.

22.4 No transaction in which CRM techniques are used should receive a higher capital requirement than an otherwise identical transaction where such techniques are not used.

22.5 The effects of CRM will not be double counted. Therefore, no additional supervisory recognition of CRM for regulatory capital purposes will be granted on claims for which an issue-specific rating is used that already reflects that CRM. As stated in [CRE21.10](#), principal-only ratings will also not be allowed within the framework of CRM.

22.6 While the use of CRM techniques reduces or transfers credit risk, it simultaneously may increase other risks (residual risks). Residual risks include legal, operational, liquidity and market risks. Therefore, it is imperative that banks employ robust procedures and processes to control these risks, including strategy, consideration of the underlying credit, valuation, policies and procedures, systems, control of roll-off risks, and management of concentration risk arising from the bank's use of CRM techniques and its interaction with the bank's overall credit risk profile. Where these risks are not adequately controlled, supervisors may impose additional capital charges or take other supervisory actions as outlined in the supervisory review process standard ([SRP](#)).

22.7

Banks must ensure that sufficient resources are devoted to the orderly operation of margin agreements with over-the-counter (OTC) derivative and securities-financing counterparties, as measured by the timeliness and accuracy of its outgoing calls and response time to incoming calls. Banks must have collateral management policies in place to control, monitor and report:

- (1) the risk to which margin agreements exposes them (such as the volatility and liquidity of the securities exchanged as collateral),
- (2) the concentration risk to particular types of collateral,
- (3) the reuse of collateral (both cash and non-cash) including the potential liquidity shortfalls resulting from the reuse of collateral received from counterparties, and
- (4) the surrender of rights on collateral posted to counterparties.

22.8 The disclosure requirements (see [DIS40](#)) must also be observed for banks to obtain capital relief in respect of any CRM techniques.

Legal certainty

22.9 In order for banks to obtain capital relief for any use of CRM techniques, the following minimum standards for legal documentation must be met. All documentation used in collateralised transactions and for documenting on-balance sheet netting, guarantees and credit derivatives must be binding on all parties and legally enforceable in all relevant jurisdictions. Banks must have conducted sufficient legal review to verify this and have a well-founded legal basis to reach this conclusion, and undertake such further review as necessary to ensure continuing enforceability.

Overview of Credit Risk Mitigation Techniques

Collateralised transactions : introduction

22.10 A collateralised transaction is one in which:

- (1) banks have a credit exposure or potential credit exposure; and
- (2) that credit exposure or potential credit exposure is hedged in whole or in part by collateral posted by a counterparty¹ or by a third party on behalf of the counterparty.

Footnotes

1 In this section “counterparty” is used to denote a party to whom a bank has an on- or off-balance sheet credit exposure or a potential credit exposure. That exposure may, for example, take the form of a loan of cash or securities (where the counterparty would traditionally be called the borrower), of securities posted as collateral, of a commitment or of exposure under an OTC derivatives contract.

22.11 Where banks take eligible financial collateral (eg cash or securities, more specifically defined in [CRE22.37](#) and [CRE22.39](#) below), they are allowed to reduce their credit exposure to a counterparty when calculating their capital requirements to take account of the risk mitigating effect of the collateral.

Collateralised transactions: overall framework and minimum conditions

22.12 Banks may opt for either the simple approach, which substitutes the risk weighting of the collateral for the risk weighting of the counterparty for the collateralised portion of the exposure (generally subject to a 20% floor), or for the comprehensive approach, which allows a more precise offset of collateral against exposures, by effectively reducing the exposure amount by the value ascribed to the collateral. Banks may operate under either, but not both, approaches in the banking book, but only under the comprehensive approach in the trading book. Partial collateralisation is recognised in both approaches. Mismatches in the maturity of the underlying exposure and the collateral will only be allowed under the comprehensive approach.

22.13 However, before capital relief will be granted in respect of any form of collateral, the standards set out below in [CRE22.14](#) to [CRE22.17](#) must be met under either approach.

22.14 In addition to the general requirements for legal certainty set out in [CRE22.9](#), the legal mechanism by which collateral is pledged or transferred must ensure that the bank has the right to liquidate or take legal possession of it, in a timely manner, in the event of the default, insolvency or bankruptcy (or one or more otherwise-defined credit events set out in the transaction documentation) of the counterparty (and, where applicable, of the custodian holding the collateral). Furthermore banks must take all steps necessary to fulfil those requirements under the law applicable to the bank’s interest in the collateral for obtaining and maintaining an enforceable security interest, eg by registering it with a registrar, or for exercising a right to net or set off in relation to title transfer collateral.

- 22.15** In order for collateral to provide protection, the credit quality of the counterparty and the value of the collateral must not have a material positive correlation. For example, securities issued by the counterparty – or by any related group entity – would provide little protection and so would be ineligible.
- 22.16** Banks must have clear and robust procedures for the timely liquidation of collateral to ensure that any legal conditions required for declaring the default of the counterparty and liquidating the collateral are observed, and that collateral can be liquidated promptly.
- 22.17** Where the collateral is held by a custodian, banks must take reasonable steps to ensure that the custodian segregates the collateral from its own assets.
- 22.18** A capital requirement will be applied to a bank on either side of the collateralised transaction: for example, both repos and reverse repos will be subject to capital requirements. Likewise, both sides of a securities lending and borrowing transaction will be subject to explicit capital charges, as will the posting of securities in connection with a derivative exposure or other borrowing.
- 22.19** Where a bank, acting as an agent, arranges a repo-style transaction (ie repurchase /reverse repurchase and securities lending/borrowing transactions) between a customer and a third party and provides a guarantee to the customer that the third party will perform on its obligations, then the risk to the bank is the same as if the bank had entered into the transaction as a principal. In such circumstances, a bank will be required to calculate capital requirements as if it were itself the principal.

Collateralised transactions: overall framework and minimum conditions under the simple approach

- 22.20** In the simple approach the risk weighting of the collateral instrument collateralising or partially collateralising the exposure is substituted for the risk weighting of the counterparty. Details of this framework are provided in [CRE22.78](#) to [CRE22.80](#).

Collateralised transactions: overall framework and minimum conditions under the comprehensive approach

22.21 In the comprehensive approach, when taking collateral, banks will need to calculate their adjusted exposure to a counterparty for capital adequacy purposes in order to take account of the effects of that collateral. Using haircuts, banks are required to adjust both the amount of the exposure to the counterparty and the value of any collateral received in support of that counterparty to take account of possible future fluctuations in the value of either,² occasioned by market movements. This will produce volatility-adjusted amounts for both exposure and collateral. Unless either side of the transaction is cash, the volatility-adjusted amount for the exposure will be higher than the exposure and for the collateral it will be lower.

Footnotes

² *Exposure amounts may vary where, for example, securities are being lent.*

22.22 Additionally where the exposure and collateral are held in different currencies an additional downwards adjustment must be made to the volatility-adjusted collateral amount to take account of possible future fluctuations in exchange rates.

22.23 Where the volatility-adjusted exposure amount is greater than the volatility-adjusted collateral amount (including any further adjustment for foreign exchange risk), banks shall calculate their risk-weighted assets as the difference between the two multiplied by the risk weight of the counterparty. The framework for performing these calculations is set out in [CRE22.40](#) to [CRE22.43](#).

22.24 In principle, banks have two ways of calculating the haircuts: (i) standard supervisory haircuts, using parameters set by the Committee, and (ii) own-estimate haircuts, using banks' own internal estimates of market price volatility. Supervisors will allow banks to use own-estimate haircuts only when they fulfil certain qualitative and quantitative criteria.

22.25 A bank may choose to use standard or own-estimate haircuts independently of the choice it has made between the standardised approach and the foundation IRB approach to credit risk. However, if banks seek to use their own-estimate haircuts, they must do so for the full range of instrument types for which they would be eligible to use own-estimates, the exception being immaterial portfolios where they may use the standard supervisory haircuts.

- 22.26** The size of the haircuts that banks must use depends on the prescribed holding period for the transaction. The holding period is the period of time over which exposure or collateral values are assumed to move before the bank can close out the transaction. Banks that use own-estimate haircuts must either use the supervisory prescribed minimum holding period, or must scale-up or scale-down their estimated haircuts if they have used a holding period that is different to the supervisory prescribed minimum. The supervisory prescribed minimum holding period is used as the basis for the calculation of the standard supervisory haircuts.
- 22.27** The holding period, and thus the size of the individual haircuts, will depend on the type of instrument, type of transaction and the frequency of marking-to-market and remargining. For example, repo-style transactions subject to daily marking-to-market and to daily remargining will receive a haircut based on a 5-business day holding period and secured lending transactions with daily mark-to-market and no remargining clauses will receive a haircut based on a 20-business day holding period. These haircut numbers will be scaled up using the square root of time formula depending on the actual frequency of remargining or marking-to-market.
- 22.28** For certain types of repo-style transactions (broadly speaking government bond repos as defined in [CRE22.66](#) and [CRE22.67](#)) supervisors may allow banks using standard supervisory haircuts or own-estimate haircuts not to apply these in calculating the exposure amount after risk mitigation.
- 22.29** The effect of master netting agreements covering repo-style transactions can be recognised for the calculation of capital requirements subject to the conditions in [CRE22.69](#). Where repo-style transactions are subject to a master netting agreement whether they are held in the banking book or trading book, a bank may choose not to recognise the netting effects in calculating capital. In that case, each transaction will be subject to a capital charge as if there were no master netting agreement.
- 22.30** As a further alternative to standard supervisory haircuts and own-estimate haircuts banks may use value-at-risk (VaR) models for calculating potential price volatility for repo-style transactions and other similar securities financing transactions (SFTs), as set out in [CRE22.74](#) to [CRE22.77](#) below. Alternatively, subject to supervisory approval, they may also calculate, for these transactions, an expected positive exposure, as set forth in the internal models method for counterparty credit risk ([CRE53](#)).

On-balance sheet netting

22.31

Where banks have legally enforceable netting arrangements for loans and deposits they may calculate capital requirements on the basis of net credit exposures subject to the conditions in [CRE22.82](#) and [CRE22.83](#).

Guarantees and credit derivatives

22.32 Where guarantees or credit derivatives are direct, explicit, irrevocable and unconditional, and supervisors are satisfied that banks fulfil certain minimum operational conditions relating to risk management processes they may allow banks to take account of such credit protection in calculating capital requirements.

22.33 A range of guarantors and protection providers are recognised, and a substitution approach will be applied. Thus only guarantees issued by or protection provided by entities with a lower risk weight than the counterparty will lead to reduced capital charges since the protected portion of the counterparty exposure is assigned the risk weight of the guarantor or protection provider, whereas the uncovered portion retains the risk weight of the underlying counterparty.

22.34 Detailed operational requirements are given below in [CRE22.84](#) to [CRE22.89](#).

Maturity mismatch

22.35 Where the residual maturity of the CRM is less than that of the underlying credit exposure a maturity mismatch occurs. Where there is a maturity mismatch and the CRM has an original maturity of less than one year, the CRM is not recognised for capital purposes. In other cases where there is a maturity mismatch, partial recognition is given to the CRM for regulatory capital purposes as detailed below in [CRE22.97](#) to [CRE22.100](#). Under the simple approach for collateral, maturity mismatches are not allowed.

Miscellaneous

22.36 Treatments for pools of credit risk mitigants and first- and second-to-default credit derivatives are given in [CRE22.101](#) to [CRE22.105](#) below.

Collateral

Eligible financial collateral

22.37 The following collateral instruments are eligible for recognition in the simple approach:

- (1) Cash (as well as certificates of deposit or comparable instruments issued by the lending bank) on deposit with the bank which is incurring the counterparty exposure.^{3 4}
- (2) Gold.
- (3) Debt securities rated⁵ by a recognised external credit assessment institution where these are either:
 - (a) at least BB- when issued by sovereigns or public sector entities (PSEs) that are treated as sovereigns by the national supervisor; or
 - (b) at least BBB- when issued by other entities (including banks and securities firms); or
 - (c) at least A-3/P-3 for short-term debt instruments.
- (4) Debt securities not rated by a recognised external credit assessment institution where these are:
 - (a) issued by a bank; and
 - (b) listed on a recognised exchange; and
 - (c) classified as senior debt; and
 - (d) all rated issues of the same seniority by the issuing bank must be rated at least BBB- or A-3/P-3 by a recognised external credit assessment institution; and
 - (e) the bank holding the securities as collateral has no information to suggest that the issue justifies a rating below BBB- or A-3/P-3 (as applicable); and
 - (f) the supervisor is sufficiently confident about the market liquidity of the security.
- (5) Equities (including convertible bonds) that are included in a main index.

- (6) Undertakings for Collective Investments in Transferable Securities (UCITS) and mutual funds where:
- (a) a price for the units is publicly quoted daily; and
 - (b) the UCITS/mutual fund is limited to investing in the instruments listed in this paragraph.⁶

Footnotes

³ *Cash funded credit linked notes issued by the bank against exposures in the banking book which fulfil the criteria for credit derivatives will be treated as cash collateralised transactions.*

⁴ *When cash on deposit, certificates of deposit or comparable instruments issued by the lending bank are held as collateral at a third-party bank in a non-custodial arrangement, if they are openly pledged /assigned to the lending bank and if the pledge/assignment is unconditional and irrevocable, the exposure amount covered by the collateral (after any necessary haircuts for currency risk) will receive the risk weight of the third-party bank.*

⁵ *When debt securities that do not have an issue specific rating are issued by a rated sovereign, banks may treat the sovereign issuer rating as the rating of the debt security.*

⁶ *However, the use or potential use by a UCITS/mutual fund of derivative instruments solely to hedge investments listed in this paragraph and [CRE22.39](#) shall not prevent units in that UCITS/mutual fund from being eligible financial collateral.*

22.38 Re-securitisations (as defined in the securitisation framework), irrespective of any credit ratings, are not eligible financial collateral. This prohibition applies whether the bank is using the supervisory haircuts method, the own estimates of haircuts method, the repo VaR method or the internal models method. It also applies whether the transaction is in the banking book or trading book.

22.39 The following collateral instruments are eligible for recognition in the comprehensive approach:

- (1) All of the instruments in [CRE22.37](#);

- (2) Equities (including convertible bonds) which are not included in a main index but which are listed on a recognised exchange; and
- (3) UCITS/mutual funds which include such equities.

The comprehensive approach : calculation of capital requirement

22.40 For a collateralised transaction, the exposure amount after risk mitigation is calculated using the formula that follows, where:

- (1) E^* = the exposure value after risk mitigation
- (2) E = current value of the exposure
- (3) H_e = haircut appropriate to the exposure
- (4) C = the current value of the collateral received
- (5) H_c = haircut appropriate to the collateral
- (6) H_{fx} = haircut appropriate for currency mismatch between the collateral and exposure

$$E^* = \max \left\{ 0, E \cdot (1 + H_e) - C \cdot (1 - H_c - H_{fx}) \right\}$$

22.41 The exposure amount after risk mitigation will be multiplied by the risk weight of the counterparty to obtain the risk-weighted asset amount for the collateralised transaction.

22.42 The treatment for transactions where there is a mismatch between the maturity of the counterparty exposure and the collateral is given in [CRE22.97](#) to [CRE22.100](#).

22.43 Where the collateral is a basket of assets, the haircut on the basket will be calculated using the formula that follows, where:

- (1) a_i is the weight of the asset (as measured by units of currency) in the basket; and
- (2) H_i the haircut applicable to that asset.

$$H = \sum_i a_i H_i$$

The comprehensive approach: standard supervisory haircuts

22.44 These are the standard supervisory haircuts (assuming daily mark-to-market, daily remargining and a 10-business day holding period), expressed as percentages:

Issue rating for debt securities	Residual Maturity	Sovereigns	Other issuers	Securitisation Exposures
AAA to AA-/A-1	£ 1 year	0.5	1	2
	>1 year £ 5 years	2	4	8
	> 5 years	4	8	16
A+ to BBB-/ A-2/A-3/P-3 and unrated bank securities per para. CRE22.37(4)	£ 1 year	1	2	4
	>1 year £ 5 years	3	6	12
	> 5 years	6	12	24
BB+ to BB-	All	15	Not Eligible	Not Eligible
Main index equities and gold	15			
Other equities (including convertible bonds) listed on a recognised exchange	25			
UCITS/Mutual funds	Highest haircut applicable to any security in fund			
Cash in the same currency	0			

22.45 In the table in [CRE22.44](#):

- (1) "Sovereigns" includes: PSEs that are treated as sovereigns by the national supervisor, as well as multilateral development banks (MDBs) receiving a 0% risk weight.
- (2) "Other issuers" includes: PSEs that are not treated as sovereigns by the national supervisor.

- (3) "Securitisation exposures" refers to exposures that meet the definition set forth in the securitisation framework (see [CRE40](#)).
- (4) "Cash in the same currency" refers to eligible cash collateral specified in [CRE22.37](#)(1).

22.46 The standard supervisory haircut for currency risk where exposure and collateral are denominated in different currencies is 8% (also based on a 10-business day holding period and daily mark-to-market).

22.47 For transactions in which the bank lends non-eligible instruments (eg non-investment grade corporate debt securities), the haircut to be applied on the exposure should be the same as the one for equity traded on a recognised exchange that is not part of a main index (ie the haircut is 25%).

The comprehensive approach: own estimates for haircuts

22.48 Supervisors may permit banks to calculate haircuts using their own internal estimates of market price volatility and foreign exchange volatility. Permission to do so will be conditional on the satisfaction of minimum qualitative and quantitative standards stated in [CRE22.50](#) to [CRE22.59](#). When debt securities are rated BBB-/A-3 or higher, supervisors may allow banks to calculate a volatility estimate for each category of security. In determining relevant categories, institutions must take into account (a) the type of issuer of the security, (b) its rating, (c) its residual maturity, and (d) its modified duration. Volatility estimates must be representative of the securities actually included in the category for that bank. For eligible debt securities rated below BBB-/A-3 or for equities eligible as collateral, the haircuts must be calculated for each individual security.

22.49 Banks must estimate the volatility of the collateral instrument or foreign exchange mismatch individually: estimated volatilities for each transaction must not take into account the correlations between unsecured exposure, collateral and exchange rates (see [CRE22.97](#) to [CRE22.100](#) for the approach to maturity mismatches).

The comprehensive approach: own estimates for haircuts - quantitative criteria

22.50 In calculating the haircuts, a 99th percentile, one-tailed confidence interval is to be used.

22.51 The minimum holding period will be dependent on the type of transaction and the frequency of remargining or marking to market. The minimum holding

periods for different types of transactions are presented in [CRE22.61](#). Banks may use haircut numbers calculated according to shorter holding periods, scaled up to the appropriate holding period by the square root of time formula.

22.52 Banks must take into account the illiquidity of lower-quality assets. The holding period should be adjusted upwards in cases where such a holding period would be inappropriate given the liquidity of the collateral. They should also identify where historical data may understate potential volatility, eg a pegged currency. Such cases must be dealt with by subjecting the data to stress testing.

22.53 The choice of historical observation period (sample period) for calculating haircuts shall be a minimum of one year. For banks that use a weighting scheme or other methods for the historical observation period, the "effective" observation period must be at least one year (that is, the weighted average time lag of the individual observations cannot be less than 6 months).

22.54 Banks should update their data sets no less frequently than once every three months and should also reassess them whenever market prices are subject to material changes. This implies that haircuts must be computed at least every three months. The supervisor may also require a bank to calculate its haircuts using a shorter observation period if, in the supervisor's judgement, this is justified by a significant upsurge in price volatility.

22.55 No particular type of model is prescribed. So long as each model used captures all the material risks run by the bank, banks will be free to use models based on, for example, historical simulations and Monte Carlo simulations.

The comprehensive approach: own estimates for haircuts - qualitative criteria

22.56 The estimated volatility data (and holding period) must be used in the day-to-day risk management process of the bank.

22.57 Banks should have robust processes in place for ensuring compliance with a documented set of internal policies, controls and procedures concerning the operation of the risk measurement system.

22.58 The risk measurement system should be used in conjunction with internal exposure limits.

22.59 An independent review of the risk measurement system should be carried out regularly in the bank's own internal auditing process. A review of the overall risk management process should take place at regular intervals (ideally not less than once a year) and should specifically address, at a minimum:

- (1) the integration of risk measures into daily risk management;
- (2) the validation of any significant change in the risk measurement process;
- (3) the accuracy and completeness of position data;
- (4) the verification of the consistency, timeliness and reliability of data sources used to run internal models, including the independence of such data sources; and
- (5) the accuracy and appropriateness of volatility assumptions.

The comprehensive approach: adjustment for different holding periods and non-daily mark-to-market or remargining

22.60 For some transactions, depending on the nature and frequency of the revaluation and remargining provisions, different holding periods are appropriate. The framework for collateral haircuts distinguishes between repo-style transactions (ie repo/reverse repos and securities lending/borrowing), "other capital-market-driven transactions" (ie OTC derivatives transactions and margin lending) and secured lending. In capital-market-driven transactions and repo-style transactions, the documentation contains remargining clauses; in secured lending transactions, it generally does not.

22.61 The minimum holding period for various products is summarised in the following table:

Transaction type	Minimum holding period	Minimum remargining/ revaluation period
Repo-style transaction	five business days	daily remargining
Other capital market transactions	ten business days	daily remargining
Secured lending	twenty business days	daily revaluation

22.62 Regarding the minimum holding periods set out in [CRE22.61](#), if a netting set includes both repo-style and other capital market transactions, the minimum holding period of ten business days must be used. Furthermore, a higher minimum holding period must be used in the following cases:

- (1) For all netting sets where the number of trades exceeds 5000 at any point during a quarter, a 20 business day minimum holding period for the following quarter must be used.
- (2) For netting sets containing one or more trades involving illiquid collateral, a minimum holding period of 20 business days must be used. "Illiquid collateral" must be determined in the context of stressed market conditions and will be characterised by the absence of continuously active markets where a counterparty would, within two or fewer days, obtain multiple price quotations that would not move the market or represent a price reflecting a market discount. Examples of situations where trades are deemed illiquid for this purpose include, but are not limited to, trades that are not marked daily and trades that are subject to specific accounting treatment for valuation purposes (eg repo-style transactions referencing securities whose fair value is determined by models with inputs that are not observed in the market).
- (3) If a bank has experienced more than two margin call disputes on a particular netting set over the previous two quarters that have lasted longer than the bank's estimate of the margin period of risk (as defined in [CRE50.19](#)), then for the subsequent two quarters the bank must use a minimum holding period that is twice the level that would apply excluding the application of this sub-paragraph.

22.63 When the frequency of remargining or revaluation is longer than the minimum, the minimum haircut numbers will be scaled up depending on the actual number of business days between remargining or revaluation using the square root of time formula below, where:

- (1) H = haircut
- (2) H_M = haircut under the minimum holding period
- (3) T_M = minimum holding period for the type of transaction
- (4) N_R = actual number of business days between remargining for capital market transactions or revaluation for secured transactions

$$H = H_M \sqrt{\frac{N_R + (T_M - 1)}{T_M}}$$

22.64 For example, for banks using the standard supervisory haircuts, the 10-business day haircuts provided in [CRE22.44](#) will be the basis and this haircut will be scaled up or down depending on the type of transaction and the frequency of remargining or revaluation using the formula below, where:

- (1) H = haircut
- (2) H_{10} = 10-business day standard supervisory haircut for instrument
- (3) N_R = actual number of business days between remargining for capital market transactions or revaluation for secured transactions.
- (4) T_M = minimum holding period for the type of transaction

$$H = H_{10} \sqrt{\frac{N_R + (T_M - 1)}{10}}$$

22.65 When a bank calculates the volatility on a T_N day holding period which is different from the specified minimum holding period T_M , the H_M will be calculated using the square root of time formula below, where:

- (1) T_N = holding period used by the bank for deriving H_N
- (2) H_N = haircut based on the holding period T_N

$$H_M = H_N \sqrt{\frac{T_M}{T_N}}$$

The comprehensive approach: conditions for zero H

22.66 For repo-style transactions where the following conditions are satisfied, and the counterparty is a core market participant, supervisors may choose not to apply the haircuts specified in the comprehensive approach and may instead apply a haircut of zero. This carve-out will not be available for banks using the modelling approaches as described in [CRE22.74](#) to [CRE22.77](#).

- (1) Both the exposure and the collateral are cash or a sovereign security or PSE security qualifying for a 0% risk weight in the standardised approach.⁷
- (2) Both the exposure and the collateral are denominated in the same currency.

- (3) Either the transaction is overnight or both the exposure and the collateral are marked-to-market daily and are subject to daily remargining.
- (4) Following a counterparty's failure to remargin, the time that is required between the last mark-to-market before the failure to remargin and the liquidation⁸ of the collateral is considered to be no more than four business days.
- (5) The transaction is settled across a settlement system proven for that type of transaction.
- (6) The documentation covering the agreement is standard market documentation for repo-style transactions in the securities concerned.
- (7) The transaction is governed by documentation specifying that if the counterparty fails to satisfy an obligation to deliver cash or securities or to deliver margin or otherwise defaults, then the transaction is immediately terminable.
- (8) Upon any default event, regardless of whether the counterparty is insolvent or bankrupt, the bank has the unfettered, legally enforceable right to immediately seize and liquidate the collateral for its benefit.

Footnotes

⁷ *Note that where a supervisor has designated domestic-currency claims on its sovereign or central bank to be eligible for a 0% risk weight in the standardised approach, such claims will satisfy this condition.*

⁸ *This does not require the bank to always liquidate the collateral but rather to have the capability to do so within the given time frame.*

22.67 Core market participants may include, at the discretion of the national supervisor, the following entities:

- (1) Sovereigns, central banks and PSEs;
- (2) Banks and securities firms;
- (3) Other financial companies (including insurance companies) eligible for a 20% risk weight in the standardised approach;
- (4) Regulated mutual funds that are subject to capital or leverage requirements;
- (5) Regulated pension funds; and

(6) Recognised clearing organisations.

22.68 Where a supervisor applies a specific carve-out to repo-style transactions in securities issued by its domestic government, then other supervisors may choose to allow banks incorporated in their jurisdiction to adopt the same approach to the same transactions.

The comprehensive approach: treatment of repo-style transactions covered under master netting agreements

22.69 The effects of bilateral netting agreements covering repo-style transactions will be recognised on a counterparty-by-counterparty basis if the agreements are legally enforceable in each relevant jurisdiction upon the occurrence of an event of default and regardless of whether the counterparty is insolvent or bankrupt. In addition, netting agreements must:

- (1) provide the non-defaulting party the right to terminate and close-out in a timely manner all transactions under the agreement upon an event of default, including in the event of insolvency or bankruptcy of the counterparty;
- (2) provide for the netting of gains and losses on transactions (including the value of any collateral) terminated and closed out under it so that a single net amount is owed by one party to the other;
- (3) allow for the prompt liquidation or setoff of collateral upon the event of default; and
- (4) be, together with the rights arising from the provisions required in (1) to (3) above, legally enforceable in each relevant jurisdiction upon the occurrence of an event of default and regardless of the counterparty's insolvency or bankruptcy.

22.70 Netting across positions in the banking and trading book will only be recognised when the netted transactions fulfil the following conditions:

- (1) All transactions are marked to market daily;⁹ and
- (2) The collateral instruments used in the transactions are recognised as eligible financial collateral in the banking book.

Footnotes

⁹ The holding period for the haircuts will depend as in other repo-style transactions on the frequency of margining.

22.71 The formula in [CRE22.40](#) will be adapted to calculate the capital requirements for transactions with netting agreements.

22.72 For banks using the standard supervisory haircuts or own-estimate haircuts, the formula¹⁰ below will apply to take into account the impact of master netting agreements, where:

- (1) E^* = the exposure value after risk mitigation
- (2) E = current value of the exposure
- (3) C = the value of the collateral received
- (4) E_s = absolute value of the net position in a given security
- (5) H_s = haircut appropriate to E_s
- (6) E_{fx} = absolute value of the net position in a currency different from the settlement currency
- (7) H_{fx} = haircut appropriate for currency mismatch

$$E^* = \max \left\{ 0, \left[\sum E - \sum C + \sum (E_s \times H_s) + \sum (E_{fx} \times H_{fx}) \right] \right\}$$

Footnotes

¹⁰ The starting point for this formula is the formula in [CRE22.40](#) which can also be presented as the following:

$$= \max \{ 0, [(E - C) + (E \times H_e) + (C \times H_c) + (C \times H_{fx})] \}$$

22.73 The intention here is to obtain a net exposure amount after netting of the exposures and collateral and have an add-on amount reflecting possible price changes for the securities involved in the transactions and for foreign exchange risk if any. The net long or short position of each security included in the netting agreement will be multiplied by the appropriate haircut. All other rules regarding the calculation of haircuts stated in [CRE22.40](#) to [CRE22.68](#) equivalently apply for banks using bilateral netting agreements for repo-style transactions.

The comprehensive approach: use of models

22.74 As an alternative to the use of standard or own-estimate haircuts, banks may be permitted to use a VaR models approach to reflect the price volatility of the exposure and collateral for repo-style transactions, taking into account correlation effects between security positions. This approach would apply to repo-style transactions covered by bilateral netting agreements on a counterparty-by-counterparty basis. At the discretion of the national supervisor, firms are also eligible to use the VaR model approach for margin lending transactions, if the transactions are covered under a bilateral master netting agreement that meets the requirements of [CRE22.69](#) and [CRE22.70](#). The VaR models approach is available to banks that have received supervisory recognition for an internal market risk model according to [MAR30.2](#). Banks which have not received supervisory recognition for use of models according to [MAR30.2](#) can separately apply for supervisory recognition to use their internal VaR models for calculation of potential price volatility for repo-style transactions. Internal models will only be accepted when a bank can prove the quality of its model to the supervisor through the backtesting of its output using one year of historical data. Banks must meet the model validation requirement of [CRE53.29](#) to use VaR for repo-style and other SFTs. In addition, other transactions similar to repo-style transactions (like prime brokerage) and that meet the requirements for repo-style transactions, are also eligible to use the VaR models approach provided the model used meets the operational requirements set forth in [CRE53.34](#) to [CRE53.61](#).

22.75 The quantitative and qualitative criteria for recognition of internal market risk models for repo-style transactions and other similar transactions are in principle the same as in [MAR30.5](#) to [MAR30.18](#). With regard to the holding period, the minimum will be 5-business days for repo-style transactions, rather than the 10-business days in [MAR30.14\(3\)](#). For other transactions eligible for the VaR models approach, the 10-business day holding period will be retained. The minimum holding period should be adjusted upwards for market instruments where such a holding period would be inappropriate given the liquidity of the instrument concerned. At a minimum, where a bank has a repo-style or similar transaction or netting set which meets the criteria outlined in [CRE53.24](#) or [CRE53.25](#), the minimum holding period should be the margin period of risk that would apply under those paragraphs, in combination with [CRE53.26](#).

22.76 For banks using a VaR model to calculate capital requirements, the previous business day's VaR number will be used and the exposure E^* will be calculated using the following formula:

$$E^* = \max \left\{ 0, \left[\left(\sum E - \sum C \right) + VaR \text{ output from internal model} \right] \right\}$$

22.77 Subject to supervisory approval, instead of using the VaR approach, banks may also calculate an expected positive exposure for repo-style and other similar SFTs, in accordance with the internal models method to counterparty credit risk set out in [CRE53](#).

The simple approach: minimum conditions

22.78 For collateral to be recognised in the simple approach, the collateral must be pledged for at least the life of the exposure and it must be marked to market and revalued with a minimum frequency of six months. Those portions of claims collateralised by the market value of recognised collateral receive the risk weight applicable to the collateral instrument. The risk weight on the collateralised portion will be subject to a floor of 20% except under the conditions specified in [CRE22.79](#) to [CRE22.80](#). The remainder of the claim should be assigned to the risk weight appropriate to the counterparty. A capital requirement will be applied to banks on either side of the collateralised transaction: for example, both repos and reverse repos will be subject to capital requirements.

The simple approach: exceptions to the risk weight floor

22.79 Transactions which fulfil the criteria outlined in [CRE22.66](#) and are with a core market participant, as defined in [CRE22.67](#), receive a risk weight of 0%. If the counterparty to the transactions is not a core market participant the transaction should receive a risk weight of 10%.

22.80 The 20% floor for the risk weight on a collateralised transaction will not be applied and a 0% risk weight can be applied where the exposure and the collateral are denominated in the same currency, and either:

- (1) the collateral is cash on deposit as defined in [CRE22.37](#)(1); or
- (2) the collateral is in the form of sovereign/PSE securities eligible for a 0% risk weight, and its market value has been discounted by 20%.

Collateralised OTC derivatives transactions

22.81 Under the standardised approach for counterparty credit risk ([CRE52](#)), the calculation of the counterparty credit risk charge for an individual contact will be calculated using the following formula, where:

- (1) $\text{Alpha} = 1.4$
- (2) RC = the replacement cost calculated according to [CRE52.3](#) to [CRE52.20](#)

- (3) PFE = the amount for potential future exposure calculated according to [CRE52.21](#) to [CRE52.73](#)

$$\text{Exposure amount} = \alpha \cdot (RC + PFE)$$

On-balance sheet netting

22.82 A bank may use the net exposure of loans and deposits as the basis for its capital adequacy calculation in accordance with the formula in [CRE22.40](#), when the bank:

- (1) has a well-founded legal basis for concluding that the netting or offsetting agreement is enforceable in each relevant jurisdiction regardless of whether the counterparty is insolvent or bankrupt;
- (2) is able at any time to determine those assets and liabilities with the same counterparty that are subject to the netting agreement;
- (3) monitors and controls its roll-off risks; and
- (4) monitors and controls the relevant exposures on a net basis.

22.83 When calculating the net exposure described in the paragraph above, assets (loans) are treated as exposure and liabilities (deposits) as collateral. The haircuts will be zero except when a currency mismatch exists. A 10-business day holding period will apply when daily mark-to-market is conducted and all the requirements contained in [CRE22.44](#), [CRE22.45](#), [CRE22.64](#) and [CRE22.97](#) to [CRE22.100](#) will apply.

Guarantees and credit derivatives

Operational requirements common to guarantees and credit derivatives

22.84 A guarantee (counter-guarantee) or credit derivative must represent a direct claim on the protection provider and must be explicitly referenced to specific exposures or a pool of exposures, so that the extent of the cover is clearly defined and incontrovertible. Other than non-payment by a protection purchaser of money due in respect of the credit protection contract it must be irrevocable; there must be no clause in the contract that would allow the protection provider unilaterally to cancel the credit cover or that would increase the effective cost of cover as a result of deteriorating credit quality in the hedged exposure.¹¹ It must also be unconditional; there should be no clause in the protection contract

outside the direct control of the bank that could prevent the protection provider from being obliged to pay out in a timely manner in the event that the original counterparty fails to make the payment(s) due.

Footnotes

¹¹

Note that the irrevocability condition does not require that the credit protection and the exposure be maturity matched; rather that the maturity agreed ex ante may not be reduced ex post by the protection provider. [CRE22.98](#) sets out the treatment of call options in determining remaining maturity for credit protection.

Additional operational requirements for guarantees

22.85 In addition to the legal certainty requirements in [CRE22.9](#) above, in order for a guarantee to be recognised, the following conditions must be satisfied:

- (1) On the qualifying default/non-payment of the counterparty, the bank may in a timely manner pursue the guarantor for any monies outstanding under the documentation governing the transaction. The guarantor may make one lump sum payment of all monies under such documentation to the bank, or the guarantor may assume the future payment obligations of the counterparty covered by the guarantee. The bank must have the right to receive any such payments from the guarantor without first having to take legal actions in order to pursue the counterparty for payment.
- (2) The guarantee is an explicitly documented obligation assumed by the guarantor.

- (3) Except as noted in the following sentence, the guarantee covers all types of payments the underlying obligor is expected to make under the documentation governing the transaction, for example notional amount, margin payments etc. Where a guarantee covers payment of principal only, interests and other uncovered payments should be treated as an unsecured amount in accordance with [CRE22.92](#).

Additional operational requirements for credit derivatives

22.86 In order for a credit derivative contract to be recognised, the following conditions must be satisfied:

- (1) The credit events specified by the contracting parties must at a minimum cover:
 - (a) failure to pay the amounts due under terms of the underlying obligation that are in effect at the time of such failure (with a grace period that is closely in line with the grace period in the underlying obligation);
 - (b) bankruptcy, insolvency or inability of the obligor to pay its debts, or its failure or admission in writing of its inability generally to pay its debts as they become due, and analogous events; and
 - (c) restructuring of the underlying obligation involving forgiveness or postponement of principal, interest or fees that results in a credit loss event (ie charge-off, specific provision or other similar debit to the profit and loss account). When restructuring is not specified as a credit event, refer to [CRE22.87](#).
- (2) If the credit derivative covers obligations that do not include the underlying obligation, bullet point 7 below governs whether the asset mismatch is permissible.
- (3) The credit derivative shall not terminate prior to expiration of any grace period required for a default on the underlying obligation to occur as a result of a failure to pay, subject to the provisions of [CRE22.98](#).
- (4) Credit derivatives allowing for cash settlement are recognised for capital purposes insofar as a robust valuation process is in place in order to estimate loss reliably. There must be a clearly specified period for obtaining post-credit-event valuations of the underlying obligation. If the reference obligation specified in the credit derivative for purposes of cash settlement is different than the underlying obligation, bullet point 7 below governs whether the asset mismatch is permissible.

- (5) If the protection purchaser's right/ability to transfer the underlying obligation to the protection provider is required for settlement, the terms of the underlying obligation must provide that any required consent to such transfer may not be unreasonably withheld.
- (6) The identity of the parties responsible for determining whether a credit event has occurred must be clearly defined. This determination must not be the sole responsibility of the protection seller. The protection buyer must have the right/ability to inform the protection provider of the occurrence of a credit event.
- (7) A mismatch between the underlying obligation and the reference obligation under the credit derivative (ie the obligation used for purposes of determining cash settlement value or the deliverable obligation) is permissible if:
 - (a) the reference obligation ranks pari passu with or is junior to the underlying obligation; and
 - (b) the underlying obligation and reference obligation share the same obligor (ie the same legal entity) and legally enforceable cross-default or cross-acceleration clauses are in place.
- (8) A mismatch between the underlying obligation and the obligation used for purposes of determining whether a credit event has occurred is permissible if:
 - (a) the latter obligation ranks pari passu with or is junior to the underlying obligation; and
 - (b) the underlying obligation and reference obligation share the same obligor (ie the same legal entity) and legally enforceable cross-default or cross-acceleration clauses are in place.

FAQ

FAQ1

The conditions outlined in [CRE22.86](#)(6) indicates that, in order for a credit derivative contract to be recognised, the identity of the parties responsible for determining whether a credit event has occurred must be clearly defined (the so-called "Determinations Committee"); this determination must not be the sole responsibility of the protection seller; the protection buyer must have the right/ability to inform the protection provider of the occurrence of a credit event. Given the recently developed market practice of the Big Bang Protocol, which all in the credit derivatives industry have signed, how does this protocol affect the recognition of credit derivatives?

Credit derivatives under the Big Bang Protocol can still be recognised. [CRE22.86](#) is still satisfied by: (1) the protection buyer having the right /ability to request a ruling from the Determinations Committee, so the buyer is not powerless; and (2) the Determinations Committee being independent of the protection seller. This means that the roles and identities are clearly defined in the protocol, and the determination of a credit event is not the sole responsibility of the protection seller.

- 22.87** When the restructuring of the underlying obligation is not covered by the credit derivative, but the other requirements in [CRE22.86](#) are met, partial recognition of the credit derivative will be allowed. If the amount of the credit derivative is less than or equal to the amount of the underlying obligation, 60% of the amount of the hedge can be recognised as covered. If the amount of the credit derivative is larger than that of the underlying obligation, then the amount of eligible hedge is capped at 60% of the amount of the underlying obligation.
- 22.88** Only credit default swaps and total return swaps that provide credit protection equivalent to guarantees will be eligible for recognition. The following exception applies. Where a bank buys credit protection through a total return swap and records the net payments received on the swap as net income, but does not record offsetting deterioration in the value of the asset that is protected (either through reductions in fair value or by an addition to reserves), the credit protection will not be recognised. The treatment of first-to-default and second-to-default products is covered separately in [CRE22.102](#) to [CRE22.105](#).
- 22.89** Other types of credit derivatives will not be eligible for recognition at this time. Cash funded credit linked notes issued by the bank against exposures in the banking book which fulfil the criteria for credit derivatives will be treated as cash collateralised transactions.

Range of eligible guarantors (counter-guarantors)/protection providers

22.90 Credit protection given by the following entities will be recognised:

- (1) sovereign entities,^{[12](#)} PSEs, banks^{[13](#)} and securities firms and other prudentially regulated financial institutions with a lower risk weight than the counterparty;^{[14](#)}
- (2) other entities that are externally rated except when credit protection is provided to a securitisation exposure. This would include credit protection provided by parent, subsidiary and affiliate companies when they have a lower risk weight than the obligor.
- (3) when credit protection is provided to a securitisation exposure, other entities that currently are externally rated BBB- or better and that were externally rated A- or better at the time the credit protection was provided. This would include credit protection provided by parent, subsidiary and affiliate companies when they have a lower risk weight than the obligor.

Footnotes

^{[12](#)} *This includes the Bank for International Settlements, the International Monetary Fund, the European Central Bank, the European Union, the European Stability Mechanism (and the European Financial Stability Facility, as well as those MDBs referred to in the footnote to [CRE20.10](#).*

^{[13](#)} *This includes other MDBs.*

^{[14](#)} *A prudentially regulated financial institution is defined as: a legal entity supervised by a regulator that imposes prudential requirements consistent with international norms or a legal entity (parent company or subsidiary) included in a consolidated group where any substantial legal entity in the consolidated group is supervised by a regulator that imposes prudential requirements consistent with international norms. These include, but are not limited to, prudentially regulated insurance companies, broker/dealers, thrifts and futures commission merchants, and qualifying central counterparties as defined in [CRE54](#).*

Risk-weight treatment of transactions in which eligible credit protection is provided

22.91 The general risk-weight treatment for transactions in which eligible credit protection is provided is as follows:

- (1) The protected portion is assigned the risk weight of the protection provider. The uncovered portion of the exposure is assigned the risk weight of the underlying counterparty.
- (2) Materiality thresholds on payments below which no payment is made in the event of loss are equivalent to retained first loss positions and must be deducted in full from the capital of the bank purchasing the credit protection.

22.92 Where the amount guaranteed, or against which credit protection is held, is less than the amount of the exposure, and the secured and unsecured portions are of equal seniority, ie the bank and the guarantor share losses on a pro-rata basis, capital relief will be afforded on a proportional basis. That is, the protected portion of the exposure will receive the treatment applicable to eligible guarantees/credit derivatives, with the remainder treated as unsecured.

22.93 Where the bank transfers a portion of the risk of an exposure in one or more tranches to a protection seller or sellers and retains some level of risk of the loan and the risk transferred and the risk retained are of different seniority, banks may obtain credit protection for either the senior tranches (eg second loss portion) or the junior tranche (eg first loss portion). In this case the rules as set out in the securitisation chapters of the credit risk standard will apply.

Currency mismatches

22.94 Where the credit protection is denominated in a currency different from that in which the exposure is denominated — ie there is a currency mismatch — the amount of the exposure deemed to be protected will be reduced by the application of a haircut H_{FX} , using the formula that follows, where:

- (1) G = nominal amount of the credit protection
- (2) H_{FX} = haircut appropriate for currency mismatch between the credit protection and underlying obligation

$$G_A = G \cdot (1 - H_{FX})$$

22.95 The appropriate haircut based on a 10-business day holding period (assuming daily marking-to-market) will be applied in the calculation of the formula in the paragraph above. If a bank uses the supervisory haircuts it will be 8%. The haircuts must be scaled up using the square root of time formula, depending on the frequency of revaluation of the credit protection as described in [CRE22.63](#) and [CRE22.65](#).

Sovereign guarantees and counter-guarantees

22.96 As specified in [CRE20.5](#), a lower risk weight may be applied at national discretion to a bank's exposures to the sovereign (or central bank) where the bank is incorporated and where the exposure is denominated in domestic currency and funded in that currency. National authorities may extend this treatment to portions of claims guaranteed by the sovereign (or central bank), where the guarantee is denominated in the domestic currency and the exposure is funded in that currency. A claim may be covered by a guarantee that is indirectly counter-guaranteed by a sovereign. Such a claim may be treated as covered by a sovereign guarantee provided that:

- (1) the sovereign counter-guarantee covers all credit risk elements of the claim;
- (2) both the original guarantee and the counter-guarantee meet all operational requirements for guarantees, except that the counter-guarantee need not be direct and explicit to the original claim; and
- (3) the supervisor is satisfied that the cover is robust and that no historical evidence suggests that the coverage of the counter-guarantee is less than effectively equivalent to that of a direct sovereign guarantee.

Maturity mismatches

22.97 For the purposes of calculating risk-weighted assets, a maturity mismatch occurs when the residual maturity of a hedge is less than that of the underlying exposure.

Definition of maturity

22.98 The maturity of the underlying exposure and the maturity of the hedge should both be defined conservatively. The effective maturity of the underlying should be gauged as the longest possible remaining time before the counterparty is scheduled to fulfil its obligation, taking into account any applicable grace period. For the hedge, embedded options which may reduce the term of the hedge should be taken into account so that the shortest possible effective maturity is used. Where a call is at the discretion of the protection seller, the maturity will always be at the first call date. If the call is at the discretion of the protection buying bank but the terms of the arrangement at origination of the hedge contain a positive incentive for the bank to call the transaction before contractual maturity, the remaining time to the first call date will be deemed to be the effective maturity. For example, where there is a step-up in cost in conjunction with a call feature or where the effective cost of cover increases over time even if credit quality remains the same or increases, the effective maturity will be the remaining time to the first call.

Risk weights for maturity mismatches

22.99 As outlined in [CRE22.35](#), hedges with maturity mismatches are only recognised when their original maturities are greater than or equal to one year. As a result, the maturity of hedges for exposures with original maturities of less than one year must be matched to be recognised. In all cases, hedges with maturity mismatches will no longer be recognised when they have a residual maturity of three months or less.

22.100 When there is a maturity mismatch with recognised credit risk mitigants (collateral, on-balance sheet netting, guarantees and credit derivatives) the following adjustment applies, where:

- (1) P_a = value of the credit protection adjusted for maturity mismatch
- (2) P = credit protection (eg collateral amount, guarantee amount) adjusted for any haircuts
- (3) t = min (T , residual maturity of the credit protection arrangement) expressed in years
- (4) T = min (5, residual maturity of the exposure) expressed in years

$$P_a = P \cdot \frac{t - 0.25}{T - 0.25}$$

Other items related to the treatment of CRM techniques

Treatment of pools of CRM techniques

22.101 In the case where a bank has multiple CRM techniques covering a single exposure (eg a bank has both collateral and guarantee partially covering an exposure), the bank will be required to subdivide the exposure into portions covered by each type of CRM technique (eg portion covered by collateral, portion covered by guarantee) and the risk-weighted assets of each portion must be calculated separately. When credit protection provided by a single protection provider has differing maturities, they must be subdivided into separate protection as well.

First-to-default credit derivatives

22.102 There are cases where a bank obtains credit protection for a basket of reference names and where the first default among the reference names triggers the credit protection and the credit event also terminates the contract. In this case, the bank may recognise regulatory capital relief for the asset within the basket with the lowest risk-weighted amount, but only if the notional amount is less than or equal to the notional amount of the credit derivative.

22.103 With regard to the bank providing credit protection through such an instrument, the risk weights of the assets included in the basket will be aggregated up to a maximum of 1250% and multiplied by the nominal amount of the protection provided by the credit derivative to obtain the risk-weighted asset amount.

Second-to-default credit derivatives

22.104 In the case where the second default among the assets within the basket triggers the credit protection, the bank obtaining credit protection through such a product will only be able to recognise any capital relief if first-default-protection has also been obtained or when one of the assets within the basket has already defaulted.

22.105 For banks providing credit protection through such a product, the capital treatment is the same as in [CRE22.103](#) above with one exception. The exception is that, in aggregating the risk weights, the asset with the lowest risk weighted amount can be excluded from the calculation.

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.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

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).

FAQ

FAQ1

In 2016, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) revised the accounting for lease transactions. Both require that most leases will be reflected on a lessee's balance sheet as an obligation to make lease payments (a liability) and a related right-of-use (ROU) asset (an asset). According to FAQ2 of [CAP30.7](#), an ROU asset should not be deducted from regulatory capital so long as the underlying asset being leased is a tangible asset. When the ROU asset is not deducted from regulatory capital, should it be included in RWA and, if so, what risk weight should apply?

Yes, the ROU asset should be included in RWA. The intent of the revisions to the lease accounting standards was to more appropriately reflect the economics of leasing transactions, including both the lessee's obligation to make future lease payments, as well as an ROU asset reflecting the lessee's control over the leased item's economic benefits during the lease term. The ROU asset should be risk-weighted at 100%, consistent with the risk weight applied historically to owned tangible assets and to a lessee's leased assets under leases accounted for as finance leases in accordance with existing accounting standards.

- 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,¹ 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 [CAP30.2](#).² 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.

Footnotes

¹ *Indirect equity interests include holdings of derivative instruments tied to equity interests, and holdings in corporations, partnerships, limited liability companies or other types of enterprises that issue ownership interests and are engaged principally in the business of investing in equity instruments.*

² *Where some member countries retain their existing treatment as an exception to the deduction approach, such equity investments by IRB banks are to be considered eligible for inclusion in their IRB equity portfolios.*

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:
 - (a) The issuer may defer indefinitely the settlement of the obligation;
 - (b) The obligation requires (or permits at the issuer's discretion) settlement by issuance of a fixed number of the issuer's equity shares;
 - (c) 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;³ or,
 - (d) 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.

Footnotes

³ For certain obligations that require or permit settlement by issuance of a variable number of the issuer's equity shares, the change in the monetary value of the obligation is equal to the change in the fair value of a fixed number of equity shares multiplied by a specified factor. Those obligations meet the conditions of item 3 if both the factor and the referenced number of shares are fixed. For example, an issuer may be required to settle an obligation by issuing shares with a value equal to three times the appreciation in the fair value of 1,000 equity shares. That obligation is considered to be the same as an obligation that requires settlement by issuance of shares equal to the appreciation in the fair value of 3,000 equity shares.

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.⁴ This includes liabilities from which the return is linked to that of equities.⁵ 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.

Footnotes

⁴ Equities that are recorded as a loan but arise from a debt/equity swap made as part of the orderly realisation or restructuring of the debt are included in the definition of equity holdings. However, these instruments may not attract a lower capital charge than would apply if the holdings remained in the debt portfolio.

⁵ Supervisors may decide not to require that such liabilities be included where they are directly hedged by an equity holding, such that the net position does not involve material risk.

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.⁶⁾
- (3) The purchasing bank has a claim on all proceeds from the pool of receivables or a pro-rata interest in the proceeds.⁷⁾

- (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.

Footnotes

[6](#) *Contra-accounts involve a customer buying from and selling to the same firm. The risk is that debts may be settled through payments in kind rather than cash. Invoices between the companies may be offset against each other instead of being paid. This practice can defeat a security interest when challenged in court.*

[7](#) *Claims on tranches of the proceeds (first loss position, second loss position, etc.) would fall under the securitisation treatment.*

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.⁸

Footnotes

⁸ As noted in [CRE32.39](#), some supervisors may require banks using the foundation approach to calculate M using the definition provided in [CRE32.41](#) to [CRE32.49](#).

30.37 Under the advanced approach, banks must calculate the effective maturity (M)⁹ and provide their own estimates of PD, LGD and EAD.

Footnotes

⁹ At the discretion of the national supervisor, certain domestic exposures may be exempt from the calculation of M (see [CRE32.40](#)).

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.

CRE31

IRB approach: risk weight functions

This chapter sets out the calculation of risk-weighted assets for (1) corporate, sovereign and bank exposures; (2) retail exposures; and (3) equity exposures.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Introduction

31.1 This chapter presents the calculation of risk weighted assets under the internal ratings-based (IRB) approach for: (i) corporate, sovereign and bank exposures; (ii) retail exposures; and (iii) equity exposures. Risk weighted assets (RWA) are designed to address unexpected losses (UL) from exposures. The method of calculating expected losses (EL), and for determining the difference between that measure and provisions, is described [CRE35](#).

Explanation of the risk-weight functions

31.2 Regarding the risk-weight functions for deriving risk weighted assets set out in this chapter:

- (1) Probability of default (PD) and loss-given-default (LGD) are measured as decimals
- (2) Exposure at default (EAD) is measured as currency (eg euros), except where explicitly noted otherwise
- (3) \ln denotes the natural logarithm
- (4) $N(x)$ denotes the cumulative distribution function for a standard normal random variable (ie the probability that a normal random variable with mean zero and variance of one is less than or equal to x). The normal cumulative distribution function is, for example, available in Excel as the function NORMSDIST.
- (5) $G(z)$ denotes the inverse cumulative distribution function for a standard normal random variable (ie the value of x such that $N(x) = z$). The inverse of the normal cumulative distribution function is, for example, available in Excel as the function NORMSINV.

Risk-weighted assets for corporate, sovereign and bank exposures

Risk-weight functions for corporate, sovereign and bank exposures

31.3 The derivation of RWA is dependent on estimates of the PD, LGD, EAD and, in some cases, effective maturity (M), for a given exposure.

31.4 For exposures not in default, the formula for calculating RWA is as follows (illustrative risk weights are shown in [CRE99](#)):

$$\text{Correlation} = R = 0.12 \cdot \frac{(1 - e^{-50 \cdot PD})}{(1 - e^{-50})} + 0.24 \cdot \left(1 - \frac{(1 - e^{-50 \cdot PD})}{(1 - e^{-50})} \right)$$

$$\text{Maturity adjustment} = b = [0.11852 - 0.05478 \cdot \ln(PD)]^2$$

$$\text{Capital requirement} = K = \left[LGD \cdot N \left[\frac{G(PD)}{\sqrt{(1-R)}} + \sqrt{\frac{R}{1-R}} \cdot G(0.999) \right] - PD \cdot LGD \right] \cdot \frac{(1 + (M - 2.5) \cdot b)}{(1 - 1.5 \cdot b)}$$

$$RWA = K \cdot 12.5 \cdot EAD$$

31.5 If the calculation in [CRE31.4](#) above results in a negative capital charge for any individual sovereign exposure, banks should apply a zero capital charge for that exposure.

31.6 Regarding the formula set out in [CRE31.4](#) above, M is the effective maturity, calculated according to [CRE32.39](#) to [CRE32.49](#), and the following terms are used to refer to specific parts of the capital requirements formula:

$$\text{Full maturity adjustment} = \frac{(1 + (M - 2.5) \cdot b)}{(1 - 1.5 \cdot b)}$$

$$\text{Explicit maturity adjustment} = (1 + (M - 2.5) \cdot b)$$

31.7 The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in [CRE36.85](#)) and the bank's best estimate of expected loss (described in [CRE36.88](#)). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

31.8 A multiplier of 1.25 is applied to the correlation parameter of all exposures to financial institutions meeting the following criteria:

- (1) Regulated financial institutions whose total assets are greater than or equal to US \$100 billion. The most recent audited financial statement of the parent company and consolidated subsidiaries must be used in order to determine asset size. For the purpose of this paragraph, a regulated financial institution is defined as a parent and its subsidiaries where any substantial legal entity in the consolidated group is supervised by a regulator that imposes prudential requirements consistent with international norms. These include, but are not limited to, prudentially regulated Insurance Companies, Broker /Dealers, Banks, Thrifts and Futures Commission Merchants.

- (2) Unregulated financial institutions, regardless of size. Unregulated financial institutions are, for the purposes of this paragraph, legal entities whose main business includes: the management of financial assets, lending, factoring, leasing, provision of credit enhancements, securitisation, investments, financial custody, central counterparty services, proprietary trading and other financial services activities identified by supervisors.

$$\text{Correlation} = R_{FI} = 1.25 \cdot \left[0.12 \cdot \frac{(1 - e^{-50 \cdot PD})}{(1 - e^{-50})} + 0.24 \cdot \left(1 - \frac{(1 - e^{-50 \cdot PD})}{(1 - e^{-50})} \right) \right]$$

FAQ

FAQ1 *Can the BCBS clarify the definition of unregulated financial institutions [CRE31.8](#)? Does this could include "real" money funds such as mutual and pension funds which are, in some cases, regulated but not "supervised by a regulator that imposes prudential requirements consistent with international norms"?*

For the sole purpose of [CRE31.8](#), "unregulated financial institution" can include a financial institution or leveraged fund that is not subject to prudential solvency regulation.

Firm-size adjustment for small or medium-sized entities (SMEs)

31.9 Under the IRB approach for corporate credits, banks will be permitted to separately distinguish exposures to SME borrowers (defined as corporate exposures where the reported sales for the consolidated group of which the firm is a part is less than €50 million) from those to large firms. A firm-size adjustment (ie $0.04 \times (1 - (S - 5) / 45)$) is made to the corporate risk weight formula for exposures to SME borrowers. S is expressed as total annual sales in millions of euros with values of S falling in the range of equal to or less than €50 million or greater than or equal to €5 million. Reported sales of less than €5 million will be treated as if they were equivalent to €5 million for the purposes of the firm-size adjustment for SME borrowers.

$$\text{Correlation} = R = 0.12 \cdot \frac{(1 - e^{-50 \cdot PD})}{(1 - e^{-50})} + 0.24 \cdot \left(1 - \frac{(1 - e^{-50 \cdot PD})}{(1 - e^{-50})} \right) - 0.04 \cdot \left(1 - \frac{(S - 5)}{45} \right)$$

31.10

Subject to national discretion, supervisors may allow banks, as a failsafe, to substitute total assets of the consolidated group for total sales in calculating the SME threshold and the firm-size adjustment. However, total assets should be used only when total sales are not a meaningful indicator of firm size.

Risk weights for specialised lending

31.11 Regarding project finance, object finance, commodities finance and income producing real estate sub-asset classes of specialised lending (SL):

- (1) Banks that meet the requirements for the estimation of PD will be able to use the foundation approach for the corporate asset class to derive risk weights for SL sub-classes. As specified in [CRE33.2](#), banks that do not meet the requirements for the estimation of PD will be required to use the supervisory slotting approach.
- (2) Banks that meet the requirements for the estimation of PD, LGD and EAD (where relevant) will be able to use the advanced approach for the corporate asset class to derive risk weights for SL sub-classes.

31.12 Regarding the high volatility commercial real estate (HVCRE) sub-asset class of SL, banks that meet the requirements for the estimation of PD and whose supervisor has chosen to implement a foundation or advanced approach to HVCRE exposures will use the same formula for the derivation of risk weights that is used for other SL exposures, except that they will apply the following asset correlation formula:

$$\text{Correlation} = R = 0.12 \cdot \frac{(1 - e^{-50 \cdot PD})}{(1 - e^{-50})} + 0.30 \cdot \left(1 - \frac{(1 - e^{-50 \cdot PD})}{(1 - e^{-50})} \right)$$

31.13 Banks that do not meet the requirements for estimation of LGD and EAD for HVCRE exposures must use the supervisory parameters for LGD and EAD for corporate exposures, or use the supervisory slotting approach.

Calculation of risk-weighted assets for exposures subject to the double default framework

31.14 For hedged exposures to be treated within the scope of the double default framework, capital requirements may be calculated according to [CRE31.15](#) to [CRE31.17](#).

31.15 The capital requirement for a hedged exposure subject to the double default treatment (K_{DD}) is calculated by multiplying K_0 as defined below by a multiplier depending on the PD of the protection provider (PD_g):

$$K_{DD} = K_0 \cdot (0.15 + 160 \cdot PD_g)$$

31.16 Regarding the formula in [CRE31.15](#) above, K_0 is calculated in the same way as a capital requirement for an unhedged corporate exposure (as defined in [CRE31.3](#) to [CRE31.10](#)), but using different parameters for LGD and the maturity adjustment as follows, where:

- (1) PD_o and PD_g are the probabilities of default of the obligor and guarantor, respectively, both subject to the PD floor set out in [CRE32.3](#).
- (2) The correlation ρ_{os} is calculated according to the formula for correlation (R) in [CRE31.4](#), [CRE31.8](#) or [CRE31.9](#), as applicable, with PD being equal to PD_o .
- (3) LGD_g is the LGD of a comparable direct exposure to the guarantor (ie consistent with [CRE32.20](#)), the LGD associated with an unhedged facility to the guarantor or the unhedged facility to the obligor, depending upon whether in the event both the guarantor and the obligor default during the life of the hedged transaction available evidence and the structure of the guarantee indicate that the amount recovered would depend on the financial condition of the guarantor or obligor, respectively; in estimating either of these LGDs, a bank may recognise collateral posted exclusively against the exposure or credit protection, respectively, in a manner consistent with [CRE32.22](#), [CRE31.11](#), and [CRE36.85](#) to [CRE36.90](#), as applicable. There may be no consideration of double recovery in the LGD estimate.
- (4) The maturity adjustment coefficient b is calculated according to the formula for maturity adjustment (b) in [CRE31.4](#), with PD being the minimum of PD_o and PD_g .
- (5) M is the effective maturity of the credit protection, which may under no circumstances be below the one-year floor if the double default framework is to be applied.

$$K_0 = LGD_g \cdot \left[N \left(\frac{G(PD_o) + \sqrt{\rho_{os}} \cdot G(0.999)}{\sqrt{1 - \rho_{os}}} \right) - PD_o \right] \cdot \frac{1 + (M - 2.5) \cdot b}{1 - 1.5 \cdot b}$$

31.17 The risk-weighted asset amount is calculated in the same way as for unhedged exposures, ie:

$$RWA_{DD} = K_{DD} \cdot EAD_g$$

Risk-weighted assets for retail exposures

31.18 There are three separate risk-weight functions for retail exposures, as defined in [CRE31.19](#) to [CRE31.24](#). Risk weights for retail exposures are based on separate assessments of PD and LGD as inputs to the risk-weight functions. None of the three retail risk-weight functions contain the full maturity adjustment component that is present in the risk-weight function for exposures to banks and corporates. Illustrative risk weights are shown in [CRE99](#).

Retail residential mortgage exposures

31.19 For exposures defined in [CRE30.19](#) that are not in default and are secured or partly secured¹ by residential mortgages, risk weights will be assigned based on the following formula:

$$\text{Correlation} = R = 0.15$$

$$\text{Capital requirement} = K = \left[LGD \cdot N \left[\frac{G(PD)}{\sqrt{(1-R)}} + \sqrt{\frac{R}{1-R}} \cdot G(0.999) \right] - PD \cdot LGD \right]$$

$$RWA = K \cdot 12.5 \cdot EAD$$

Footnotes

¹ This means that risk weights for residential mortgages also apply to the unsecured portion of such residential mortgages.

31.20 The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in [CRE36.85](#)) and the bank's best estimate of expected loss (described in [CRE36.88](#)). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5 and the EAD.

Qualifying revolving retail exposures

31.21

For qualifying revolving retail exposures as defined in [CRE30.23](#) that are not in default, risk weights are defined based on the following formula:

$$\text{Correlation} = R = 0.04$$

$$\text{Capital requirement} = K = \left[LGD \cdot N \left[\frac{G(PD)}{\sqrt{(1-R)}} + \sqrt{\frac{R}{1-R}} \cdot G(0.999) \right] - PD \cdot LGD \right]$$

$$RWA = K \cdot 12.5 \cdot EAD$$

31.22 The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in [CRE36.85](#)) and the bank's best estimate of expected loss (described in [CRE36.88](#)). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

Other retail exposures

31.23 For all other retail exposures that are not in default, risk weights are assigned based on the following function, which allows correlation to vary with PD:

$$\text{Correlation} = R = 0.03 \cdot \frac{(1 - e^{-35 \cdot PD})}{(1 - e^{-35})} + 0.16 \cdot \left(1 - \frac{(1 - e^{-35 \cdot PD})}{(1 - e^{-35})} \right)$$

$$\text{Capital requirement} = K = \left[LGD \cdot N \left[\frac{G(PD)}{\sqrt{(1-R)}} + \sqrt{\frac{R}{1-R}} \cdot G(0.999) \right] - PD \cdot LGD \right]$$

$$RWA = K \cdot 12.5 \cdot EAD$$

31.24 The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in [CRE36.85](#)) and the bank's best estimate of expected loss (described in [CRE36.88](#)). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

Risk-weighted assets for equity exposures

31.25 There are two broad methods for calculating risk-weighted assets for equity exposures not held in the trading book:

(1) The market-based approach, which is further subdivided into:

- (a) a simple risk weight method; and
- (b) an internal models method.

(2) The PD/LGD approach.

31.26 RWA for equity exposures in the trading book are subject to the market risk capital rules.

31.27 Supervisors will decide which approach or approaches will be used by banks, and in what circumstances. Certain equity holdings are excluded as defined in [CRE31.43](#) to [CRE31.45](#) and are subject to the capital charges required under the standardised approach.

31.28 Where supervisors permit both methodologies, banks' choices must be made consistently, and in particular not determined by regulatory arbitrage considerations.

31.29 Investments in significant minority- or majority-owned and –controlled commercial entities below the materiality thresholds in [CRE20.33](#) must be risk-weighted using the approaches in this chapter ([CRE31](#)), with the relevant risk weight subject to a floor of 100%. Investments in excess of the materiality thresholds must be risk-weighted at 1250%.

Market-based approach

31.30 Under the market-based approach, institutions are permitted to calculate the minimum capital requirements for their banking book equity holdings using one or both of two separate and distinct methods: a simple risk weight method or an internal models method. The method used should be consistent with the amount and complexity of the institution's equity holdings and commensurate with the overall size and sophistication of the institution. Supervisors may require the use of either method based on the individual circumstances of an institution.

Market-based approach: simple risk weight method

31.31 Under the simple risk weight method, a 300% risk weight is to be applied to equity holdings that are publicly traded and a 400% risk weight is to be applied to all other equity holdings. A publicly traded holding is defined as any equity security traded on a recognised security exchange.

31.32 Short cash positions and derivative instruments held in the banking book are permitted to offset long positions in the same individual stocks provided that these instruments have been explicitly designated as hedges of specific equity holdings and that they have remaining maturities of at least one year. Other short positions are to be treated as if they are long positions with the relevant risk weight applied to the absolute value of each position. In the context of maturity mismatched positions, the methodology is that for corporate exposures.

Market-based approach: internal models method

31.33 IRB banks may use, or may be required by their supervisor to use, internal risk measurement models to calculate the risk-based capital requirement. Under this alternative, banks must hold capital equal to the potential loss on the institution's equity holdings as derived using internal value-at-risk models subject to the 99th percentile, one-tailed confidence interval of the difference between quarterly returns and an appropriate risk-free rate computed over a long-term sample period. The capital charge would be incorporated into an institution's risk-based capital ratio through the calculation of risk-weighted equivalent assets.

31.34 The risk weight used to convert holdings into risk-weighted equivalent assets would be calculated by multiplying the derived capital charge by 12.5 (ie the inverse of the minimum 8% risk-based capital requirement). Capital charges calculated under the internal models method may be no less than the capital charges that would be calculated under the simple risk weight method using a 200% risk weight for publicly traded equity holdings and a 300% risk weight for all other equity holdings. These minimum capital charges would be calculated separately using the methodology of the simple risk weight approach. Further, these minimum risk weights are to apply at the individual exposure level rather than at the portfolio level.

31.35 A bank may be permitted by its supervisor to employ different market-based approaches to different portfolios based on appropriate considerations and where the bank itself uses different approaches internally.

31.36 Banks are permitted to recognise guarantees but not collateral obtained on an equity position wherein the capital requirement is determined through use of the market-based approach.

PD/LGD approach

The minimum requirements and methodology for the PD/LGD approach for equity exposures (including equity of companies that are included in the retail asset class) are the same as those for the IRB foundation approach for corporate exposures subject to the following specifications:²

- (1) The bank's estimate of the PD of a corporate entity in which it holds an equity position must satisfy the same requirements as the bank's estimate of the PD of a corporate entity where the bank holds debt.³ If a bank does not hold debt of the company in whose equity it has invested, and does not have sufficient information on the position of that company to be able to use the applicable definition of default in practice but meets the other standards, a 1.5 scaling factor will be applied to the risk weights derived from the corporate risk-weight function, given the PD set by the bank. If, however, the bank's equity holdings are material and it is permitted to use a PD/LGD approach for regulatory purposes but the bank has not yet met the relevant standards, the simple risk-weight method under the market-based approach will apply.
- (2) An LGD of 90% would be assumed in deriving the risk weight for equity exposures.
- (3) For these purposes, the risk weight is subject to a five-year maturity adjustment whether or not the bank is using the explicit approach to maturity elsewhere in its IRB portfolio.

Footnotes

² *There is no advanced approach for equity exposures, given the 90% LGD assumption.*

³ *In practice, if there is both an equity exposure and an IRB credit exposure to the same counterparty, a default on the credit exposure would thus trigger a simultaneous default for regulatory purposes on the equity exposure.*

31.38 Under the PD/LGD approach, minimum risk weights as set out in [CRE31.39](#) and [CRE31.40](#) apply. When the sum of UL and EL associated with the equity exposure results in less capital than would be required from application of one of the minimum risk weights, the minimum risk weights must be used. In other words, the minimum risk weights must be applied, if the risk weights calculated

according to [CRE31.37](#) plus the EL associated with the equity exposure multiplied by 12.5 are smaller than the applicable minimum risk weights.

31.39 A minimum risk weight of 100% applies for the following types of equities for as long as the portfolio is managed in the manner outlined below:

- (1) Public equities where the investment is part of a long-term customer relationship, any capital gains are not expected to be realised in the short term and there is no anticipation of (above trend) capital gains in the long term. It is expected that in almost all cases, the institution will have lending and/or general banking relationships with the portfolio company so that the estimated probability of default is readily available. Given their long-term nature, specification of an appropriate holding period for such investments merits careful consideration. In general, it is expected that the bank will hold the equity over the long term (at least five years).
- (2) Private equities where the returns on the investment are based on regular and periodic cash flows not derived from capital gains and there is no expectation of future (above trend) capital gain or of realising any existing gain.

31.40 For all other equity positions, including net short positions (as defined in [CRE31.32](#)), capital charges calculated under the PD/LGD approach may be no less than the capital charges that would be calculated under a simple risk weight method using a 200% risk weight for publicly traded equity holdings and a 300% risk weight for all other equity holdings.

31.41 The maximum risk weight for the PD/LGD approach for equity exposures is 1250%. This maximum risk weight can be applied, if risk weights calculated according to [CRE31.37](#) plus the EL associated with the equity exposure multiplied by 12.5 exceed the 1250% risk weight.

31.42 Hedging for PD/LGD equity exposures is, as for corporate exposures, subject to an LGD of 90% on the exposure to the provider of the hedge. For these purposes equity positions will be treated as having a five-year maturity.

Exclusions to the market-based and PD/LGD approaches

31.43

Equity holdings in entities whose debt obligations qualify for a zero risk weight under the standardised approach to credit risk can be excluded from the IRB approaches to equity (including those publicly sponsored entities where a zero risk weight can be applied), at the discretion of the national supervisor. If a national supervisor makes such an exclusion this will be available to all banks.

31.44 To promote specified sectors of the economy, supervisors may exclude from the IRB capital charges equity holdings made under legislated programmes that provide significant subsidies for the investment to the bank and involve some form of government oversight and restrictions on the equity investments. Example of restrictions are limitations on the size and types of businesses in which the bank is investing, allowable amounts of ownership interests, geographical location and other pertinent factors that limit the potential risk of the investment to the bank. Equity holdings made under legislated programmes can only be excluded from the IRB approaches up to an aggregate of 10% of Tier 1 plus Tier 2 capital.

31.45 Supervisors may also exclude the equity exposures of a bank from the IRB treatment based on materiality. The equity exposures of a bank are considered material if their aggregate value, excluding all legislative programmes discussed in [CRE31.44](#), exceeds, on average over the prior year, 10% of bank's Total capital. This materiality threshold is lowered to 5% of a bank's Total capital if the equity portfolio consists of less than 10 individual holdings. National supervisors may use lower materiality thresholds.

CRE32

IRB approach: risk components for each asset class

This chapter sets out the calculation of the risk components used (eg PD, LGD, EAD, M) for each asset class.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Introduction

32.1 This chapter presents the calculation of the risk components (PD, LGD, EAD, M) that are used in the formulas set out in [CRE31](#). In calculating these components, the legal certainty standards for recognising credit risk mitigation under the standardised approach to credit risk [CRE22](#) apply for both the foundation and advanced internal ratings-based (IRB) approaches.

Risk components for corporate, sovereign, and bank exposures

32.2 This section, [CRE32.2](#) to [CRE32.50](#), sets out the calculation of the risk components for corporate, sovereign, and bank exposures.

Probability of default (PD)

32.3 For corporate and bank exposures, the PD is the greater of the one-year PD associated with the internal borrower grade to which that exposure is assigned, or 0.03%. For sovereign exposures, the PD is the one-year PD associated with the internal borrower grade to which that exposure is assigned. The PD of borrowers assigned to a default grade(s), consistent with the reference definition of default, is 100%. The minimum requirements for the derivation of the PD estimates associated with each internal borrower grade are outlined in [CRE36.78](#) to [CRE36.80](#).

Loss given default (LGD)

32.4 A bank must provide an estimate of the LGD for each corporate, sovereign and bank exposure. There are two approaches for deriving this estimate: a foundation internal ratings-based (F-IRB) approach and an advanced internal ratings-based (A-IRB) approach.

LGD under the F-IRB approach: treatment of unsecured claims and non-recognised collateral

32.5 Under the foundation approach, senior claims on corporates, sovereigns and banks not secured by recognised collateral will be assigned a 45% LGD.

32.6 All subordinated claims on corporates, sovereigns and banks will be assigned a 75% LGD. A subordinated loan is a facility that is expressly subordinated to another facility. At national discretion, supervisors may choose to employ a wider definition of subordination. This might include economic subordination, such as

cases where the facility is unsecured and the bulk of the borrower's assets are used to secure other exposures.

LGD under the F-IRB approach: collateral recognition

32.7 In addition to the eligible financial collateral recognised in the standardised approach [CRE22](#), under the F-IRB approach some other forms of collateral, known as eligible IRB collateral, are also recognised. These include receivables, specified commercial and residential real estate, and other collateral, where they meet the minimum requirements set out in [CRE36.127](#) to [CRE36.142](#).¹ For eligible financial collateral, the requirements are identical to the operational standards as set out in the credit risk mitigation chapter of the standardised approach to credit risk [CRE22](#).

Footnotes

¹ *The Committee, however, recognises that, in exceptional circumstances for well-developed and long-established markets, mortgages on office and/or multi-purpose commercial premises and/or multi-tenanted commercial premises may have the potential to receive alternative recognition as collateral in the corporate portfolio. Please refer to the footnote to [CRE20.25](#) for a discussion of the eligibility criteria that would apply. The LGD applied to the collateralised portion of such exposures, subject to the limitations set out in [CRE22.11](#) to [CRE22.76](#) of the standardised approach, will be set at 35%. The LGD applied to the remaining portion of this exposure will be set at 45%. In order to ensure consistency with the capital charges in the standardised approach (while providing a small capital incentive in the IRB approach relative to the standardised approach), supervisors may apply a cap on the capital charge associated with such exposures so as to achieve comparable treatment in both approaches.*

LGD under the F-IRB approach: methodology for recognition of eligible financial collateral

32.8 The methodology for the recognition of eligible financial collateral closely follows that outlined in the comprehensive approach to collateral in the standardised

approach in [CRE22.40](#) to [CRE22.76](#). The simple approach to collateral presented in the standardised approach will not be available to banks applying the IRB approach.

32.9 Following the comprehensive approach, the effective loss given default (LGD*) applicable to a collateralised transaction can be expressed as follows, where:

- (1) LGD is that of the senior unsecured exposure before recognition of collateral (45%).
- (2) E is the current value of the exposure (i.e. cash lent or securities lent or posted).
- (3) E* is the exposure value after risk mitigation as determined in [CRE22.40](#) to [CRE22.43](#) of the standardised approach. This concept is only used to calculate LGD*. Banks must continue to calculate EAD without taking into account the presence of any collateral, unless otherwise specified.

$$LGD^* = LGD \times (E^* / E)$$

32.10 Banks that qualify for the F-IRB approach may calculate E* using any of the ways specified under the comprehensive approach for collateralised transactions under the standardised approach.

32.11 Where repo-style transactions are subject to a master netting agreement, a bank may choose not to recognise the netting effects in calculating capital. Banks that want to recognise the effect of master netting agreements on such for transactions for capital purposes must satisfy the criteria provided in [CRE22.68](#) and [CRE22.69](#) of the standardised approach. The bank must calculate E* in accordance with [CRE22.71](#) and [CRE22.72](#) or [CRE22.73](#) to [CRE22.76](#) and equate this to EAD. The impact of collateral on these transactions may not be reflected through an adjustment to LGD.

32.12 As in the standardised approach, for transactions where the conditions in [CRE22.65](#) are met, and in addition, the counterparty is a core market participant as specified in [CRE22.66](#), supervisors may choose not to apply the haircuts specified under the comprehensive approach, but instead to apply a zero H.

LGD under the F-IRB approach: methodology for recognition of eligible IRB collateral

32.13

The methodology for determining the effective LGD under the foundation approach for cases where banks have taken eligible IRB collateral to secure a corporate exposure is as follows.

- (1) Exposures where the minimum eligibility requirements are met, but the ratio of the current value of the collateral received (C) to the current value of the exposure (E) is below a threshold level of C^* (ie the required minimum collateralisation level for the exposure) would receive the appropriate LGD for unsecured exposures or those secured by collateral which is not eligible financial collateral or eligible IRB collateral.
- (2) Exposures where the ratio of C to E exceeds a second, higher threshold level of C^{**} (ie the required level of over-collateralisation for full LGD recognition) would be assigned an LGD according to the following table.

32.14 The following table displays the applicable LGD and required over-collateralisation levels for the secured parts of senior exposures, where:

- (1) Senior exposures are to be divided into fully collateralised and uncollateralised portions.
- (2) The part of the exposure considered to be fully collateralised, C/C^{**} , receives the LGD associated with the type of collateral.
- (3) The remaining part of the exposure is regarded as unsecured and receives an LGD of 45%.

- (4) Other collateral excludes physical assets acquired by the bank as a result of a loan default.

	Minimum LGD	Required minimum collateralisation level of the exposure (C*)	Required level of over-collateralisation for full LGD recognition (C**)
Eligible Financial collateral	0%	0%	n.a.
Receivables	35%	0%	125%
Commercial or residential real estate	35%	30%	140%
Other collateral	40%	30%	140%

Minimum LGD for secured portion of senior exposures

LGD under the F-IRB approach: methodology for the treatment of pools of collateral

32.15 The methodology for determining the effective LGD of a transaction under the foundation approach where banks have taken both financial collateral and other eligible IRB collateral is aligned to the treatment in the standardised approach and based on the following guidance.

- (1) In the case where a bank has obtained multiple forms of credit risk mitigation (CRM), it will be required to subdivide the adjusted value of the exposure (after the haircut for eligible financial collateral) into portions each covered by only one CRM type. That is, the bank must divide the exposure into the portion covered by eligible financial collateral, the portion covered by receivables, the portion covered by commercial or residential real estate collateral, a portion covered by other collateral, and an unsecured portion, where relevant.

- (2) Where the ratio of the sum of the value of commercial or residential real estate and other collateral to the reduced exposure (after recognising the effect of eligible financial collateral and receivables collateral) is below the associated threshold level (i.e. the minimum degree of collateralisation of the exposure), the exposure would receive the appropriate unsecured LGD value of 45%.
- (3) The risk-weighted assets for each fully secured portion of exposure must be calculated separately.

LGD under the advanced approach

32.16 Subject to certain additional minimum requirements specified below, supervisors may permit banks to use their own internal estimates of LGD for corporate, sovereign and bank exposures. LGD must be measured as the loss given default as a percentage of the EAD. Banks eligible for the IRB approach that are unable to meet these additional minimum requirements must utilise the foundation LGD treatment described above.

32.17 The minimum requirements for the derivation of LGD estimates are outlined in [CRE36.85](#) to [CRE36.90](#).

Treatment of certain repo-style transactions

32.18 Banks that want to recognise the effects of master netting agreements on repo-style transactions for capital purposes must apply the methodology outlined in [CRE32.11](#) for determining E* for use as the EAD. For banks using the advanced approach, own LGD estimates would be permitted for the unsecured equivalent amount (E*).

Treatment of guarantees and credit derivatives

32.19 There are two approaches for recognition of CRM in the form of guarantees and credit derivatives in the IRB approach: a foundation approach for banks using supervisory values of LGD, and an advanced approach for those banks using their own internal estimates of LGD.

32.20 Under either approach, CRM in the form of guarantees and credit derivatives must not reflect the effect of double default (see [CRE36.100](#)). As such, to the extent that the CRM is recognised by the bank, the adjusted risk weight will not be less than that of a comparable direct exposure to the protection provider. Consistent with the standardised approach, banks may choose not to recognise credit protection if doing so would result in a higher capital requirement.

Treatment of guarantees and credit derivatives: recognition under the foundation approach

32.21 For banks using the foundation approach for LGD, the approach to guarantees and credit derivatives closely follows the treatment under the standardised approach as specified in [CRE22.84](#) to [CRE22.96](#). The range of eligible guarantors is the same as under the standardised approach except that companies that are internally rated may also be recognised under the foundation approach. To receive recognition, the requirements outlined in [CRE22.84](#) to [CRE22.89](#) must be met.

32.22 Eligible guarantees from eligible guarantors will be recognised as follows:

- (1) For the covered portion of the exposure, a risk weight is derived by taking:
 - (a) the risk-weight function appropriate to the type of guarantor, and
 - (b) the PD appropriate to the guarantor's borrower grade, or some grade between the underlying obligor and the guarantor's borrower grade if the bank deems a full substitution treatment not to be warranted.
- (2) The bank may replace the LGD of the underlying transaction with the LGD applicable to the guarantee taking into account seniority and any collateralisation of a guaranteed commitment.

32.23 The uncovered portion of the exposure is assigned the risk weight associated with the underlying obligor.

32.24 Where partial coverage exists, or where there is a currency mismatch between the underlying obligation and the credit protection, it is necessary to split the exposure into a covered and an uncovered amount. The treatment in the foundation approach follows that outlined in the standardised approach in [CRE22.92](#) to [CRE22.95](#), and depends upon whether the cover is proportional or tranching.

Treatment of guarantees and credit derivatives: recognition under the advanced approach

32.25

Banks using the advanced approach for estimating LGDs may reflect the risk-mitigating effect of guarantees and credit derivatives through either adjusting PD or LGD estimates. Whether adjustments are done through PD or LGD, they must be done in a consistent manner for a given guarantee or credit derivative type. In doing so, banks must not include the effect of double default in such adjustments. Thus, the adjusted risk weight must not be less than that of a comparable direct exposure to the protection provider.

32.26 A bank relying on own-estimates of LGD has the option to adopt the treatment outlined above for banks under the F-IRB approach [CRE32.21](#) to [CRE32.24](#), or to make an adjustment to its LGD estimate of the exposure to reflect the presence of the guarantee or credit derivative. Under this option, there are no limits to the range of eligible guarantors although the set of minimum requirements provided in [CRE36.101](#) to [CRE36.102](#) concerning the type of guarantee must be satisfied. For credit derivatives, the requirements of [CRE36.106](#) to [CRE36.107](#) must be satisfied. When credit derivatives do not cover the restructuring of the underlying obligation, the partial recognition set out in [CRE22.87](#) applies.

Operational requirements for recognition of double default

32.27 A bank using an IRB approach has the option of using the substitution approach in determining the appropriate capital requirement for an exposure. However, for exposures hedged by one of the following instruments the double default framework according to [CRE31.14](#) to [CRE31.17](#) may be applied subject to the additional operational requirements set out in [CRE32.28](#). A bank may decide separately for each eligible exposure to apply either the double default framework or the substitution approach.

- (1) Single-name, unfunded credit derivatives (eg credit default swaps) or single-name guarantees.
- (2) First-to-default basket products — the double default treatment will be applied to the asset within the basket with the lowest risk-weighted amount.
- (3) n^{th} -to-default basket products — the protection obtained is only eligible for consideration under the double default framework if eligible $(n-1)^{\text{th}}$ default protection has also been obtained or where $(n-1)$ of the assets within the basket have already defaulted.

32.28 The double default framework is only applicable where the following conditions are met:

- (1) The risk weight that is associated with the exposure prior to the application of the framework does not already factor in any aspect of the credit protection.
- (2) The entity selling credit protection is a bank², investment firm or insurance company (but only those that are in the business of providing credit protection, including mono-lines, re-insurers, and non-sovereign credit export agencies³), referred to as a financial firm, that:
 - (a) is regulated in a manner broadly equivalent to that in this Framework (where there is appropriate supervisory oversight and transparency /market discipline), or externally rated as at least investment grade by a credit rating agency deemed suitable for this purpose by supervisors;
 - (b) had an internal rating with a PD equivalent to or lower than that associated with an external A– rating at the time the credit protection for an exposure was first provided or for any period of time thereafter; and
 - (c) has an internal rating with a PD equivalent to or lower than that associated with an external investment-grade rating.
- (3) The underlying obligation is:
 - (a) a corporate exposure as defined in [CRE30.6](#) to [CRE30.16](#) (excluding specialised lending exposures for which the supervisory slotting criteria approach described in [CRE33.2](#) to [CRE33.7](#) is being used); or
 - (b) a claim on a public sector entity (PSE) that is not a sovereign exposure as defined in [CRE30.17](#); or
 - (c) a loan extended to a small business and classified as a retail exposure as defined in [CRE30.21](#)(2).
- (4) The underlying obligor is not:
 - (a) a financial firm as defined in (2); or
 - (b) a member of the same group as the protection provider.
- (5) The credit protection meets the minimum operational requirements for such instruments as outlined in [CRE22.84](#) to [CRE22.88](#).

- (6) In keeping with [CRE22.85](#) for guarantees, for any recognition of double default effects for both guarantees and credit derivatives a bank must have the right and expectation to receive payment from the credit protection provider without having to take legal action in order to pursue the counterparty for payment. To the extent possible, a bank should take steps to satisfy itself that the protection provider is willing to pay promptly if a credit event should occur.
- (7) The purchased credit protection absorbs all credit losses incurred on the hedged portion of an exposure that arise due to the credit events outlined in the contract.
- (8) If the payout structure provides for physical settlement, then there must be legal certainty with respect to the deliverability of a loan, bond, or contingent liability. If a bank intends to deliver an obligation other than the underlying exposure, it must ensure that the deliverable obligation is sufficiently liquid so that the bank would have the ability to purchase it for delivery in accordance with the contract.
- (9) The terms and conditions of credit protection arrangements must be legally confirmed in writing by both the credit protection provider and the bank.
- (10) In the case of protection against dilution risk, the seller of purchased receivables must not be a member of the same group as the protection provider.
- (11) There is no excessive correlation between the creditworthiness of a protection provider and the obligor of the underlying exposure due to their performance being dependent on common factors beyond the systematic risk factor. The bank has a process to detect such excessive correlation. An example of a situation in which such excessive correlation would arise is when a protection provider guarantees the debt of a supplier of goods or services and the supplier derives a high proportion of its income or revenue from the protection provider.

Footnotes

² This does not include PSEs and multilateral development banks, even though claims on these may be treated as claims on banks according to [CRE30.18](#).

³ By non-sovereign it is meant that credit protection in question does not benefit from any explicit sovereign counter-guarantee.

Exposure at default (EAD)

32.29 The following sections apply to both on and off-balance sheet positions. All exposures are measured gross of specific provisions or partial write-offs. The EAD on drawn amounts should not be less than the sum of (i) the amount by which a bank's regulatory capital would be reduced if the exposure were written-off fully, and (ii) any specific provisions and partial write-offs. When the difference between the instrument's EAD and the sum of (i) and (ii) is positive, this amount is termed a discount. The calculation of risk-weighted assets is independent of any discounts. Under the limited circumstances described in [CRE35.4](#), discounts may be included in the measurement of total eligible provisions for purposes of the EL-provision calculation set out in [CRE35](#).

Exposure measurement for on-balance sheet items

32.30 On-balance sheet netting of loans and deposits will be recognised subject to the same conditions as under the standardised approach (see [CRE22.82](#) to [CRE22.83](#)). Where currency or maturity mismatched on-balance sheet netting exists, the treatment follows the standardised approach, as set out in [CRE22.94](#), [CRE22.95](#) and [CRE22.97](#) to [CRE22.100](#).

Exposure measurement for off-balance sheet items (with the exception of foreign exchange and interest-rate, equity, and commodity-related derivatives)

32.31 For off-balance sheet items, exposure is calculated as the committed but undrawn amount multiplied by a credit conversion factor (CCF). There are two approaches for the estimation of CCFs: a foundation approach and an advanced approach. When only the drawn balances of revolving facilities have been securitised, banks must ensure that they continue to hold required capital against the undrawn balances associated with the securitised exposures.

EAD under the foundation approach

32.32 The types of instruments and the CCFs applied to them are the same as those in the standardised approach, as outlined in [CRE20.35](#) to [CRE20.45](#) with the exception of commitments, Note Issuance Facilities (NIFs) and Revolving Underwriting Facilities (RUFs).

32.33 A CCF of 75% will be applied to commitments, NIFs and RUFs regardless of the maturity of the underlying facility. This does not apply to those facilities which are uncommitted, that are unconditionally cancellable, or that effectively provide for automatic cancellation, for example due to deterioration in a borrower's

creditworthiness, at any time by the bank without prior notice. A CCF of 0% will be applied to these facilities.

32.34 The amount to which the CCF is applied is the lower of the value of the unused committed credit line, and the value that reflects any possible constraining availability of the facility, such as the existence of a ceiling on the potential lending amount which is related to a borrower's reported cash flow. If the facility is constrained in this way, the bank must have sufficient line monitoring and management procedures to support this contention.

32.35 In order to apply a 0% CCF for unconditionally and immediately cancellable corporate overdrafts and other facilities, banks must demonstrate that they actively monitor the financial condition of the borrower, and that their internal control systems are such that they could cancel the facility upon evidence of a deterioration in the credit quality of the borrower.

32.36 Where a commitment is obtained on another off-balance sheet exposure, banks under the foundation approach are to apply the lower of the applicable CCFs.

EAD under the advanced approach

32.37 Banks which meet the minimum requirements for use of their own estimates of EAD (see [CRE36.91](#) to [CRE36.96](#)) will be allowed to use their own internal estimates of CCFs across different product types provided the exposure is not subject to a CCF of 100% in the foundation approach (see [CRE32.32](#)).

Exposures that give rise to counterparty credit risk

32.38 For exposures that give rise to counterparty credit risk according to [CRE51.4](#) (ie over-the-counter, or OTC, derivatives, exchange-traded derivatives, long settlement transactions and securities financing transactions), the EAD is to be calculated under the rules set forth in [CRE50](#) to [CRE54](#).

Effective maturity (M)

32.39 For banks using the foundation approach for corporate exposures, effective maturity (M) will be 2.5 years except for repo-style transactions where the

effective maturity will be 6 months. National supervisors may choose to require all banks in their jurisdiction (those using the foundation and advanced approaches) to measure M for each facility using the definition provided below.

32.40 Banks using any element of the A-IRB approach are required to measure effective maturity for each facility as defined below. However, national supervisors may exempt facilities to certain smaller domestic corporate borrowers from the explicit maturity adjustment if the reported sales (ie turnover) as well as total assets for the consolidated group of which the firm is a part of are less than €500 million. The consolidated group has to be a domestic company based in the country where the exemption is applied. If adopted, national supervisors must apply such an exemption to all IRB banks using the advanced approach in that country, rather than on a bank-by-bank basis. If the exemption is applied, all exposures to qualifying smaller domestic firms will be assumed to have an average maturity of 2.5 years, as under the F-IRB approach.

32.41 Except as noted in [CRE32.45](#), M is defined as the greater of one year and the remaining effective maturity in years as defined below. In all cases, M will be no greater than 5 years.

32.42 For an instrument subject to a determined cash flow schedule, effective maturity M is defined as follows, where CF_t denotes the cash flows (principal, interest payments and fees) contractually payable by the borrower in period t:

$$\text{Effective maturity} = M = \sum_t t \cdot CF_t / \sum_t CF_t$$

32.43 If a bank is not in a position to calculate the effective maturity of the contracted payments as noted above, it is allowed to use a more conservative measure of M such as that it equals the maximum remaining time (in years) that the borrower is permitted to take to fully discharge its contractual obligation (principal, interest, and fees) under the terms of loan agreement. Normally, this will correspond to the nominal maturity of the instrument.

32.44 For derivatives subject to a master netting agreement, the weighted average maturity of the transactions should be used when applying the explicit maturity adjustment. Further, the notional amount of each transaction should be used for weighting the maturity.

32.45 The one-year floor does not apply to certain short-term exposures, comprising fully or nearly-fully collateralised⁴ capital market-driven transactions (ie OTC

derivatives transactions and margin lending) and repo-style transactions (ie repos /reverse repos and securities lending/borrowing) with an original maturity of less than one year, where the documentation contains daily remargining clauses. For all eligible transactions the documentation must require daily revaluation, and must include provisions that must allow for the prompt liquidation or setoff of the collateral in the event of default or failure to re-margin. The maturity of such transactions must be calculated as the greater of one-day, and the effective maturity (M, consistent with the definition above).

Footnotes

⁴ *The intention is to include both parties of a transaction meeting these conditions where neither of the parties is systematically under-collateralised.*

32.46 The one-year floor also does not apply to the following exposures:

- (1) Short-term self-liquidating trade transactions. Import and export letters of credit and similar transactions should be accounted for at their actual remaining maturity.
- (2) Issued as well as confirmed letters of credit that are short term (ie have a maturity below one year) and self-liquidating.

32.47 In addition to the transactions considered in [CRE32.45](#) above, other short-term exposures with an original maturity of less than one year that are not part of a bank's ongoing financing of an obligor may be eligible for exemption from the one-year floor. After a careful review of the particular circumstances in their jurisdictions, national supervisors should define the types of short-term exposures that might be considered eligible for this treatment. The results of these reviews might, for example, include transactions such as:

- (1) Some capital market-driven transactions and repo-style transactions that might not fall within the scope of [CRE32.45](#);
- (2) Some trade finance transactions that are not exempted by [CRE32.46](#).
- (3) Some exposures arising from settling securities purchases and sales. This could also include overdrafts arising from failed securities settlements provided that such overdrafts do not continue more than a short, fixed number of business days;

- (4) Some exposures arising from cash settlements by wire transfer, including overdrafts arising from failed transfers provided that such overdrafts do not continue more than a short, fixed number of business days;
- (5) Some exposures to banks arising from foreign exchange settlements; and
- (6) Some short-term loans and deposits.

32.48 For transactions falling within the scope of [CRE32.45](#) subject to a master netting agreement, the weighted average maturity of the transactions should be used when applying the explicit maturity adjustment. A floor equal to the minimum holding period for the transaction type set out in [CRE22.61](#) will apply to the average. Where more than one transaction type is contained in the master netting agreement a floor equal to the highest holding period will apply to the average. Further, the notional amount of each transaction should be used for weighting maturity.

32.49 Where there is no explicit adjustment, the effective maturity (M) assigned to all exposures is set at 2.5 years unless otherwise specified in [CRE32.39](#).

Treatment of maturity mismatches

32.50 The treatment of maturity mismatches under IRB is identical to that in the standardised approach (see [CRE22.97](#) to [CRE22.100](#)).

Risk components for retail exposures

Probability of default (PD) and loss given default (LGD)

32.51 For each identified pool of retail exposures, banks are expected to provide an estimate of the PD and LGD associated with the pool, subject to the minimum requirements as set out in [CRE36](#). Additionally, the PD for retail exposures is the greater of the one-year PD associated with the internal borrower grade to which the pool of retail exposures is assigned or 0.03%.

32.52 LGDs for retail exposures secured by residential properties cannot be set below 10% for any sub-segment of exposures to which the formula in [CRE31.19](#) is applied. The 10% LGD floor shall not apply, however, to sub-segments that are subject to/benefit from sovereign guarantees. Further, the existence of the floor does not imply any waiver of the requirements of LGD estimation as laid out in the minimum requirements starting with [CRE36.85](#).

Recognition of guarantees and credit derivatives

- 32.53** Banks may reflect the risk-reducing effects of guarantees and credit derivatives, either in support of an individual obligation or a pool of exposures, through an adjustment of either the PD or LGD estimate, subject to the minimum requirements in [CRE36.98](#) to [CRE36.107](#). Whether adjustments are done through PD or LGD, they must be done in a consistent manner for a given guarantee or credit derivative type.
- 32.54** Consistent with the requirements outlined above for corporate, sovereign, and bank exposures, banks must not include the effect of double default in such adjustments. The adjusted risk weight must not be less than that of a comparable direct exposure to the protection provider. Consistent with the standardised approach, banks may choose not to recognise credit protection if doing so would result in a higher capital requirement.

Exposure at default (EAD)

- 32.55** Both on and off-balance sheet retail exposures are measured gross of specific provisions or partial write-offs. The EAD on drawn amounts should not be less than the sum of (i) the amount by which a bank's regulatory capital would be reduced if the exposure were written-off fully, and (ii) any specific provisions and partial write-offs. When the difference between the instrument's EAD and the sum of (i) and (ii) is positive, this amount is termed a discount. The calculation of risk-weighted assets is independent of any discounts. Under the limited circumstances described in [CRE35.4](#), discounts may be included in the measurement of total eligible provisions for purposes of the EL-provision calculation set out in [CRE35](#).
- 32.56** On-balance sheet netting of loans and deposits of a bank to or from a retail customer will be permitted subject to the same conditions outlined in [CRE22.82](#) and [CRE22.83](#) of the standardised approach. For retail off-balance sheet items, banks must use their own estimates of CCFs provided the minimum requirements in [CRE36.91](#) to [CRE36.94](#) and [CRE36.97](#) are satisfied.
- 32.57** For retail exposures with uncertain future drawdown such as credit cards, banks must take into account their history and/or expectation of additional drawings prior to default in their overall calibration of loss estimates. In particular, where a bank does not reflect conversion factors for undrawn lines in its EAD estimates, it must reflect in its LGD estimates the likelihood of additional drawings prior to default. Conversely, if the bank does not incorporate the possibility of additional drawings in its LGD estimates, it must do so in its EAD estimates.

32.58 When only the drawn balances of revolving retail facilities have been securitised, banks must ensure that they continue to hold required capital against the undrawn balances associated with securitised exposures using the IRB approach to credit risk for commitments.

32.59 To the extent that foreign exchange and interest rate commitments exist within a bank's retail portfolio for IRB purposes, banks are not permitted to provide their internal assessments of credit equivalent amounts. Instead, the rules for the standardised approach continue to apply.

Risk components for equity exposures

32.60 In general, the measure of an equity exposure on which capital requirements is based is the value presented in the financial statements, which depending on national accounting and regulatory practices may include unrealised revaluation gains. Thus, for example, equity exposure measures will be:

- (1) For investments held at fair value with changes in value flowing directly through income and into regulatory capital, exposure is equal to the fair value presented in the balance sheet.
- (2) For investments held at fair value with changes in value not flowing through income but into a tax-adjusted separate component of equity, exposure is equal to the fair value presented in the balance sheet.
- (3) For investments held at cost or at the lower of cost or market, exposure is equal to the cost or market value presented in the balance sheet.

CRE33

IRB approach: supervisory slotting approach for specialised lending

This chapter sets out the calculation of risk-weighted assets and expected losses for specialised lending exposures subject to the supervisory slotting approach.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Introduction

33.1 This chapter sets out the calculation of risk weighted assets and expected losses for specialised lending (SL) exposures subject to the supervisory slotting approach. The method for determining the difference between expected losses and provisions is set out in [CRE35](#).

Risk weights for specialised lending (PF, OF, CF and IPRE)

33.2 For project finance (PF), object finance (OF), commodities finance (CF) and income producing real estate (IPRE) exposures, banks that do not meet the requirements for the estimation of probability of default (PD) under the corporate internal ratings-based (IRB) approach will be required to map their internal grades to five supervisory categories, each of which is associated with a specific risk weight. The slotting criteria on which this mapping must be based are provided in [CRE33.13](#) for PF exposures, [CRE33.15](#) for OF exposures, [CRE33.16](#) for CF exposures and [CRE33.14](#) for IPRE exposures. The risk weights for unexpected losses (UL) associated with each supervisory category are:

Supervisory categories and unexpected loss (UL) risk weights for other SL exposures

Strong	Good	Satisfactory	Weak	Default
70%	90%	115%	250%	0%

33.3 Although banks are expected to map their internal ratings to the supervisory categories for specialised lending using the slotting criteria, each supervisory category broadly corresponds to a range of external credit assessments as outlined below.

Strong	Good	Satisfactory	Weak	Default
BBB- or better	BB+ or BB	BB- or B+	B to C-	Not applicable

33.4 At national discretion, supervisors may allow banks to assign preferential risk weights of 50% to "strong" exposures, and 70% to "good" exposures, provided they have a remaining maturity of less than 2.5 years or the supervisor determines that banks' underwriting and other risk characteristics are substantially stronger than specified in the slotting criteria for the relevant supervisory risk category.

Risk weights for specialised lending (HVCRE)

- 33.5** For high-volatility commercial real estate (HVCRE) exposures, banks that do not meet the requirements for estimation of PD, or whose supervisor has chosen not to implement the foundation or advanced approaches to HVCRE, must map their internal grades to five supervisory categories, each of which is associated with a specific risk weight. The slotting criteria on which this mapping must be based are the same as those for IPRE, as provided in [CRE33.14](#). The risk weights associated with each supervisory category are:

Supervisory categories and UL risk weights for high-volatility commercial real estate				
Strong	Good	Satisfactory	Weak	Default
95%	120%	140%	250%	0%

- 33.6** As indicated in [CRE33.3](#), each supervisory category broadly corresponds to a range of external credit assessments.
- 33.7** At national discretion, supervisors may allow banks to assign preferential risk weights of 70% to “strong” exposures, and 95% to “good” exposures, provided they have a remaining maturity of less than 2.5 years or the supervisor determines that banks’ underwriting and other risk characteristics are substantially stronger than specified in the slotting criteria for the relevant supervisory risk category.

Expected loss for specialised lending (SL) exposures subject to the supervisory slotting criteria

- 33.8** For SL exposures subject to the supervisory slotting criteria, the expected loss (EL) amount is determined by multiplying 8% by the risk-weighted assets produced from the appropriate risk weights, as specified below, multiplied by exposure at default.
- 33.9** The risk weights for SL, other than HVCRE, are as follows:

Strong	Good	Satisfactory	Weak	Default
5%	10%	35%	100%	625%

33.10 Where, at national discretion, supervisors allow banks to assign preferential risk weights to non-HVCRE SL exposures falling into the “strong” and “good” supervisory categories as outlined in [CRE33.4](#), the corresponding expected loss (EL) risk weight is 0% for “strong” exposures, and 5% for “good” exposures.

33.11 The risk weights for HVCRE are as follows:

Strong	Good	Satisfactory	Weak	Default
5%	5%	35%	100%	625%

33.12 Even where, at national discretion, supervisors allow banks to assign preferential risk weights to HVCRE exposures falling into the “strong” and “good” supervisory categories as outlined in [CRE33.7](#), the corresponding EL risk weight will remain at 5% for both “strong” and “good” exposures.

Supervisory slotting criteria for specialised lending

33.13 The following table sets out the supervisory rating grades for project finance exposures subject to the supervisory slotting approach.

	Strong	Good	Satisfactory	Weak
Financial strength				
Market conditions	Few competing suppliers or substantial and durable advantage in location, cost, or technology. Demand is strong and growing	Few competing suppliers or better than average location, cost, or technology but this situation may not last. Demand is strong and stable	Project has no advantage in location, cost, or technology. Demand is adequate and stable	Project has worse than average location, cost, or technology. Demand is weak and declining
Financial ratios (eg <i>debt service coverage ratio (DSCR)</i> , <i>loan life coverage ratio</i> , <i>project life coverage ratio</i> , and <i>debt-to-equity ratio</i>)	Strong financial ratios considering the level of project risk; very robust economic assumptions	Strong to acceptable financial ratios considering the level of project risk; robust project economic assumptions	Standard financial ratios considering the level of project risk	Aggressive financial ratios considering the level of project risk
Stress analysis	The project can meet its financial obligations under sustained, severely stressed economic or sectoral conditions	The project can meet its financial obligations under normal stressed economic or sectoral conditions. The project is only likely to default under severe economic conditions	The project is vulnerable to stresses that are not uncommon through an economic cycle, and may default in a normal downturn	The project is likely to default unless conditions improve soon
<i>Financial structure</i>				
Duration of the credit compared to the duration of the project	Useful life of the project significantly exceeds tenor of the loan	Useful life of the project exceeds tenor of the loan	Useful life of the project exceeds tenor of the loan	Useful life of the project may not exceed tenor of the loan
Amortisation schedule	Amortising debt	Amortising debt	Amortising debt repayments	Bullet repayment or amortising

			with limited bullet payment	debt repayments with high bullet repayment
Political and legal environment				
Political risk, including transfer risk, considering project type and mitigants	Very low exposure; strong mitigation instruments, if needed	Low exposure; satisfactory mitigation instruments, if needed	Moderate exposure; fair mitigation instruments	High exposure; no or weak mitigation instruments
Force majeure risk (war, civil unrest, etc),	Low exposure	Acceptable exposure	Standard protection	Significant risks, not fully mitigated
Government support and project's importance for the country over the long term	Project of strategic importance for the country (preferably export- oriented). Strong support from Government	Project considered important for the country. Good level of support from Government	Project may not be strategic but brings unquestionable benefits for the country. Support from Government may not be explicit	Project not key to the country. No or weak support from Government
Stability of legal and regulatory environment (risk of change in law)	Favourable and stable regulatory environment over the long term	Favourable and stable regulatory environment over the medium term	Regulatory changes can be predicted with a fair level of certainty	Current or future regulatory issues may affect the project
Acquisition of all necessary supports and approvals for such relief from local content laws	Strong	Satisfactory	Fair	Weak
Enforceability of contracts, collateral and security	Contracts, collateral and security are enforceable	Contracts, collateral and security are enforceable	Contracts, collateral and security are considered enforceable	There are unresolved key issues in respect if actual

			even if certain non-key issues may exist	enforcement of contracts, collateral and security
Transaction characteristics				
<i>Design and technology risk</i>	Fully proven technology and design	Fully proven technology and design	Proven technology and design — start-up issues are mitigated by a strong completion package	Unproven technology and design; technology issues exist and/or complex design
<i>Construction risk</i>				
Permitting and siting	All permits have been obtained	Some permits are still outstanding but their receipt is considered very likely	Some permits are still outstanding but the permitting process is well defined and they are considered routine	Key permits still need to be obtained and are not considered routine. Significant conditions may be attached
Type of construction contract	Fixed-price date-certain turnkey construction engineering and procurement contract (EPC)	Fixed-price date-certain turnkey construction EPC	Fixed-price date-certain turnkey construction contract with one or several contractors	No or partial fixed-price turnkey contract and /or interfacing issues with multiple contractors
Completion guarantees	Substantial liquidated damages supported by financial substance and /or strong completion guarantee from sponsors with excellent	Significant liquidated damages supported by financial substance and /or completion guarantee from sponsors with good financial standing	Adequate liquidated damages supported by financial substance and /or completion guarantee from sponsors with good financial standing	Inadequate liquidated damages or not supported by financial substance or weak completion guarantees

	financial standing			
Track record and financial strength of contractor in constructing similar projects.	Strong	Good	Satisfactory	Weak
<i>Operating risk</i>				
Scope and nature of operations and maintenance (O & M) contracts	Strong long-term O&M contract, preferably with contractual performance incentives, and /or O&M reserve accounts	Long-term O&M contract, and/or O&M reserve accounts	Limited O&M contract or O&M reserve account	No O&M contract: risk of high operational cost overruns beyond mitigants
Operator's expertise, track record, and financial strength	Very strong, or committed technical assistance of the sponsors	Strong	Acceptable	Limited/weak, or local operator dependent on local authorities
<i>Off-take risk</i>				
(a) If there is a take-or-pay or fixed-price off-take contract:	Excellent creditworthiness of off-taker; strong termination clauses; tenor of contract comfortably exceeds the maturity of the debt	Good creditworthiness of off-taker; strong termination clauses; tenor of contract exceeds the maturity of the debt	Acceptable financial standing of off-taker; normal termination clauses; tenor of contract generally matches the maturity of the debt	Weak off-taker; weak termination clauses; tenor of contract does not exceed the maturity of the debt
(b) If there is no take-or-pay or fixed-price off-take contract:	Project produces essential services or a commodity sold widely on a world market; output can readily be	Project produces essential services or a commodity sold widely on a regional market that will absorb it at projected	Commodity is sold on a limited market that may absorb it only at lower than projected prices	Project output is demanded by only one or a few buyers or is not generally sold on an

	absorbed at projected prices even at lower than historic market growth rates	prices at historical growth rates		organised market
<i>Supply risk</i>				
Price, volume and transportation risk of feed-stocks; supplier's track record and financial strength	Long-term supply contract with supplier of excellent financial standing	Long-term supply contract with supplier of good financial standing	Long-term supply contract with supplier of good financial standing — a degree of price risk may remain	Short-term supply contract or long-term supply contract with financially weak supplier — a degree of price risk definitely remains
Reserve risks (e. g. natural resource development)	Independently audited, proven and developed reserves well in excess of requirements over lifetime of the project	Independently audited, proven and developed reserves in excess of requirements over lifetime of the project	Proven reserves can supply the project adequately through the maturity of the debt	Project relies to some extent on potential and undeveloped reserves
Strength of Sponsor				
Sponsor's track record, financial strength, and country/sector experience	Strong sponsor with excellent track record and high financial standing	Good sponsor with satisfactory track record and good financial standing	Adequate sponsor with adequate track record and good financial standing	Weak sponsor with no or questionable track record and/or financial weaknesses
Sponsor support, as evidenced by equity, ownership clause and incentive to	Strong. Project is highly strategic for the sponsor (core business — long-term strategy)	Good. Project is strategic for the sponsor (core business — long-term strategy)	Acceptable. Project is considered important for the sponsor (core business)	Limited. Project is not key to sponsor's long-term strategy or core business

inject additional cash if necessary				
Security Package				
Assignment of contracts and accounts	Fully comprehensive	Comprehensive	Acceptable	Weak
Pledge of assets, taking into account quality, value and liquidity of assets	First perfected security interest in all project assets, contracts, permits and accounts necessary to run the project	Perfected security interest in all project assets, contracts, permits and accounts necessary to run the project	Acceptable security interest in all project assets, contracts, permits and accounts necessary to run the project	Little security or collateral for lenders; weak negative pledge clause
Lender's control over cash flow (eg cash sweeps, independent escrow accounts)	Strong	Satisfactory	Fair	Weak
Strength of the covenant package (mandatory prepayments, payment deferrals, payment cascade, dividend restrictions...)	Covenant package is strong for this type of project Project may issue no additional debt	Covenant package is satisfactory for this type of project Project may issue extremely limited additional debt	Covenant package is fair for this type of project Project may issue limited additional debt	Covenant package is Insufficient for this type of project Project may issue unlimited additional debt
Reserve funds (debt service, O&M, renewal and replacement, unforeseen events, etc)	Longer than average coverage period, all reserve funds fully funded in cash or letters of credit from highly rated bank	Average coverage period, all reserve funds fully funded	Average coverage period, all reserve funds fully funded	Shorter than average coverage period, reserve funds funded from operating cash flows

33.14

The following table sets out the supervisory rating grades for income producing real estate exposures and high-volatility commercial real estate exposures subject to the supervisory slotting approach.

	Strong	Good	Satisfactory	Weak
Financial strength				
Market conditions	The supply and demand for the project's type and location are currently in equilibrium. The number of competitive properties coming to market is equal or lower than forecasted demand	The supply and demand for the project's type and location are currently in equilibrium. The number of competitive properties coming to market is roughly equal to forecasted demand	Market conditions are roughly in equilibrium. Competitive properties are coming on the market and others are in the planning stages. The project's design and capabilities may not be state of the art compared to new projects	Market conditions are weak. It is uncertain when conditions will improve and return to equilibrium. The project is losing tenants at lease expiration. New lease terms are less favourable compared to those expiring
Financial ratios and advance rate	The property's DSCR is considered strong (DSCR is not relevant for the construction phase) and its loan-to-value ratio (LTV) is considered low given its property type. Where a secondary market exists, the transaction is underwritten to market standards	The DSCR (not relevant for development real estate) and LTV are satisfactory. Where a secondary market exists, the transaction is underwritten to market standards	The property's DSCR has deteriorated and its value has fallen, increasing its LTV	The property's DSCR has deteriorated significantly and its LTV is well above underwriting standards for new loans
Stress analysis	The property's resources, contingencies and liability structure allow it to meet its financial obligations	The property can meet its financial obligations under a sustained period of financial stress (eg interest rates, economic	During an economic downturn, the property would suffer a decline in revenue that would limit its ability to fund	The property's financial condition is strained and is likely to default unless conditions improve in the near term

		during a period of severe financial stress (eg interest rates, economic growth)	growth). The property is likely to default only under severe economic conditions	capital expenditures and significantly increase the risk of default	
Cash-flow predictability					
(a) For complete and	stabilised property	The property's leases are long-term with creditworthy tenants and their maturity dates are scattered. The property has a track record of tenant retention upon lease expiration. Its vacancy rate is low. Expenses (maintenance, insurance, security, and property taxes) are predictable	Most of the property's leases are long-term, with tenants that range in creditworthiness. The property experiences a normal level of tenant turnover upon lease expiration. Its vacancy rate is low. Expenses are predictable	Most of the property's leases are medium rather than long-term with tenants that range in creditworthiness. The property experiences a moderate level of tenant turnover upon lease expiration. Its vacancy rate is moderate. Expenses are relatively predictable but vary in relation to revenue	The property's leases are of various terms with tenants that range in creditworthiness. The property experiences a very high level of tenant turnover upon lease expiration. Its vacancy rate is high. Significant expenses are incurred preparing space for new tenants
(b) For complete and	stabilised property	Leasing activity exceeds projections. The project should achieve stabilisation in the near future	Leasing activity exceeds projections. The project should achieve stabilisation in the near future	Most leasing activity is within projections; however, stabilisation will not occur for some time	Market rents do not meet expectations. Despite achieving target occupancy rate, cash flow coverage is tight due to disappointing revenue
(c) For construction phase		The property is entirely pre-leased through the tenor of the loan or pre-sold to an	The property is entirely pre-leased or pre-sold to a creditworthy tenant or buyer,	Leasing activity is within projections but the building may not be pre-leased and there	The property is deteriorating due to cost overruns, market deterioration, tenant

	investment grade tenant or buyer, or the bank has a binding commitment for take-out financing from an investment grade lender	or the bank has a binding commitment for permanent financing from a creditworthy lender	may not exist a take-out financing. The bank may be the permanent lender	cancellations or other factors. There may be a dispute with the party providing the permanent financing
Asset characteristics				
Location	Property is located in highly desirable location that is convenient to services that tenants desire	Property is located in desirable location that is convenient to services that tenants desire	The property location lacks a competitive advantage	The property's location, configuration, design and maintenance have contributed to the property's difficulties
Design and condition	Property is favoured due to its design, configuration, and maintenance, and is highly competitive with new properties	Property is appropriate in terms of its design, configuration and maintenance. The property's design and capabilities are competitive with new properties	Property is adequate in terms of its configuration, design and maintenance	Weaknesses exist in the property's configuration, design or maintenance
Property is under construction	Construction budget is conservative and technical hazards are limited. Contractors are highly qualified	Construction budget is conservative and technical hazards are limited. Contractors are highly qualified	Construction budget is adequate and contractors are ordinarily qualified	Project is over budget or unrealistic given its technical hazards. Contractors may be under qualified
Strength of Sponsor /Developer				
Financial capacity and	The sponsor /developer	The sponsor /developer made	The sponsor /developer's	The sponsor /developer lacks

willingness to support the property.	made a substantial cash contribution to the construction or purchase of the property. The sponsor /developer has substantial resources and limited direct and contingent liabilities. The sponsor /developer's properties are diversified geographically and by property type	a material cash contribution to the construction or purchase of the property. The sponsor /developer's financial condition allows it to support the property in the event of a cash flow shortfall. The sponsor /developer's properties are located in several geographic regions	contribution may be immaterial or non-cash. The sponsor /developer is average to below average in financial resources	capacity or willingness to support the property
Reputation and track record with similar properties.	Experienced management and high sponsors' quality. Strong reputation and lengthy and successful record with similar properties	Appropriate management and sponsors' quality. The sponsor or management has a successful record with similar properties	Moderate management and sponsors' quality. Management or sponsor track record does not raise serious concerns	Ineffective management and substandard sponsors' quality. Management and sponsor difficulties have contributed to difficulties in managing properties in the past
Relationships with relevant real estate actors	Strong relationships with leading actors such as leasing agents	Proven relationships with leading actors such as leasing agents	Adequate relationships with leasing agents and other parties providing important real estate services	Poor relationships with leasing agents and/or other parties providing important real estate services
Security Package				
Nature of lien	Perfected first lien	Perfected first lien. Lenders in	Perfected first lien. Lenders in	

		some markets extensively use loan structures that include junior liens. Junior liens may be indicative of this level of risk if the total LTV inclusive of all senior positions does not exceed a typical first loan LTV.	some markets extensively use loan structures that include junior liens. Junior liens may be indicative of this level of risk if the total LTV inclusive of all senior positions does not exceed a typical first loan LTV.	Ability of lender to foreclose is constrained
Assignment of rents (for projects leased to long-term tenants)	The lender has obtained an assignment. They maintain current tenant information that would facilitate providing notice to remit rents directly to the lender, such as a current rent roll and copies of the project's leases	The lender has obtained an assignment. They maintain current tenant information that would facilitate providing notice to the tenants to remit rents directly to the lender, such as current rent roll and copies of the project's leases	The lender has obtained an assignment. They maintain current tenant information that would facilitate providing notice to the tenants to remit rents directly to the lender, such as current rent roll and copies of the project's leases	The lender has not obtained an assignment of the leases or has not maintained the information necessary to readily provide notice to the building's tenants
Quality of the insurance coverage	Appropriate	Appropriate	Appropriate	Substandard

33.15 The following table sets out the supervisory rating grades for object finance exposures subject to the supervisory slotting approach.

	Strong	Good	Satisfactory	Weak
Financial strength				
Market conditions	Demand is strong and growing, strong entry barriers, low sensitivity to changes in technology and economic outlook	Demand is strong and stable. Some entry barriers, some sensitivity to changes in technology and economic outlook	Demand is adequate and stable, limited entry barriers, significant sensitivity to changes in technology and economic outlook	Demand is weak and declining, vulnerable to changes in technology and economic outlook, highly uncertain environment
Financial ratios (DSCR and LTV)	Strong financial ratios considering the type of asset. Very robust economic assumptions	Strong / acceptable financial ratios considering the type of asset. Robust project economic assumptions	Standard financial ratios for the asset type	Aggressive financial ratios considering the type of asset
Stress analysis	Stable long-term revenues, capable of withstanding severely stressed conditions through an economic cycle	Satisfactory short-term revenues. Loan can withstand some financial adversity. Default is only likely under severe economic conditions	Uncertain short-term revenues. Cash flows are vulnerable to stresses that are not uncommon through an economic cycle. The loan may default in a normal downturn	Revenues subject to strong uncertainties; even in normal economic conditions the asset may default, unless conditions improve
Market liquidity	Market is structured on a worldwide basis; assets are highly liquid	Market is worldwide or regional; assets are relatively liquid	Market is regional with limited prospects in the short term, implying lower liquidity	Local market and/or poor visibility. Low or no liquidity, particularly on niche markets
Political and legal environment				
	Very low; strong mitigation	Low; satisfactory mitigation		High; no or weak

Political risk, including transfer risk	instruments, if needed	instruments, if needed	Moderate; fair mitigation instruments	mitigation instruments
Legal and regulatory risks	Jurisdiction is favourable to repossession and enforcement of contracts	Jurisdiction is favourable to repossession and enforcement of contracts	Jurisdiction is generally favourable to repossession and enforcement of contracts, even if repossession might be long and/or difficult	Poor or unstable legal and regulatory environment. Jurisdiction may make repossession and enforcement of contracts lengthy or impossible
Transaction characteristics				
Financing term compared to the economic life of the asset	Full payout profile /minimum balloon. No grace period	Balloon more significant, but still at satisfactory levels	Important balloon with potentially grace periods	Repayment in fine or high balloon
Operating risk				
Permits / licensing	All permits have been obtained; asset meets current and foreseeable safety regulations	All permits obtained or in the process of being obtained; asset meets current and foreseeable safety regulations	Most permits obtained or in process of being obtained, outstanding ones considered routine, asset meets current safety regulations	Problems in obtaining all required permits, part of the planned configuration and/or planned operations might need to be revised
Scope and nature of O & M contracts	Strong long-term O&M contract, preferably with contractual performance incentives, and /or O&M reserve accounts (if needed)	Long-term O&M contract, and/or O&M reserve accounts (if needed)	Limited O&M contract or O&M reserve account (if needed)	No O&M contract: risk of high operational cost overruns beyond mitigants

Operator's financial strength, track record in managing the asset type and capability to re-market asset when it comes off-lease	Excellent track record and strong re-marketing capability	Satisfactory track record and re-marketing capability	Weak or short track record and uncertain re-marketing capability	No or unknown track record and inability to remarket the asset
Asset characteristics				
Configuration, size, design and maintenance (ie age, size for a plane) compared to other assets on the same market	Strong advantage in design and maintenance. Configuration is standard such that the object meets a liquid market	Above average design and maintenance. Standard configuration, maybe with very limited exceptions — such that the object meets a liquid market	Average design and maintenance. Configuration is somewhat specific, and thus might cause a narrower market for the object	Below average design and maintenance. Asset is near the end of its economic life. Configuration is very specific; the market for the object is very narrow
Resale value	Current resale value is well above debt value	Resale value is moderately above debt value	Resale value is slightly above debt value	Resale value is below debt value
Sensitivity of the asset value and liquidity to economic cycles	Asset value and liquidity are relatively insensitive to economic cycles	Asset value and liquidity are sensitive to economic cycles	Asset value and liquidity are quite sensitive to economic cycles	Asset value and liquidity are highly sensitive to economic cycles
Strength of sponsor				
Operator's financial strength, track record in managing the asset type and capability to re-	Excellent track record and strong re-marketing capability	Satisfactory track record and re-marketing capability	Weak or short track record and uncertain re-marketing capability	No or unknown track record and inability to re-market the asset

market asset when it comes off-lease				
Sponsors' track record and financial strength	Sponsors with excellent track record and high financial standing	Sponsors with good track record and good financial standing	Sponsors with adequate track record and good financial standing	Sponsors with no or questionable track record and/or financial weaknesses
Security Package				
Asset control	Legal documentation provides the lender effective control (e.g. a first perfected security interest, or a leasing structure including such security) on the asset, or on the company owning it	Legal documentation provides the lender effective control (e.g. a perfected security interest, or a leasing structure including such security) on the asset, or on the company owning it	Legal documentation provides the lender effective control (e.g. a perfected security interest, or a leasing structure including such security) on the asset, or on the company owning it	The contract provides little security to the lender and leaves room to some risk of losing control on the asset
Rights and means at the lender's disposal to monitor the location and condition of the asset	The lender is able to monitor the location and condition of the asset, at any time and place (regular reports, possibility to lead inspections)	The lender is able to monitor the location and condition of the asset, almost at any time and place	The lender is able to monitor the location and condition of the asset, almost at any time and place	The lender is able to monitor the location and condition of the asset are limited
Insurance against damages	Strong insurance coverage including collateral damages with top quality insurance companies	Satisfactory insurance coverage (not including collateral damages) with good quality insurance companies	Fair insurance coverage (not including collateral damages) with acceptable quality insurance companies	Weak insurance coverage (not including collateral damages) or with weak quality insurance companies

33.16 The following table sets out the supervisory rating grades for commodities finance exposures subject to the supervisory slotting approach.

	Strong	Good	Satisfactory	Weak
Financial strength				
Degree of over-collateralisation of trade	Strong	Good	Satisfactory	Weak
Political and legal environment				
Country risk	No country risk	Limited exposure to country risk (in particular, offshore location of reserves in an emerging country)	Exposure to country risk (in particular, offshore location of reserves in an emerging country)	Strong exposure to country risk (in particular, inland reserves in an emerging country)
Mitigation of country risks	Very strong mitigation: Strong offshore mechanisms Strategic commodity 1 st class buyer	Strong mitigation: Offshore mechanisms Strategic commodity Strong buyer	Acceptable mitigation: Offshore mechanisms Less strategic commodity Acceptable buyer	Only partial mitigation: No offshore mechanisms Non-strategic commodity Weak buyer
Asset characteristics				
Liquidity and susceptibility to damage	Commodity is quoted and can be hedged through futures or over-the-counter (OTC) instruments. Commodity is not susceptible to damage	Commodity is quoted and can be hedged through OTC instruments. Commodity is not susceptible to damage	Commodity is not quoted but is liquid. There is uncertainty about the possibility of hedging. Commodity is not susceptible to damage	Commodity is not quoted. Liquidity is limited given the size and depth of the market. No appropriate hedging instruments. Commodity is susceptible to damage
Strength of sponsor				

Financial strength of trader	Very strong, relative to trading philosophy and risks	Strong	Adequate	Weak
Track record, including ability to manage the logistic process	Extensive experience with the type of transaction in question. Strong record of operating success and cost efficiency	Sufficient experience with the type of transaction in question. Above average record of operating success and cost efficiency	Limited experience with the type of transaction in question. Average record of operating success and cost efficiency	Limited or uncertain track record in general. Volatile costs and profits
Trading controls and hedging policies	Strong standards for counterparty selection, hedging, and monitoring	Adequate standards for counterparty selection, hedging, and monitoring	Past deals have experienced no or minor problems	Trader has experienced significant losses on past deals
Quality of financial disclosure	Excellent	Good	Satisfactory	Financial disclosure contains some uncertainties or is insufficient
Security package				
Asset control	First perfected security interest provides the lender legal control of the assets at any time if needed	First perfected security interest provides the lender legal control of the assets at any time if needed	At some point in the process, there is a rupture in the control of the assets by the lender. The rupture is mitigated by knowledge of the trade process or a third party undertaking as the case may be	Contract leaves room for some risk of losing control over the assets. Recovery could be jeopardised
Insurance against damages	Strong insurance	Satisfactory insurance	Fair insurance coverage (not	Weak insurance coverage (not

coverage including collateral damages with top quality insurance companies	coverage (not including collateral damages) with good quality insurance companies	including collateral damages) with acceptable quality insurance companies	including collateral damages) or with weak quality insurance companies
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CRE34

IRB approach: RWA for purchased receivables

This chapter sets out the calculation of risk-weighted under the internal ratings-based approach for purchased receivables.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Introduction

- 34.1** This chapter presents the method of calculating the unexpected loss (UL) capital requirements for purchased receivables. For such assets, there are internal ratings-based (IRB) capital charges for both default risk and dilution risk.

Risk-weighted assets for default risk

- 34.2** For receivables belonging unambiguously to one asset class, the IRB risk weight for default risk is based on the risk-weight function applicable to that particular exposure type, as long as the bank can meet the qualification standards for this particular risk-weight function. For example, if banks cannot comply with the standards for qualifying revolving retail exposures (defined in [CRE30.24](#)), they should use the risk-weight function for other retail exposures. For hybrid pools containing mixtures of exposure types, if the purchasing bank cannot separate the exposures by type, the risk-weight function producing the highest capital requirements for the exposure types in the receivable pool applies.
- 34.3** For purchased retail receivables, a bank must meet the risk quantification standards for retail exposures but can utilise external and internal reference data to estimate the probabilities of default (PDs) and losses-given-default (LGDs). The estimates for PD and LGD (or expected loss, EL) must be calculated for the receivables on a stand-alone basis; that is, without regard to any assumption of recourse or guarantees from the seller or other parties.
- 34.4** For purchased corporate receivables the purchasing bank is expected to apply the existing IRB risk quantification standards for the bottom-up approach. However, for eligible purchased corporate receivables, and subject to supervisory permission, a bank may employ the following top-down procedure for calculating IRB risk weights for default risk:
- (1) The purchasing bank will estimate the pool's one-year EL for default risk, expressed in percentage of the exposure amount (ie the total exposure at default, or EAD, amount to the bank by all obligors in the receivables pool). The estimated EL must be calculated for the receivables on a stand-alone basis; that is, without regard to any assumption of recourse or guarantees from the seller or other parties. The treatment of recourse or guarantees covering default risk (and/or dilution risk) is discussed separately below.

- (2) Given the EL estimate for the pool's default losses, the risk weight for default risk is determined by the risk-weight function for corporate exposures.¹ As described below, the precise calculation of risk weights for default risk depends on the bank's ability to decompose EL into its PD and LGD components in a reliable manner. Banks can utilise external and internal data to estimate PDs and LGDs. However, the advanced approach will not be available for banks that use the foundation approach for corporate exposures.

Footnotes

- ¹ *The firm-size adjustment for small or medium-sized entities (SMEs), as defined in [CRE31.9](#), will be the weighted average by individual exposure of the pool of purchased corporate receivables. If the bank does not have the information to calculate the average size of the pool, the firm-size adjustment will not apply.*

Foundation IRB treatment

34.5 The risk weight under the foundation IRB treatment is determined as follows:

- (1) If the purchasing bank is unable to decompose EL into its PD and LGD components in a reliable manner, the risk weight is determined from the corporate risk-weight function using the following specifications:
 - (a) If the bank can demonstrate that the exposures are exclusively senior claims to corporate borrowers:
 - (i) An LGD of 45% can be used.
 - (ii) PD will be calculated by dividing the EL using this LGD.
 - (iii) EAD will be calculated as the outstanding amount minus the capital charge for dilution prior to credit risk mitigation (K_{Dilution}).
 - (iv) EAD for a revolving purchase facility is the sum of the current amount of receivables purchased plus 75% of any undrawn purchase commitments minus K_{Dilution} .
 - (b) If the bank cannot demonstrate that the exposures are exclusively senior claims to corporate borrowers:
 - (i) PD is the bank's estimate of EL.
 - (ii) LGD will be 100%.
 - (iii) EAD is the amount outstanding minus K_{Dilution} .
 - (iv) EAD for a revolving purchase facility is the sum of the current amount of receivables purchased plus 75% of any undrawn purchase commitments minus K_{Dilution} .
- (2) If the purchasing bank is able to estimate PD in a reliable manner, the risk weight is determined from the corporate risk-weight functions according to the specifications for LGD, maturity (M) and the treatment of guarantees under the foundation approach as given in [CRE32.5](#) to [CRE32.15](#), [CRE32.18](#), [CRE32.19](#) to [CRE32.24](#) and [CRE32.39](#).

Advanced IRB treatment

- 34.6** Under the advanced IRB approach, if the purchasing bank can estimate either the pool's default-weighted average loss rates given default (as defined in [CRE36.85](#)) or average PD in a reliable manner, the bank may estimate the other parameter based on an estimate of the expected long-run loss rate. The bank may (i) use an appropriate PD estimate to infer the long-run default-weighted average loss rate given default, or (ii) use a long-run default-weighted average loss rate given default to infer the appropriate PD. In either case, it is important to recognise that the LGD used for the IRB capital calculation for purchased receivables cannot be less than the long-run default-weighted average loss rate given default and must be consistent with the concepts defined in [CRE36.85](#). The risk weight for the purchased receivables will be determined using the bank's estimated PD and LGD as inputs to the corporate risk-weight function. Similar to the foundation IRB treatment, EAD will be the amount outstanding minus K_{Dilution} . EAD for a revolving purchase facility will be the sum of the current amount of receivables purchased plus 75% of any undrawn purchase commitments minus K_{Dilution} (thus, banks using the advanced IRB approach will not be permitted to use their internal EAD estimates for undrawn purchase commitments).
- 34.7** For drawn amounts, M will equal the pool's exposure-weighted average effective maturity (as defined in [CRE32.41](#) to [CRE32.49](#)). This same value of M will also be used for undrawn amounts under a committed purchase facility provided the facility contains effective covenants, early amortisation triggers, or other features that protect the purchasing bank against a significant deterioration in the quality of the future receivables it is required to purchase over the facility's term. Absent such effective protections, the M for undrawn amounts will be calculated as the sum of (a) the longest-dated potential receivable under the purchase agreement and (b) the remaining maturity of the purchase facility.

Risk-weighted assets for dilution risk

- 34.8** Dilution refers to the possibility that the receivable amount is reduced through cash or non-cash credits to the receivable's obligor.² For both corporate and retail receivables, unless the bank can demonstrate to its supervisor that the dilution risk for the purchasing bank is immaterial, the treatment of dilution risk must be the following:

- (1) At the level of either the pool as a whole (top-down approach) or the individual receivables making up the pool (bottom-up approach), the purchasing bank will estimate the one-year EL for dilution risk, also expressed in percentage of the receivables amount. Banks can utilise external and internal data to estimate EL. As with the treatments of default risk, this estimate must be computed on a stand-alone basis; that is, under the assumption of no recourse or other support from the seller or third-party guarantors.
- (2) For the purpose of calculating risk weights for dilution risk, the corporate risk-weight function must be used with the following settings:
 - (a) The PD must be set equal to the estimated EL.
 - (b) The LGD must be set at 100%.
 - (c) An appropriate maturity treatment applies when determining the capital requirement for dilution risk. If a bank can demonstrate that the dilution risk is appropriately monitored and managed to be resolved within one year, the supervisor may allow the bank to apply a one-year maturity.

Footnotes

² *Examples include offsets or allowances arising from returns of goods sold, disputes regarding product quality, possible debts of the borrower to a receivables obligor, and any payment or promotional discounts offered by the borrower (eg a credit for cash payments within 30 days).*

34.9 This treatment will be applied regardless of whether the underlying receivables are corporate or retail exposures, and regardless of whether the risk weights for default risk are computed using the standard IRB treatments or, for corporate receivables, the top-down treatment described above.

Treatment of purchase price discounts for receivables

- 34.10** In many cases, the purchase price of receivables will reflect a discount (not to be confused with the discount concept defined in [CRE32.29](#) and [CRE32.55](#)) that provides first loss protection for default losses, dilution losses or both. To the extent that a portion of such a purchase price discount may be refunded to the seller based on the performance of the receivables, the purchaser may recognise this refundable amount as first loss protection and hence treat this exposure under the securitisation chapters of credit risk standard ([CRE40](#) to [CRE44](#)), while the seller providing such a refundable purchase price discount must treat the refundable amount as a first-loss position under the securitisation framework. Non-refundable purchase price discounts for receivables do not affect either the EL-provision calculation in [CRE35](#) or the calculation of risk-weighted assets.
- 34.11** When collateral or partial guarantees obtained on receivables provide first loss protection (collectively referred to as mitigants in this paragraph), and these mitigants cover default losses, dilution losses, or both, they may also be treated as first loss protection under the securitisation framework ([CRE44.11](#)). When the same mitigant covers both default and dilution risk, banks using the Securitisation Internal Ratings-Based Approach (SEC-IRBA) that are able to calculate an exposure-weighted LGD must do so as defined in [CRE44.22](#).

Recognition of credit risk mitigants

- 34.12** Credit risk mitigants will be recognised generally using the same type of framework as set forth in [CRE32.19](#) to [CRE32.26](#).³ In particular, a guarantee provided by the seller or a third party will be treated using the existing IRB rules for guarantees, regardless of whether the guarantee covers default risk, dilution risk, or both.
- (1) If the guarantee covers both the pool's default risk and dilution risk, the bank will substitute the risk weight for an exposure to the guarantor in place of the pool's total risk weight for default and dilution risk.
 - (2) If the guarantee covers only default risk or dilution risk, but not both, the bank will substitute the risk weight for an exposure to the guarantor in place of the pool's risk weight for the corresponding risk component (default or dilution). The capital requirement for the other component will then be added.

- (3) If a guarantee covers only a portion of the default and/or dilution risk, the uncovered portion of the default and/or dilution risk will be treated as per

the existing credit risk mitigation rules for proportional or tranching coverage (ie the risk weights of the uncovered risk components will be added to the risk weights of the covered risk components).

Footnotes

³ *At national supervisory discretion, banks may recognise guarantors that are internally rated and associated with a PD equivalent to less than A- under the foundation IRB approach for purposes of determining capital requirements for dilution risk.*

34.13 If protection against dilution risk has been purchased, and the conditions of [CRE32.27](#) and [CRE32.28](#) are met, the double default framework may be used for the calculation of the risk-weighted asset amount for dilution risk. In this case, [CRE31.14](#) to [CRE31.17](#) apply with PD_o being equal to the estimated EL, LGD_g being equal to 100 percent, and effective maturity being set according to [CRE34.8](#).

CRE35

IRB approach: treatment of expected losses and provisions

This chapter sets out the treatment of expected losses and provisions within the internal ratings-based approach.

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First version in the format of the consolidated framework

Introduction

35.1 This chapter discusses the calculation of expected losses (EL) under the internal ratings-based (IRB) approach, and the method by which the difference between provisions (eg specific provisions, partial write-offs, portfolio-specific general provisions such as country risk provisions or general provisions) and EL may be included in or must be deducted from regulatory capital, as outlined in the definition of capital standard [CAP10.19](#) and [CAP30.13](#). The treatment of EL and provisions related to securitisation exposures is outlined in [CRE40.36](#).

Calculation of expected losses

35.2 A bank must sum the EL amount (defined as EL multiplied by EAD) associated with its exposures (excluding the EL amount associated with equity exposures under the probability of default / loss-given-default (PD/LGD) approach and securitisation exposures) to obtain a total EL amount. While the EL amount associated with equity exposures subject to the PD/LGD approach is excluded from the total EL amount, [CRE35.3](#) and [CRE35.10](#) apply to such exposures.

35.3 Banks must calculate an EL as $PD \times LGD$ for corporate, sovereign, bank, and retail exposures both not in default and not treated as hedged exposures under the double default treatment. For corporate, sovereign, bank, and retail exposures that are in default, banks must use their best estimate of expected loss as defined in [CRE36.88](#) and banks on the foundation approach must use the supervisory LGD. For specialised lending exposures subject to the supervisory slotting criteria EL is calculated as described in paragraphs [CRE33.8](#) to [CRE33.12](#). For equity exposures subject to the PD/LGD approach, the EL is calculated as $PD \times LGD$ unless [CRE31.38](#) to [CRE31.41](#) apply. Securitisation exposures do not contribute to the EL amount, as set out in [CRE40.36](#). For all other exposures, including hedged exposures under the double default treatment, the EL is zero.

Calculation of provisions

Exposures subject to the IRB approach for credit risk

35.4 Total eligible provisions are defined as the sum of all provisions (eg specific provisions, partial write-offs, portfolio-specific general provisions such as country risk provisions or general provisions) that are attributed to exposures treated under the IRB approach. In addition, total eligible provisions may include any discounts on defaulted assets. Specific provisions set aside against equity and securitisation exposures must not be included in total eligible provisions.

Portion of exposures subject to the standardised approach for credit risk

- 35.5** Banks using the standardised approach for a portion of their credit risk exposures, either on a transitional basis (as defined in [CRE30.47](#) and [CRE30.48](#)), or on a permanent basis if the exposures subject to the standardised approach are immaterial ([CRE30.49](#)), must determine the portion of general provisions attributed to the standardised or IRB treatment of provisions according to the methods outlined in [CRE35.6](#) and [CRE35.7](#) below.
- 35.6** Banks should generally attribute total general provisions on a pro rata basis according to the proportion of credit risk-weighted assets subject to the standardised and IRB approaches. However, when one approach to determining credit risk-weighted assets (ie standardised or IRB approach) is used exclusively within an entity, general provisions booked within the entity using the standardised approach may be attributed to the standardised treatment. Similarly, general provisions booked within entities using the IRB approach may be attributed to the total eligible provisions as defined in [CRE35.4](#).
- 35.7** At national supervisory discretion, banks using both the standardised and IRB approaches may rely on their internal methods for allocating general provisions for recognition in capital under either the standardised or IRB approach, subject to the following conditions. Where the internal allocation method is made available, the national supervisor will establish the standards surrounding their use. Banks will need to obtain prior approval from their supervisors to use an internal allocation method for this purpose.

Treatment of EL and provisions

- 35.8** As specified in [CAP10.19](#) and [CAP30.13](#), banks using the IRB approach must compare the total amount of total eligible provisions (as defined in [CRE35.4](#)) with the total EL amount as calculated within the IRB approach (as defined in [CRE35.2](#)). In addition, [CAP10.18](#) outlines the treatment for that portion of a bank that is subject to the standardised approach to credit risk when the bank uses both the standardised and IRB approaches.
- 35.9** Where the calculated EL amount is lower than the provisions of the bank, its supervisors must consider whether the EL fully reflects the conditions in the market in which it operates before allowing the difference to be included in Tier 2 capital. If specific provisions exceed the EL amount on defaulted assets this assessment also needs to be made before using the difference to offset the EL amount on non-defaulted assets.

35.10 The EL amount for equity exposures under the PD/LGD approach is risk-weighted at 1250%. Provisions or write-offs for equity exposures under the PD/LGD approach will not be used in the EL-provision calculation. The treatment of EL and provisions related to securitisation exposures is outlined in [CRE40.36](#).

CRE36

IRB approach: minimum requirements to use IRB approach

This chapter sets out the minimum requirements for banks to use the internal ratings-based approach, including requirements for initial adoption and for ongoing use.

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Introduction

36.1 This chapter presents the minimum requirements for entry and on-going use of the internal ratings-based (IRB) approach. The minimum requirements are set out in the following 12 sections:

- (1) Composition of minimum requirements
- (2) Compliance with minimum requirements
- (3) Rating system design
- (4) Risk rating system operations
- (5) Corporate governance and oversight
- (6) Use of internal ratings
- (7) Risk quantification
- (8) Validation of internal estimates
- (9) Supervisory loss-given-default (LGD) and exposure at default (EAD) estimates
- (10) Requirements for recognition of leasing
- (11) Calculation of capital charges for equity exposures
- (12) Disclosure requirements.

36.2 The minimum requirements in the sections that follow cut across asset classes. Therefore, more than one asset class may be discussed within the context of a given minimum requirement.

Section 1: composition of minimum requirements

36.3 To be eligible for the IRB approach a bank must demonstrate to its supervisor that it meets certain minimum requirements at the outset and on an ongoing basis. Many of these requirements are in the form of objectives that a qualifying bank's risk rating systems must fulfil. The focus is on banks' abilities to rank order and quantify risk in a consistent, reliable and valid fashion.

- 36.4** The overarching principle behind these requirements is that rating and risk estimation systems and processes provide for a meaningful assessment of borrower and transaction characteristics; a meaningful differentiation of risk; and reasonably accurate and consistent quantitative estimates of risk. Furthermore, the systems and processes must be consistent with internal use of these estimates. The Committee recognises that differences in markets, rating methodologies, banking products, and practices require banks and supervisors to customise their operational procedures. It is not the Committee's intention to dictate the form or operational detail of banks' risk management policies and practices. Each supervisor will develop detailed review procedures to ensure that banks' systems and controls are adequate to serve as the basis for the IRB approach.
- 36.5** The minimum requirements set out in this chapter apply to all asset classes unless noted otherwise. The standards related to the process of assigning exposures to borrower or facility grades (and the related oversight, validation, etc.) apply equally to the process of assigning retail exposures to pools of homogenous exposures, unless noted otherwise.
- 36.6** The minimum requirements set out in this chapter apply to both foundation and advanced approaches unless noted otherwise. Generally, all IRB banks must produce their own estimates of probability of default (PD)¹ and must adhere to the overall requirements for rating system design, operations, controls, and corporate governance, as well as the requisite requirements for estimation and validation of PD measures. Banks wishing to use their own estimates of LGD and EAD must also meet the incremental minimum requirements for these risk factors included in [CRE36.85](#) to [CRE36.107](#).

Footnotes

- ¹ *Banks are not required to produce their own estimates of PD for certain equity exposures and certain exposures that fall within the specialised lending (SL) sub-class.*

Section 2: compliance with minimum requirements

- 36.7** To be eligible for an IRB approach, a bank must demonstrate to its supervisor that it meets the IRB requirements in this document, at the outset and on an ongoing basis. Banks' overall credit risk management practices must also be consistent with the evolving sound practice guidelines issued by the Committee and national supervisors.

36.8

There may be circumstances when a bank is not in complete compliance with all the minimum requirements. Where this is the case, the bank must produce a plan for a timely return to compliance, and seek approval from its supervisor, or the bank must demonstrate that the effect of such non-compliance is immaterial in terms of the risk posed to the institution. Failure to produce an acceptable plan or satisfactorily implement the plan or to demonstrate immateriality will lead supervisors to reconsider the bank's eligibility for the IRB approach. Furthermore, for the duration of any non-compliance, supervisors will consider the need for the bank to hold additional capital under the supervisory review process ([SRP](#)) or take other appropriate supervisory action.

Section 3: rating system design

36.9 The term "rating system" comprises all of the methods, processes, controls, and data collection and IT systems that support the assessment of credit risk, the assignment of internal risk ratings, and the quantification of default and loss estimates.

36.10 Within each asset class, a bank may utilise multiple rating methodologies /systems. For example, a bank may have customised rating systems for specific industries or market segments (eg middle market, and large corporate). If a bank chooses to use multiple systems, the rationale for assigning a borrower to a rating system must be documented and applied in a manner that best reflects the level of risk of the borrower. Banks must not allocate borrowers across rating systems inappropriately to minimise regulatory capital requirements (ie cherry-picking by choice of rating system). Banks must demonstrate that each system used for IRB purposes is in compliance with the minimum requirements at the outset and on an ongoing basis.

Rating dimensions : standards for corporate, sovereign, and bank exposures

36.11 A qualifying IRB rating system must have two separate and distinct dimensions:

- (1) the risk of borrower default, and
- (2) transaction-specific factors.

- 36.12** The first dimension must be oriented to the risk of borrower default. Separate exposures to the same borrower must be assigned to the same borrower grade, irrespective of any differences in the nature of each specific transaction. There are two exceptions to this. Firstly, in the case of country transfer risk, where a bank may assign different borrower grades depending on whether the facility is denominated in local or foreign currency. Secondly, when the treatment of associated guarantees to a facility may be reflected in an adjusted borrower grade. In either case, separate exposures may result in multiple grades for the same borrower. A bank must articulate in its credit policy the relationship between borrower grades in terms of the level of risk each grade implies. Perceived and measured risk must increase as credit quality declines from one grade to the next. The policy must articulate the risk of each grade in terms of both a description of the probability of default risk typical for borrowers assigned the grade and the criteria used to distinguish that level of credit risk.
- 36.13** The second dimension must reflect transaction-specific factors, such as collateral, seniority, product type, etc. For foundation IRB banks, this requirement can be fulfilled by the existence of a facility dimension, which reflects both borrower and transaction-specific factors. For example, a rating dimension that reflects expected loss (EL) by incorporating both borrower strength (PD) and loss severity (LGD) considerations would qualify. Likewise a rating system that exclusively reflects LGD would qualify. Where a rating dimension reflects EL and does not separately quantify LGD, the supervisory estimates of LGD must be used.
- 36.14** For banks using the advanced approach, facility ratings must reflect exclusively LGD. These ratings can reflect any and all factors that can influence LGD including, but not limited to, the type of collateral, product, industry, and purpose. Borrower characteristics may be included as LGD rating criteria only to the extent they are predictive of LGD. Banks may alter the factors that influence facility grades across segments of the portfolio as long as they can satisfy their supervisor that it improves the relevance and precision of their estimates.
- 36.15** Banks using the supervisory slotting criteria for the SL sub-class are exempt from this two-dimensional requirement for these exposures. Given the interdependence between borrower/transaction characteristics in SL, banks may satisfy the requirements under this heading through a single rating dimension that reflects EL by incorporating both borrower strength (PD) and loss severity (LGD) considerations. This exemption does not apply to banks using either the general corporate foundation or advanced approach for the SL sub-class.

Rating dimensions: standards for retail exposures

36.16 Rating systems for retail exposures must be oriented to both borrower and transaction risk, and must capture all relevant borrower and transaction

characteristics. Banks must assign each exposure that falls within the definition of retail for IRB purposes into a particular pool. Banks must demonstrate that this process provides for a meaningful differentiation of risk, provides for a grouping of sufficiently homogenous exposures, and allows for accurate and consistent estimation of loss characteristics at pool level.

36.17 For each pool, banks must estimate PD, LGD, and EAD. Multiple pools may share identical PD, LGD and EAD estimates. At a minimum, banks should consider the following risk drivers when assigning exposures to a pool:

- (1) Borrower risk characteristics (eg borrower type, demographics such as age /occupation).
- (2) Transaction risk characteristics, including product and/or collateral types (eg loan to value measures, seasoning, guarantees; and seniority (first vs. second lien)). Banks must explicitly address crosscollateral provisions where present.
- (3) Delinquency of exposure: Banks are expected to separately identify exposures that are delinquent and those that are not.

Rating structure : standards for corporate, sovereign, and bank exposures

36.18 A bank must have a meaningful distribution of exposures across grades with no excessive concentrations, on both its borrower-rating and its facility-rating scales.

36.19 To meet this objective, a bank must have a minimum of seven borrower grades for non-defaulted borrowers and one for those that have defaulted. Banks with lending activities focused on a particular market segment may satisfy this requirement with the minimum number of grades.

36.20 A borrower grade is defined as an assessment of borrower risk on the basis of a specified and distinct set of rating criteria, from which estimates of PD are derived. The grade definition must include both a description of the degree of default risk typical for borrowers assigned the grade and the criteria used to distinguish that level of credit risk. Furthermore, "+" or "-" modifiers to alpha or numeric grades will only qualify as distinct grades if the bank has developed complete rating descriptions and criteria for their assignment, and separately quantifies PDs for these modified grades.

- 36.21** Banks with loan portfolios concentrated in a particular market segment and range of default risk must have enough grades within that range to avoid undue concentrations of borrowers in particular grades. Significant concentrations within a single grade or grades must be supported by convincing empirical evidence that the grade or grades cover reasonably narrow PD bands and that the default risk posed by all borrowers in a grade fall within that band.
- 36.22** There is no specific minimum number of facility grades for banks using the advanced approach for estimating LGD. A bank must have a sufficient number of facility grades to avoid grouping facilities with widely varying LGDs into a single grade. The criteria used to define facility grades must be grounded in empirical evidence.
- 36.23** Banks using the supervisory slotting criteria for the SL asset classes must have at least four grades for non-defaulted borrowers, and one for defaulted borrowers. The requirements for SL exposures that qualify for the corporate foundation and advanced approaches are the same as those for general corporate exposures.

Rating structure: standards for retail exposures

- 36.24** For each pool identified, the bank must be able to provide quantitative measures of loss characteristics (PD, LGD, and EAD) for that pool. The level of differentiation for IRB purposes must ensure that the number of exposures in a given pool is sufficient so as to allow for meaningful quantification and validation of the loss characteristics at the pool level. There must be a meaningful distribution of borrowers and exposures across pools. A single pool must not include an undue concentration of the bank's total retail exposure.

Rating criteria

- 36.25** A bank must have specific rating definitions, processes and criteria for assigning exposures to grades within a rating system. The rating definitions and criteria must be both plausible and intuitive and must result in a meaningful differentiation of risk.
- (1) The grade descriptions and criteria must be sufficiently detailed to allow those charged with assigning ratings to consistently assign the same grade to borrowers or facilities posing similar risk. This consistency should exist across lines of business, departments and geographic locations. If rating criteria and procedures differ for different types of borrowers or facilities, the bank must monitor for possible inconsistency, and must alter rating criteria to improve consistency when appropriate.

- (2) Written rating definitions must be clear and detailed enough to allow third parties to understand the assignment of ratings, such as internal audit or an equally independent function and supervisors, to replicate rating assignments and evaluate the appropriateness of the grade/pool assignments.
- (3) The criteria must also be consistent with the bank's internal lending standards and its policies for handling troubled borrowers and facilities.

36.26 To ensure that banks are consistently taking into account available information, they must use all relevant and material information in assigning ratings to borrowers and facilities. Information must be current. The less information a bank has, the more conservative must be its assignments of exposures to borrower and facility grades or pools. An external rating can be the primary factor determining an internal rating assignment; however, the bank must ensure that it considers other relevant information.

Rating criteria: exposures subject to the supervisory slotting approach

36.27 Banks using the supervisory slotting criteria for SL exposures must assign exposures to their internal rating grades based on their own criteria, systems and processes, subject to compliance with the requisite minimum requirements. Banks must then map these internal rating grades into the five supervisory rating categories. The slotting criteria tables in the supervisory slotting approach chapter ([CRE33](#)) provide, for each sub-class of SL exposures, the general assessment factors and characteristics exhibited by the exposures that fall under each of the supervisory categories. Each lending activity has a unique table describing the assessment factors and characteristics.

36.28 The Committee recognises that the criteria that banks use to assign exposures to internal grades will not perfectly align with criteria that define the supervisory categories; however, banks must demonstrate that their mapping process has resulted in an alignment of grades which is consistent with the preponderance of the characteristics in the respective supervisory category. Banks should take special care to ensure that any overrides of their internal criteria do not render the mapping process ineffective.

Rating assignment horizon

36.29 Although the time horizon used in PD estimation is one year (as described in [CRE36.64](#)), banks are expected to use a longer time horizon in assigning ratings.

36.30

A borrower rating must represent the bank's assessment of the borrower's ability and willingness to contractually perform despite adverse economic conditions or the occurrence of unexpected events. For example, a bank may base rating assignments on specific, appropriate stress scenarios. Alternatively, a bank may take into account borrower characteristics that are reflective of the borrower's vulnerability to adverse economic conditions or unexpected events, without explicitly specifying a stress scenario. The range of economic conditions that are considered when making assessments must be consistent with current conditions and those that are likely to occur over a business cycle within the respective industry/geographic region.

- 36.31** PD estimates for borrowers that are highly leveraged or for borrowers whose assets are predominantly traded assets must reflect the performance of the underlying assets based on periods of stressed volatilities.

FAQ

FAQ1 *How are highly leveraged borrowers to be defined (eg will non-financial entities be included in the definition)?*

The reference to highly leveraged borrowers is intended to capture hedge funds or any other equivalently highly leveraged counterparties that are financial entities.

FAQ2 *How should PDs of highly leveraged non-financial counterparties be estimated if there are no underlying traded assets or other assets with observable prices?*

[CRE36.31](#) elaborates on the sentence in [CRE36.30](#) that states "...a bank may take into account borrower characteristics that are reflective of the borrower's vulnerability to adverse economic conditions or unexpected events...". This means that in the case of highly leveraged counterparties where there is likely a significant vulnerability to market risk, the bank must assess the potential impact on the counterparty's ability to perform that arises from "periods of stressed volatilities" when assigning a rating and corresponding PD to that counterparty under the IRB framework.

- 36.32** Given the difficulties in forecasting future events and the influence they will have on a particular borrower's financial condition, a bank must take a conservative view of projected information. Furthermore, where limited data are available, a bank must adopt a conservative bias to its analysis.

Use of models

36.33 The requirements in this section apply to statistical models and other mechanical methods used to assign borrower or facility ratings or in estimation of PDs, LGDs, or EADs. Credit scoring models and other mechanical rating procedures generally use only a subset of available information. Although mechanical rating procedures may sometimes avoid some of the idiosyncratic errors made by rating systems in which human judgement plays a large role, mechanical use of limited information also is a source of rating errors. Credit scoring models and other mechanical procedures are permissible as the primary or partial basis of rating assignments, and may play a role in the estimation of loss characteristics. Sufficient human judgement and human oversight is necessary to ensure that all relevant and material information, including that which is outside the scope of the model, is also taken into consideration, and that the model is used appropriately.

- (1) The burden is on the bank to satisfy its supervisor that a model or procedure has good predictive power and that regulatory capital requirements will not be distorted as a result of its use. The variables that are input to the model must form a reasonable set of predictors. The model must be accurate on average across the range of borrowers or facilities to which the bank is exposed and there must be no known material biases.
- (2) The bank must have in place a process for vetting data inputs into a statistical default or loss prediction model which includes an assessment of the accuracy, completeness and appropriateness of the data specific to the assignment of an approved rating.
- (3) The bank must demonstrate that the data used to build the model are representative of the population of the bank's actual borrowers or facilities.
- (4) When combining model results with human judgement, the judgement must take into account all relevant and material information not considered by the model. The bank must have written guidance describing how human judgement and model results are to be combined.
- (5) The bank must have procedures for human review of model-based rating assignments. Such procedures should focus on finding and limiting errors associated with known model weaknesses and must also include credible ongoing efforts to improve the model's performance.
- (6) The bank must have a regular cycle of model validation that includes monitoring of model performance and stability; review of model relationships; and testing of model outputs against outcomes.

Documentation of rating system design

- 36.34** Banks must document in writing their rating systems' design and operational details. The documentation must evidence banks' compliance with the minimum standards, and must address topics such as portfolio differentiation, rating criteria, responsibilities of parties that rate borrowers and facilities, definition of what constitutes a rating exception, parties that have authority to approve exceptions, frequency of rating reviews, and management oversight of the rating process. A bank must document the rationale for its choice of internal rating criteria and must be able to provide analyses demonstrating that rating criteria and procedures are likely to result in ratings that meaningfully differentiate risk. Rating criteria and procedures must be periodically reviewed to determine whether they remain fully applicable to the current portfolio and to external conditions. In addition, a bank must document a history of major changes in the risk rating process, and such documentation must support identification of changes made to the risk rating process subsequent to the last supervisory review. The organisation of rating assignment, including the internal control structure, must also be documented.
- 36.35** Banks must document the specific definitions of default and loss used internally and demonstrate consistency with the reference definitions set out in [CRE36.69](#) to [CRE36.77](#).
- 36.36** If the bank employs statistical models in the rating process, the bank must document their methodologies. This material must:
- (1) Provide a detailed outline of the theory, assumptions and/or mathematical and empirical basis of the assignment of estimates to grades, individual obligors, exposures, or pools, and the data source(s) used to estimate the model;
 - (2) Establish a rigorous statistical process (including out-of-time and out-of-sample performance tests) for validating the model; and
 - (3) Indicate any circumstances under which the model does not work effectively.
- 36.37** Use of a model obtained from a third-party vendor that claims proprietary technology is not a justification for exemption from documentation or any other of the requirements for internal rating systems. The burden is on the model's vendor and the bank to satisfy supervisors.

Section 4: risk rating system operations

Coverage of ratings

- 36.38** For corporate, sovereign, and bank exposures, each borrower and all recognised guarantors must be assigned a rating and each exposure must be associated with a facility rating as part of the loan approval process. Similarly, for retail, each exposure must be assigned to a pool as part of the loan approval process.
- 36.39** Each separate legal entity to which the bank is exposed must be separately rated. A bank must have policies acceptable to its supervisor regarding the treatment of individual entities in a connected group including circumstances under which the same rating may or may not be assigned to some or all related entities. Those policies must include a process for the identification of specific wrong way risk for each legal entity to which the bank is exposed. Transactions with counterparties where specific wrong way risk has been identified need to be treated differently when calculating the EAD for such exposures (see [CRE53.48](#) of the counterparty credit risk chapters of the credit risk standard).

Integrity of rating process : standards for corporate, sovereign, and bank exposures

- 36.40** Rating assignments and periodic rating reviews must be completed or approved by a party that does not directly stand to benefit from the extension of credit. Independence of the rating assignment process can be achieved through a range of practices that will be carefully reviewed by supervisors. These operational processes must be documented in the bank's procedures and incorporated into bank policies. Credit policies and underwriting procedures must reinforce and foster the independence of the rating process.
- 36.41** Borrowers and facilities must have their ratings refreshed at least on an annual basis. Certain credits, especially higher risk borrowers or problem exposures, must be subject to more frequent review. In addition, banks must initiate a new rating if material information on the borrower or facility comes to light.
- 36.42** The bank must have an effective process to obtain and update relevant and material information on the borrower's financial condition, and on facility characteristics that affect LGDs and EADs (such as the condition of collateral). Upon receipt, the bank needs to have a procedure to update the borrower's rating in a timely fashion.

Integrity of rating process: standards for retail exposures

36.43

A bank must review the loss characteristics and delinquency status of each identified risk pool on at least an annual basis. It must also review the status of individual borrowers within each pool as a means of ensuring that exposures continue to be assigned to the correct pool. This requirement may be satisfied by review of a representative sample of exposures in the pool.

Overrides

36.44 For rating assignments based on expert judgement, banks must clearly articulate the situations in which bank officers may override the outputs of the rating process, including how and to what extent such overrides can be used and by whom. For model-based ratings, the bank must have guidelines and processes for monitoring cases where human judgement has overridden the model's rating, variables were excluded or inputs were altered. These guidelines must include identifying personnel that are responsible for approving these overrides. Banks must identify overrides and separately track their performance.

Data maintenance

36.45 A bank must collect and store data on key borrower and facility characteristics to provide effective support to its internal credit risk measurement and management process, to enable the bank to meet the other requirements in this document, and to serve as a basis for supervisory reporting. These data should be sufficiently detailed to allow retrospective re-allocation of obligors and facilities to grades, for example if increasing sophistication of the internal rating system suggests that finer segregation of portfolios can be achieved. Furthermore, banks must collect and retain data on aspects of their internal ratings as required by the disclosure requirements standard ([DIS](#)).

Data maintenance: for corporate, sovereign, and bank exposures

36.46 Banks must maintain rating histories on borrowers and recognised guarantors, including the rating since the borrower/guarantor was assigned an internal grade, the dates the ratings were assigned, the methodology and key data used to derive the rating and the person/model responsible. The identity of borrowers and facilities that default, and the timing and circumstances of such defaults, must be retained. Banks must also retain data on the PDs and realised default rates associated with rating grades and ratings migration in order to track the predictive power of the borrower rating system.

- 36.47** Banks using the advanced IRB approach must also collect and store a complete history of data on the LGD and EAD estimates associated with each facility and the key data used to derive the estimate and the person/model responsible. Banks must also collect data on the estimated and realised LGDs and EADs associated with each defaulted facility. Banks that reflect the credit risk mitigating effects of guarantees/credit derivatives through LGD must retain data on the LGD of the facility before and after evaluation of the effects of the guarantee/credit derivative. Information about the components of loss or recovery for each defaulted exposure must be retained, such as amounts recovered, source of recovery (eg collateral, liquidation proceeds and guarantees), time period required for recovery, and administrative costs.
- 36.48** Banks under the foundation approach which utilise supervisory estimates are encouraged to retain the relevant data (ie data on loss and recovery experience for corporate exposures under the foundation approach, data on realised losses for banks using the supervisory slotting criteria).

Data maintenance: for retail exposures

- 36.49** Banks must retain data used in the process of allocating exposures to pools, including data on borrower and transaction risk characteristics used either directly or through use of a model, as well as data on delinquency. Banks must also retain data on the estimated PDs, LGDs and EADs, associated with pools of exposures. For defaulted exposures, banks must retain the data on the pools to which the exposure was assigned over the year prior to default and the realised outcomes on LGD and EAD.

Stress tests used in assessment of capital adequacy

- 36.50** An IRB bank must have in place sound stress testing processes for use in the assessment of capital adequacy. Stress testing must involve identifying possible events or future changes in economic conditions that could have unfavourable effects on a bank's credit exposures and assessment of the bank's ability to withstand such changes. Examples of scenarios that could be used are:
- (1) economic or industry downturns;
 - (2) market-risk events; and
 - (3) liquidity conditions.

- 36.51** In addition to the more general tests described above, the bank must perform a credit risk stress test to assess the effect of certain specific conditions on its IRB regulatory capital requirements. The test to be employed would be one chosen by the bank, subject to supervisory review. The test to be employed must be meaningful and reasonably conservative. Individual banks may develop different approaches to undertaking this stress test requirement, depending on their circumstances. For this purpose, the objective is not to require banks to consider worst-case scenarios. The bank's stress test in this context should, however, consider at least the effect of mild recession scenarios. In this case, one example might be to use two consecutive quarters of zero growth to assess the effect on the bank's PDs, LGDs and EADs, taking account — on a conservative basis — of the bank's international diversification.
- 36.52** Banks using the double default framework must consider as part of their stress testing framework the impact of a deterioration in the credit quality of protection providers, in particular the impact of protection providers falling outside the eligibility criteria due to rating changes. Banks should also consider the impact of the default of one but not both of the obligor and protection provider, and the consequent increase in risk and capital requirements at the time of that default.
- 36.53** Whatever method is used, the bank must include a consideration of the following sources of information. First, a bank's own data should allow estimation of the ratings migration of at least some of its exposures. Second, banks should consider information about the impact of smaller deterioration in the credit environment on a bank's ratings, giving some information on the likely effect of bigger, stress circumstances. Third, banks should evaluate evidence of ratings migration in external ratings. This would include the bank broadly matching its buckets to rating categories.
- 36.54** National supervisors may wish to issue guidance to their banks on how the tests to be used for this purpose should be designed, bearing in mind conditions in their jurisdiction. The results of the stress test may indicate no difference in the capital calculated under the IRB rules described in this section of this Framework if the bank already uses such an approach for its internal rating purposes. Where a bank operates in several markets, it does not need to test for such conditions in all of those markets, but a bank should stress portfolios containing the vast majority of its total exposures.

Section 5: corporate governance and oversight

Corporate governance

36.55

All material aspects of the rating and estimation processes must be approved by the bank's board of directors or a designated committee thereof and senior management.² These parties must possess a general understanding of the bank's risk rating system and detailed comprehension of its associated management reports. Senior management must provide notice to the board of directors or a designated committee thereof of material changes or exceptions from established policies that will materially impact the operations of the bank's rating system.

Footnotes

² *This standard refers to a management structure composed of a board of directors and senior management. The Committee is aware that there are significant differences in legislative and regulatory frameworks across countries as regards the functions of the board of directors and senior management. In some countries, the board has the main, if not exclusive, function of supervising the executive body (senior management, general management) so as to ensure that the latter fulfils its tasks. For this reason, in some cases, it is known as a supervisory board. This means that the board has no executive functions. In other countries, by contrast, the board has a broader competence in that it lays down the general framework for the management of the bank. Owing to these differences, the notions of the board of directors and senior management are used in this paper not to identify legal constructs but rather to label two decision-making functions within a bank.*

36.56 Senior management also must have a good understanding of the rating system's design and operation, and must approve material differences between established procedure and actual practice. Management must also ensure, on an ongoing basis, that the rating system is operating properly. Management and staff in the credit control function must meet regularly to discuss the performance of the rating process, areas needing improvement, and the status of efforts to improve previously identified deficiencies.

36.57 Internal ratings must be an essential part of the reporting to these parties. Reporting must include risk profile by grade, migration across grades, estimation of the relevant parameters per grade, and comparison of realised default rates (and LGDs and EADs for banks on advanced approaches) against expectations. Reporting frequencies may vary with the significance and type of information and the level of the recipient.

Credit risk control

36.58 Banks must have independent credit risk control units that are responsible for the design or selection, implementation and performance of their internal rating systems. The unit(s) must be functionally independent from the personnel and management functions responsible for originating exposures. Areas of responsibility must include:

- (1) Testing and monitoring internal grades;
- (2) Production and analysis of summary reports from the bank's rating system, to include historical default data sorted by rating at the time of default and one year prior to default, grade migration analyses, and monitoring of trends in key rating criteria;
- (3) Implementing procedures to verify that rating definitions are consistently applied across departments and geographic areas;
- (4) Reviewing and documenting any changes to the rating process, including the reasons for the changes; and
- (5) Reviewing the rating criteria to evaluate if they remain predictive of risk. Changes to the rating process, criteria or individual rating parameters must be documented and retained for supervisors to review.

36.59 A credit risk control unit must actively participate in the development, selection, implementation and validation of rating models. It must assume oversight and supervision responsibilities for any models used in the rating process, and ultimate responsibility for the ongoing review and alterations to rating models.

Internal and external audit

36.60 Internal audit or an equally independent function must review at least annually the bank's rating system and its operations, including the operations of the credit function and the estimation of PDs, LGDs and EADs. Areas of review include adherence to all applicable minimum requirements. Internal audit must document its findings.

Section 6: use of internal ratings

- 36.61** Internal ratings and default and loss estimates must play an essential role in the credit approval, risk management, internal capital allocations, and corporate governance functions of banks using the IRB approach. Ratings systems and estimates designed and implemented exclusively for the purpose of qualifying for the IRB approach and used only to provide IRB inputs are not acceptable. It is recognised that banks will not necessarily be using exactly the same estimates for both IRB and all internal purposes. For example, pricing models are likely to use PDs and LGDs relevant to the life of the asset. Where there are such differences, a bank must document them and demonstrate their reasonableness to the supervisor.
- 36.62** A bank must have a credible track record in the use of internal ratings information. Thus, the bank must demonstrate that it has been using a rating system that was broadly in line with the minimum requirements articulated in this document for at least the three years prior to qualification. A bank using the advanced IRB approach must demonstrate that it has been estimating and employing LGDs and EADs in a manner that is broadly consistent with the minimum requirements for use of own estimates of LGDs and EADs for at least the three years prior to qualification. Improvements to a bank's rating system will not render a bank non-compliant with the three-year requirement.

Section 7: risk quantification

Overall requirements for estimation (structure and intent)

- 36.63** This section addresses the broad standards for own-estimates of PD, LGD, and EAD. Generally, all banks using the IRB approaches must estimate a PD³ for each internal borrower grade for corporate, sovereign and bank exposures or for each pool in the case of retail exposures.

Footnotes

- ³ Banks are not required to produce their own estimates of PD for certain equity exposures and certain exposures that fall within the SL sub-classes.

- 36.64** PD estimates must be a long-run average of one-year default rates for borrowers in the grade, with the exception of retail exposures (see below). Requirements specific to PD estimation are provided in [CRE36.78](#) to [CRE36.84](#). Banks on the advanced approach must estimate an appropriate LGD (as defined in [CRE36.85](#) to [CRE36.90](#)) for each of its facilities (or retail pools). Banks on the advanced approach must also estimate an appropriate long-run default-weighted average EAD for each of its facilities as defined in [CRE36.91](#) and [CRE36.92](#). Requirements specific to EAD estimation appear in [CRE36.91](#) to [CRE36.97](#). For corporate, sovereign and bank exposures, banks that do not meet the requirements for own-estimates of EAD or LGD, above, must use the supervisory estimates of these parameters. Standards for use of such estimates are set out in [CRE36.124](#) to [CRE36.142](#).
- 36.65** Internal estimates of PD, LGD, and EAD must incorporate all relevant, material and available data, information and methods. A bank may utilise internal data and data from external sources (including pooled data). Where internal or external data is used, the bank must demonstrate that its estimates are representative of long run experience.
- 36.66** Estimates must be grounded in historical experience and empirical evidence, and not based purely on subjective or judgmental considerations. Any changes in lending practice or the process for pursuing recoveries over the observation period must be taken into account. A bank's estimates must promptly reflect the implications of technical advances and new data and other information, as it becomes available. Banks must review their estimates on a yearly basis or more frequently.
- 36.67** The population of exposures represented in the data used for estimation, and lending standards in use when the data were generated, and other relevant characteristics should be closely matched to or at least comparable with those of the bank's exposures and standards. The bank must also demonstrate that economic or market conditions that underlie the data are relevant to current and foreseeable conditions. For estimates of LGD and EAD, banks must take into account [CRE36.85](#) to [CRE36.97](#). The number of exposures in the sample and the data period used for quantification must be sufficient to provide the bank with confidence in the accuracy and robustness of its estimates. The estimation technique must perform well in out-of-sample tests.

36.68 In general, estimates of PDs, LGDs, and EADs are likely to involve unpredictable errors. In order to avoid over-optimism, a bank must add to its estimates a margin of conservatism that is related to the likely range of errors. Where methods and data are less satisfactory and the likely range of errors is larger, the margin of conservatism must be larger. Supervisors may allow some flexibility in application of the required standards for data that are collected prior to the date of implementation of this Framework. However, in such cases banks must demonstrate to their supervisors that appropriate adjustments have been made to achieve broad equivalence to the data without such flexibility. Data collected beyond the date of implementation must conform to the minimum standards unless otherwise stated.

Definition of default

36.69 A default is considered to have occurred with regard to a particular obligor when either or both of the two following events have taken place.

- (1) The bank considers that the obligor is unlikely to pay its credit obligations to the banking group in full, without recourse by the bank to actions such as realising security (if held).
- (2) The obligor is past due more than 90 days on any material credit obligation to the banking group.⁴ Overdrafts will be considered as being past due once the customer has breached an advised limit or been advised of a limit smaller than current outstandings.

Footnotes

⁴ *In the case of retail and public sector entity obligations, for the 90 days figure, a supervisor may substitute a figure up to 180 days for different products, as it considers appropriate to local conditions.*

36.70 The elements to be taken as indications of unlikelihood to pay include:

- (1) The bank puts the credit obligation on non-accrued status.
- (2) The bank makes a charge-off or account-specific provision resulting from a significant perceived decline in credit quality subsequent to the bank taking on the exposure.⁵
- (3) The bank sells the credit obligation at a material credit-related economic loss.

- (4) The bank consents to a distressed restructuring of the credit obligation where this is likely to result in a diminished financial obligation caused by the material forgiveness, or postponement, of principal, interest or (where relevant) fees.⁶
- (5) The bank has filed for the obligor's bankruptcy or a similar order in respect of the obligor's credit obligation to the banking group.
- (6) The obligor has sought or has been placed in bankruptcy or similar protection where this would avoid or delay repayment of the credit obligation to the banking group.

Footnotes

⁵ *In some jurisdictions, specific provisions on equity exposures are set aside for price risk and do not signal default.*

⁶ *Including, in the case of equity holdings assessed under a PD/LGD approach, such distressed restructuring of the equity itself.*

36.71 National supervisors will provide appropriate guidance as to how these elements must be implemented and monitored.

36.72 For retail exposures, the definition of default can be applied at the level of a particular facility, rather than at the level of the obligor. As such, default by a borrower on one obligation does not require a bank to treat all other obligations to the banking group as defaulted.

36.73 A bank must record actual defaults on IRB exposure classes using this reference definition. A bank must also use the reference definition for its estimation of PDs, and (where relevant) LGDs and EADs. In arriving at these estimations, a bank may use external data available to it that is not itself consistent with that definition, subject to the requirements set out in [CRE36.79](#). However, in such cases, banks must demonstrate to their supervisors that appropriate adjustments to the data have been made to achieve broad equivalence with the reference definition. This same condition would apply to any internal data used up to implementation of this Framework. Internal data (including that pooled by banks) used in such estimates beyond the date of implementation of this Framework must be consistent with the reference definition.

36.74 If the bank considers that a previously defaulted exposure's status is such that no trigger of the reference definition any longer applies, the bank must rate the

borrower and estimate LGD as they would for a non-defaulted facility. Should the reference definition subsequently be triggered, a second default would be deemed to have occurred.

Re-ageing

36.75 The bank must have clearly articulated and documented policies in respect of the counting of days past due, in particular in respect of the re-ageing of the facilities and the granting of extensions, deferrals, renewals and rewrites to existing accounts. At a minimum, the re-ageing policy must include: (a) approval authorities and reporting requirements; (b) minimum age of a facility before it is eligible for re-ageing; (c) delinquency levels of facilities that are eligible for re-ageing; (d) maximum number of re-ageings per facility; and (e) a reassessment of the borrower's capacity to repay. These policies must be applied consistently over time, and must support the 'use test' (ie if a bank treats a re-aged exposure in a similar fashion to other delinquent exposures more than the past-due cut off point, this exposure must be recorded as in default for IRB purposes).

Treatment of overdrafts

36.76 Authorised overdrafts must be subject to a credit limit set by the bank and brought to the knowledge of the client. Any break of this limit must be monitored; if the account were not brought under the limit after 90 to 180 days (subject to the applicable past-due trigger), it would be considered as defaulted. Non-authorised overdrafts will be associated with a zero limit for IRB purposes. Thus, days past due commence once any credit is granted to an unauthorised customer; if such credit were not repaid within 90 to 180 days, the exposure would be considered in default. Banks must have in place rigorous internal policies for assessing the creditworthiness of customers who are offered overdraft accounts.

Definition of loss for all asset classes

36.77 The definition of loss used in estimating LGD is economic loss. When measuring economic loss, all relevant factors should be taken into account. This must include material discount effects and material direct and indirect costs associated with collecting on the exposure. Banks must not simply measure the loss recorded in accounting records, although they must be able to compare accounting and economic losses. The bank's own workout and collection expertise significantly influences their recovery rates and must be reflected in their LGD estimates, but adjustments to estimates for such expertise must be conservative until the bank has sufficient internal empirical evidence of the impact of its expertise.

Requirements specific to PD estimation : corporate, sovereign, and bank exposures

36.78 Banks must use information and techniques that take appropriate account of the long-run experience when estimating the average PD for each rating grade. For example, banks may use one or more of the three specific techniques set out below: internal default experience, mapping to external data, and statistical default models.

36.79 Banks may have a primary technique and use others as a point of comparison and potential adjustment. Supervisors will not be satisfied by mechanical application of a technique without supporting analysis. Banks must recognise the importance of judgmental considerations in combining results of techniques and in making adjustments for limitations of techniques and information.

- (1) A bank may use data on internal default experience for the estimation of PD. A bank must demonstrate in its analysis that the estimates are reflective of underwriting standards and of any differences in the rating system that generated the data and the current rating system. Where only limited data are available, or where underwriting standards or rating systems have changed, the bank must add a greater margin of conservatism in its estimate of PD. The use of pooled data across institutions may also be recognised. A bank must demonstrate that the internal rating systems and criteria of other banks in the pool are comparable with its own.

- (2) Banks may associate or map their internal grades to the scale used by an external credit assessment institution or similar institution and then attribute the default rate observed for the external institution's grades to the bank's grades. Mappings must be based on a comparison of internal rating criteria to the criteria used by the external institution and on a comparison of the internal and external ratings of any common borrowers. Biases or inconsistencies in the mapping approach or underlying data must be avoided. The external institution's criteria underlying the data used for quantification must be oriented to the risk of the borrower and not reflect transaction characteristics. The bank's analysis must include a comparison of the default definitions used, subject to the requirements in [CRE36.69](#) to [CRE36.74](#). The bank must document the basis for the mapping.
- (3) A bank is allowed to use a simple average of default-probability estimates for individual borrowers in a given grade, where such estimates are drawn from statistical default prediction models. The bank's use of default probability models for this purpose must meet the standards specified in [CRE36.33](#).

36.80 Irrespective of whether a bank is using external, internal, or pooled data sources, or a combination of the three, for its PD estimation, the length of the underlying historical observation period used must be at least five years for at least one source. If the available observation period spans a longer period for any source, and this data are relevant and material, this longer period must be used.

Requirements specific to PD estimation: retail exposures

36.81 Given the bank-specific basis of assigning exposures to pools, banks must regard internal data as the primary source of information for estimating loss characteristics. Banks are permitted to use external data or statistical models for quantification provided a strong link can be demonstrated between (a) the bank's process of assigning exposures to a pool and the process used by the external data source, and (b) between the bank's internal risk profile and the composition of the external data. In all cases banks must use all relevant and material data sources as points of comparison.

36.82 One method for deriving long-run average estimates of PD and default-weighted average loss rates given default (as defined in [CRE36.85](#)) for retail would be based on an estimate of the expected long-run loss rate. A bank may (i) use an appropriate PD estimate to infer the long-run default-weighted average loss rate given default, or (ii) use a long-run default-weighted average loss rate given default to infer the appropriate PD. In either case, it is important to recognise that

the LGD used for the IRB capital calculation cannot be less than the long-run default-weighted average loss rate given default and must be consistent with the concepts defined in [CRE36.85](#).

36.83 Irrespective of whether banks are using external, internal, pooled data sources, or a combination of the three, for their estimation of loss characteristics, the length of the underlying historical observation period used must be at least five years. If the available observation spans a longer period for any source, and these data are relevant, this longer period must be used. A bank need not give equal importance to historic data if it can convince its supervisor that more recent data are a better predictor of loss rates.

36.84 The Committee recognises that seasoning can be quite material for some long-term retail exposures characterised by seasoning effects that peak several years after origination. Banks should anticipate the implications of rapid exposure growth and take steps to ensure that their estimation techniques are accurate, and that their current capital level and earnings and funding prospects are adequate to cover their future capital needs. In order to avoid gyrations in their required capital positions arising from short-term PD horizons, banks are also encouraged to adjust PD estimates upward for anticipated seasoning effects, provided such adjustments are applied in a consistent fashion over time. Within some jurisdictions, such adjustments might be made mandatory, subject to supervisory discretion.

Requirements specific to own-LGD estimates: standards for all asset classes

- 36.85** A bank must estimate an LGD for each facility that aims to reflect economic downturn conditions where necessary to capture the relevant risks. This LGD cannot be less than the long-run default-weighted average loss rate given default calculated based on the average economic loss of all observed defaults within the data source for that type of facility. In addition, a bank must take into account the potential for the LGD of the facility to be higher than the default-weighted average during a period when credit losses are substantially higher than average. For certain types of exposures, loss severities may not exhibit such cyclical variability and LGD estimates may not differ materially (or possibly at all) from the long-run default-weighted average. However, for other exposures, this cyclical variability in loss severities may be important and banks will need to incorporate it into their LGD estimates. For this purpose, banks may use averages of loss severities observed during periods of high credit losses, forecasts based on appropriately conservative assumptions, or other similar methods. Appropriate estimates of LGD during periods of high credit losses might be formed using either internal and/or external data. Supervisors will continue to monitor and encourage the development of appropriate approaches to this issue.
- 36.86** In its analysis, the bank must consider the extent of any dependence between the risk of the borrower and that of the collateral or collateral provider. Cases where there is a significant degree of dependence must be addressed in a conservative manner. Any currency mismatch between the underlying obligation and the collateral must also be considered and treated conservatively in the bank's assessment of LGD.
- 36.87** LGD estimates must be grounded in historical recovery rates and, when applicable, must not solely be based on the collateral's estimated market value. This requirement recognises the potential inability of banks to gain both control of their collateral and liquidate it expeditiously. To the extent, that LGD estimates take into account the existence of collateral, banks must establish internal requirements for collateral management, operational procedures, legal certainty and risk management process that are generally consistent with those required for the standardised approach.

36.88 Recognising the principle that realised losses can at times systematically exceed expected levels, the LGD assigned to a defaulted asset should reflect the possibility that the bank would have to recognise additional, unexpected losses during the recovery period. For each defaulted asset, the bank must also construct its best estimate of the expected loss on that asset based on current economic circumstances and facility status. The amount, if any, by which the LGD on a defaulted asset exceeds the bank's best estimate of expected loss on the asset represents the capital requirement for that asset, and should be set by the bank on a risk-sensitive basis in accordance with [CRE31.7](#), [CRE31.20](#), [CRE31.22](#)

and [CRE31.24](#). Instances where the best estimate of expected loss on a defaulted asset is less than the sum of specific provisions and partial charge-offs on that asset will attract supervisory scrutiny and must be justified by the bank.

Requirements specific to own-LGD estimates: additional standards for corporate, sovereign, and bank exposures

36.89 Estimates of LGD must be based on a minimum data observation period that should ideally cover at least one complete economic cycle but must in any case be no shorter than a period of seven years for at least one source. If the available observation period spans a longer period for any source, and the data are relevant, this longer period must be used.

Requirements specific to own-LGD estimates: additional standards for retail exposures

36.90 The minimum data observation period for LGD estimates for retail exposures is five years. The less data a bank has, the more conservative it must be in its estimation. A bank need not give equal importance to historic data if it can demonstrate to its supervisor that more recent data are a better predictor of loss rates.

Requirements specific to own-EAD estimates : standards for all asset classes

36.91 EAD for an on-balance sheet or off-balance sheet item is defined as the expected gross exposure of the facility upon default of the obligor. For on-balance sheet items, banks must estimate EAD at no less than the current drawn amount, subject to recognising the effects of on-balance sheet netting as specified in the foundation approach. The minimum requirements for the recognition of netting are the same as those under the foundation approach. The additional minimum requirements for internal estimation of EAD under the advanced approach,

therefore, focus on the estimation of EAD for off-balance sheet items (excluding transactions that expose banks to counterparty credit risk as set out in [CRE51](#)). Advanced approach banks must have established procedures in place for the estimation of EAD for off-balance sheet items. These must specify the estimates of EAD to be used for each facility type. Banks' estimates of EAD should reflect the possibility of additional drawings by the borrower up to and after the time a default event is triggered. Where estimates of EAD differ by facility type, the delineation of these facilities must be clear and unambiguous.

36.92 Under the advanced approach, banks must assign an estimate of EAD for each facility. It must be an estimate of the long-run default-weighted average EAD for similar facilities and borrowers over a sufficiently long period of time, but with a margin of conservatism appropriate to the likely range of errors in the estimate. If a positive correlation can reasonably be expected between the default frequency and the magnitude of EAD, the EAD estimate must incorporate a larger margin of conservatism. Moreover, for exposures for which EAD estimates are volatile over the economic cycle, the bank must use EAD estimates that are appropriate for an economic downturn, if these are more conservative than the long-run average. For banks that have been able to develop their own EAD models, this could be achieved by considering the cyclical nature, if any, of the drivers of such models. Other banks may have sufficient internal data to examine the impact of previous recession(s). However, some banks may only have the option of making conservative use of external data.

36.93 The criteria by which estimates of EAD are derived must be plausible and intuitive, and represent what the bank believes to be the material drivers of EAD. The choices must be supported by credible internal analysis by the bank. The bank must be able to provide a breakdown of its EAD experience by the factors it sees as the drivers of EAD. A bank must use all relevant and material information in its derivation of EAD estimates. Across facility types, a bank must review its estimates of EAD when material new information comes to light and at least on an annual basis.

36.94 Due consideration must be paid by the bank to its specific policies and strategies adopted in respect of account monitoring and payment processing. The bank must also consider its ability and willingness to prevent further drawings in circumstances short of payment default, such as covenant violations or other technical default events. Banks must also have adequate systems and procedures in place to monitor facility amounts, current outstandings against committed lines and changes in outstandings per borrower and per grade. The bank must be able to monitor outstanding balances on a daily basis.

36.95 For transactions that expose banks to counterparty credit risk, estimates of EAD must fulfil the requirements set forth in the counterparty credit risk chapters [CRE50](#) to [CRE55](#).

Requirements specific to own-EAD estimates: additional standards for corporate, sovereign and bank exposures

36.96 Estimates of EAD must be based on a time period that must ideally cover a complete economic cycle but must in any case be no shorter than a period of seven years. If the available observation period spans a longer period for any source, and the data are relevant, this longer period must be used. EAD estimates must be calculated using a default-weighted average and not a time-weighted average.

Requirements specific to own-EAD estimates: additional standards for retail exposures

36.97 The minimum data observation period for EAD estimates for retail exposures is five years. The less data a bank has, the more conservative it must be in its estimation. A bank need not give equal importance to historic data if it can demonstrate to its supervisor that more recent data are a better predictor of drawdowns.

Requirements for assessing effect of guarantees: standards for corporate, sovereign, and bank exposures where own estimates of LGD are used and standards for retail exposures

36.98 When a bank uses its own estimates of LGD, it may reflect the risk-mitigating effect of guarantees through an adjustment to PD or LGD estimates. The option to adjust LGDs is available only to those banks that have been approved to use their own internal estimates of LGD. For retail exposures, where guarantees exist, either in support of an individual obligation or a pool of exposures, a bank may reflect the risk-reducing effect either through its estimates of PD or LGD,

provided this is done consistently. In adopting one or the other technique, a bank must adopt a consistent approach, both across types of guarantees and over time.

36.99 In all cases, both the borrower and all recognised guarantors must be assigned a borrower rating at the outset and on an ongoing basis. A bank must follow all minimum requirements for assigning borrower ratings set out in this document, including the regular monitoring of the guarantor's condition and ability and willingness to honour its obligations. Consistent with the requirements in [CRE36.46](#) and [CRE36.47](#), a bank must retain all relevant information on the borrower absent the guarantee and the guarantor. In the case of retail guarantees, these requirements also apply to the assignment of an exposure to a pool, and the estimation of PD.

36.100 In no case can the bank assign the guaranteed exposure an adjusted PD or LGD such that the adjusted risk weight would be lower than that of a comparable, direct exposure to the guarantor. Neither criteria nor rating processes are permitted to consider possible favourable effects of imperfect expected correlation between default events for the borrower and guarantor for purposes of regulatory minimum capital requirements. As such, the adjusted risk weight must not reflect the risk mitigation of "double default."

36.101 There are no restrictions on the types of eligible guarantors. The bank must, however, have clearly specified criteria for the types of guarantors it will recognise for regulatory capital purposes.

36.102 The guarantee must be evidenced in writing, non-cancellable on the part of the guarantor, in force until the debt is satisfied in full (to the extent of the amount and tenor of the guarantee) and legally enforceable against the guarantor in a jurisdiction where the guarantor has assets to attach and enforce a judgement. However, in contrast to the foundation approach to corporate, bank, and sovereign exposures, guarantees prescribing conditions under which the guarantor may not be obliged to perform (conditional guarantees) may be recognised under certain conditions. Specifically, the onus is on the bank to demonstrate that the assignment criteria adequately address any potential reduction in the risk mitigation effect.

36.103 A bank must have clearly specified criteria for adjusting borrower grades or LGD estimates (or in the case of retail and eligible purchased receivables, the process of allocating exposures to pools) to reflect the impact of guarantees for regulatory capital purposes. These criteria must be as detailed as the criteria for assigning exposures to grades consistent with [CRE36.25](#) and [CRE36.26](#), and must follow all minimum requirements for assigning borrower or facility ratings set out in this document.

36.104 The criteria must be plausible and intuitive, and must address the guarantor's ability and willingness to perform under the guarantee. The criteria must also address the likely timing of any payments and the degree to which the guarantor's ability to perform under the guarantee is correlated with the borrower's ability to repay. The bank's criteria must also consider the extent to which residual risk to the borrower remains, for example a currency mismatch between the guarantee and the underlying exposure.

36.105 In adjusting borrower grades or LGD estimates (or in the case of retail and eligible purchased receivables, the process of allocating exposures to pools), banks must take all relevant available information into account.

Requirements for assessing effect of credit derivatives: standards for corporate, sovereign, and bank exposures where own estimates of LGD are used and standards for retail exposures

36.106 The minimum requirements for guarantees are relevant also for single-name credit derivatives. Additional considerations arise in respect of asset mismatches. The criteria used for assigning adjusted borrower grades or LGD estimates (or pools) for exposures hedged with credit derivatives must require that the asset on which the protection is based (the reference asset) cannot be different from the underlying asset, unless the conditions outlined in the foundation approach are met.

36.107 In addition, the criteria must address the payout structure of the credit derivative and conservatively assess the impact this has on the level and timing of recoveries. The bank must also consider the extent to which other forms of residual risk remain.

Requirements for assessing effect of guarantees and credit derivatives: standards for banks using foundation LGD estimates

36.108 The minimum requirements outlined in [CRE36.98](#) to [CRE36.107](#) apply to banks using the foundation LGD estimates with the following exceptions:

- (1) The bank is not able to use an 'LGD-adjustment' option; and
- (2) The range of eligible guarantees and guarantors is limited to those outlined in [CRE32.21](#).

Requirements specific to estimating PD and LGD (or EL) for qualifying purchased receivables

36.109The following minimum requirements for risk quantification must be satisfied for any purchased receivables (corporate or retail) making use of the top-down treatment of default risk and/or the IRB treatments of dilution risk.

36.110The purchasing bank will be required to group the receivables into sufficiently homogeneous pools so that accurate and consistent estimates of PD and LGD (or EL) for default losses and EL estimates of dilution losses can be determined. In general, the risk bucketing process will reflect the seller's underwriting practices and the heterogeneity of its customers. In addition, methods and data for estimating PD, LGD, and EL must comply with the existing risk quantification standards for retail exposures. In particular, quantification should reflect all information available to the purchasing bank regarding the quality of the underlying receivables, including data for similar pools provided by the seller, by the purchasing bank, or by external sources. The purchasing bank must determine whether the data provided by the seller are consistent with expectations agreed upon by both parties concerning, for example, the type, volume and on-going quality of receivables purchased. Where this is not the case, the purchasing bank is expected to obtain and rely upon more relevant data.

36.111A bank purchasing receivables has to justify confidence that current and future advances can be repaid from the liquidation of (or collections against) the receivables pool. To qualify for the top-down treatment of default risk, the receivable pool and overall lending relationship should be closely monitored and controlled. Specifically, a bank will have to demonstrate the following:

- (1) Legal certainty (see [CRE36.112](#)).
- (2) Effectiveness of monitoring systems (see [CRE36.113](#))
- (3) Effectiveness of work-out systems (see [CRE36.114](#))
- (4) Effectiveness of systems for controlling collateral, credit availability, and cash (see [CRE36.115](#))
- (5) Compliance with the bank's internal policies and procedures (see [CRE36.116](#) and [CRE36.117](#))

36.112 Legal certainty: the structure of the facility must ensure that under all foreseeable circumstances the bank has effective ownership and control of the cash remittances from the receivables, including incidences of seller or servicer distress and bankruptcy. When the obligor makes payments directly to a seller or servicer, the bank must verify regularly that payments are forwarded completely and within the contractually agreed terms. As well, ownership over the receivables and cash receipts should be protected against bankruptcy 'stays' or legal challenges that could materially delay the lender's ability to liquidate/assign the receivables or retain control over cash receipts.

36.113 Effectiveness of monitoring systems: the bank must be able to monitor both the quality of the receivables and the financial condition of the seller and servicer. In particular:

(1) The bank must:

- (a) assess the correlation among the quality of the receivables and the financial condition of both the seller and servicer; and
- (b) have in place internal policies and procedures that provide adequate safeguards to protect against such contingencies, including the assignment of an internal risk rating for each seller and servicer.

(2) The bank must have clear and effective policies and procedures for determining seller and servicer eligibility. The bank or its agent must conduct periodic reviews of sellers and servicers in order to verify the accuracy of reports from the seller/servicer, detect fraud or operational weaknesses, and verify the quality of the seller's credit policies and servicer's collection policies and procedures. The findings of these reviews must be well documented.

(3) The bank must have the ability to assess the characteristics of the receivables pool, including:

- (a) over-advances;
- (b) history of the seller's arrears, bad debts, and bad debt allowances;
- (c) payment terms; and
- (d) potential contra accounts.

(4) The bank must have effective policies and procedures for monitoring on an aggregate basis single-obligor concentrations both within and across receivables pools.

- (5) The bank must receive timely and sufficiently detailed reports of receivables ageings and dilutions to
 - (a) ensure compliance with the bank's eligibility criteria and advancing policies governing purchased receivables, and
 - (b) provide an effective means with which to monitor and confirm the seller's terms of sale (eg invoice date ageing) and dilution.

36.114 Effectiveness of work-out systems: an effective programme requires systems and procedures not only for detecting deterioration in the seller's financial condition and deterioration in the quality of the receivables at an early stage, but also for addressing emerging problems pro-actively. In particular:

- (1) The bank should have clear and effective policies, procedures, and information systems to monitor compliance with (a) all contractual terms of the facility (including covenants, advancing formulas, concentration limits, early amortisation triggers, etc) as well as (b) the bank's internal policies governing advance rates and receivables eligibility. The bank's systems should track covenant violations and waivers as well as exceptions to established policies and procedures.
- (2) To limit inappropriate draws, the bank should have effective policies and procedures for detecting, approving, monitoring, and correcting over-advances.
- (3) The bank should have effective policies and procedures for dealing with financially weakened sellers or servicers and/or deterioration in the quality of receivable pools. These include, but are not necessarily limited to, early termination triggers in revolving facilities and other covenant protections, a structured and disciplined approach to dealing with covenant violations, and clear and effective policies and procedures for initiating legal actions and dealing with problem receivables.

36.115 Effectiveness of systems for controlling collateral, credit availability, and cash: the bank must have clear and effective policies and procedures governing the control of receivables, credit, and cash. In particular:

- (1) Written internal policies must specify all material elements of the receivables purchase programme, including the advancing rates, eligible collateral, necessary documentation, concentration limits, and how cash receipts are to be handled. These elements should take appropriate account of all relevant and material factors, including the seller's/servicer's financial condition, risk concentrations, and trends in the quality of the receivables and the seller's customer base.
- (2) Internal systems must ensure that funds are advanced only against specified supporting collateral and documentation (such as servicer attestations, invoices, shipping documents, etc).

36.116 Compliance with the bank's internal policies and procedures: given the reliance on monitoring and control systems to limit credit risk, the bank should have an effective internal process for assessing compliance with all critical policies and procedures, including:

- (1) Regular internal and/or external audits of all critical phases of the bank's receivables purchase programme
- (2) Verification of the separation of duties
 - (a) between the assessment of the seller/servicer and the assessment of the obligor; and
 - (b) between the assessment of the seller/servicer and the field audit of the seller/servicer.

36.117 A bank's effective internal process for assessing compliance with all critical policies and procedures should also include evaluations of back office operations, with particular focus on qualifications, experience, staffing levels, and supporting systems.

Section 8: validation of internal estimates

36.118 Banks must have a robust system in place to validate the accuracy and consistency of rating systems, processes, and the estimation of all relevant risk components. A bank must demonstrate to its supervisor that the internal validation process enables it to assess the performance of internal rating and risk estimation systems consistently and meaningfully.

36.119Banks must regularly compare realised default rates with estimated PDs for each grade and be able to demonstrate that the realised default rates are within the expected range for that grade. Banks using the advanced IRB approach must complete such analysis for their estimates of LGDs and EADs. Such comparisons must make use of historical data that are over as long a period as possible. The methods and data used in such comparisons by the bank must be clearly documented by the bank. This analysis and documentation must be updated at least annually.

36.120Banks must also use other quantitative validation tools and comparisons with relevant external data sources. The analysis must be based on data that are appropriate to the portfolio, are updated regularly, and cover a relevant observation period. Banks' internal assessments of the performance of their own rating systems must be based on long data histories, covering a range of economic conditions, and ideally one or more complete business cycles.

36.121Banks must demonstrate that quantitative testing methods and other validation methods do not vary systematically with the economic cycle. Changes in methods and data (both data sources and periods covered) must be clearly and thoroughly documented.

36.122Banks must have well-articulated internal standards for situations where deviations in realised PDs, LGDs and EADs from expectations become significant enough to call the validity of the estimates into question. These standards must take account of business cycles and similar systematic variability in default experiences. Where realised values continue to be higher than expected values, banks must revise estimates upward to reflect their default and loss experience.

36.123Where banks rely on supervisory, rather than internal, estimates of risk parameters, they are encouraged to compare realised LGDs and EADs to those set by the supervisors. The information on realised LGDs and EADs should form part of the bank's assessment of economic capital.

Section 9: supervisory LGD and EAD estimates

36.124Banks under the foundation IRB approach, which do not meet the requirements for own-estimates of LGD and EAD, above, must meet the minimum requirements described in the standardised approach to receive recognition for eligible financial collateral (as set out in the credit risk mitigation chapter of the standardised approach ([CRE22](#))). They must meet the following additional minimum requirements in order to receive recognition for additional collateral types.

Definition of eligibility of commercial real estate and residential real estate as collateral

36.125 Eligible commercial and residential real estate collateral for corporate, sovereign and bank exposures are defined as:

- (1) Collateral where the risk of the borrower is not materially dependent upon the performance of the underlying property or project, but rather on the underlying capacity of the borrower to repay the debt from other sources. As such, repayment of the facility is not materially dependent on any cash flow generated by the underlying commercial or residential real estate serving as collateral;⁷ and
- (2) Additionally, the value of the collateral pledged must not be materially dependent on the performance of the borrower. This requirement is not intended to preclude situations where purely macro-economic factors affect both the value of the collateral and the performance of the borrower.

Footnotes

⁷ *The Committee recognises that in some countries where multifamily housing makes up an important part of the housing market and where public policy is supportive of that sector, including specially established public sector companies as major providers, the risk characteristics of lending secured by mortgage on such residential real estate can be similar to those of traditional corporate exposures. The national supervisor may under such circumstances recognise mortgage on multifamily residential real estate as eligible collateral for corporate exposures.*

36.126 In light of the generic description above and the definition of corporate exposures, income producing real estate that falls under the SL asset class is specifically excluded from recognition as collateral for corporate exposures.⁸

Footnotes

8

As noted in the footnote to [CRE32.7](#), in exceptional circumstances for well-developed and long-established markets, mortgages on office and/or multi-purpose commercial premises and/or multi-tenanted commercial premises may have the potential to receive recognition as collateral in the corporate portfolio. Please refer to the footnote of [CRE20.25](#) for a discussion of the eligibility criteria that would apply.

Operational requirements for eligible commercial or residential real estate

36.127 Subject to meeting the definition above, commercial and residential real estate will be eligible for recognition as collateral for corporate claims only if all of the following operational requirements are met.

- (1) Legal enforceability: any claim on a collateral taken must be legally enforceable in all relevant jurisdictions, and any claim on collateral must be properly filed on a timely basis. Collateral interests must reflect a perfected lien (ie all legal requirements for establishing the claim have been fulfilled). Furthermore, the collateral agreement and the legal process underpinning it must be such that they provide for the bank to realise the value of the collateral within a reasonable timeframe.
- (2) Objective market value of collateral: the collateral must be valued at or less than the current fair value under which the property could be sold under private contract between a willing seller and an arm's-length buyer on the date of valuation.
- (3) Frequent revaluation: the bank is expected to monitor the value of the collateral on a frequent basis and at a minimum once every year. More frequent monitoring is suggested where the market is subject to significant changes in conditions. Statistical methods of evaluation (eg reference to house price indices, sampling) may be used to update estimates or to identify collateral that may have declined in value and that may need re-appraisal. A qualified professional must evaluate the property when information indicates that the value of the collateral may have declined materially relative to general market prices or when a credit event, such as default, occurs.

- (4) Junior liens: In some member countries, eligible collateral will be restricted to situations where the lender has a first charge over the property.⁹ Junior liens may be taken into account where there is no doubt that the claim for collateral is legally enforceable and constitutes an efficient credit risk mitigant. When recognised, junior liens are to be treated using the C*/C**

threshold, which is used for senior liens. In such cases, the C* and C** are calculated by taking into account the sum of the junior lien and all more senior liens.

Footnotes

- ⁹ *In some of these jurisdictions, first liens are subject to the prior right of preferential creditors, such as outstanding tax claims and employees' wages.*

36.128 Additional collateral management requirements are as follows:

- (1) The types of commercial and residential real estate collateral accepted by the bank and lending policies (advance rates) when this type of collateral is taken must be clearly documented.
- (2) The bank must take steps to ensure that the property taken as collateral is adequately insured against damage or deterioration.
- (3) The bank must monitor on an ongoing basis the extent of any permissible prior claims (eg tax) on the property.
- (4) The bank must appropriately monitor the risk of environmental liability arising in respect of the collateral, such as the presence of toxic material on a property.

Requirements for recognition of financial receivables : definition of eligible receivables

36.129 Eligible financial receivables are claims with an original maturity of less than or equal to one year where repayment will occur through the commercial or financial flows related to the underlying assets of the borrower. This includes both self-liquidating debt arising from the sale of goods or services linked to a commercial transaction and general amounts owed by buyers, suppliers, renters, national and local governmental authorities, or other non-affiliated parties not related to the sale of goods or services linked to a commercial transaction. Eligible receivables do not include those associated with securitisations, sub-participations or credit derivatives.

Requirements for recognition of financial receivables: legal certainty

36.130 The legal mechanism by which collateral is given must be robust and ensure that the lender has clear rights over the proceeds from the collateral.

36.131 Banks must take all steps necessary to fulfil local requirements in respect of the enforceability of security interest, eg by registering a security interest with a registrar. There should be a framework that allows the potential lender to have a perfected first priority claim over the collateral.

36.132 All documentation used in collateralised transactions must be binding on all parties and legally enforceable in all relevant jurisdictions. Banks must have conducted sufficient legal review to verify this and have a well-founded legal basis to reach this conclusion, and undertake such further review as necessary to ensure continuing enforceability.

36.133 The collateral arrangements must be properly documented, with a clear and robust procedure for the timely collection of collateral proceeds. Banks' procedures should ensure that any legal conditions required for declaring the default of the customer and timely collection of collateral are observed. In the event of the obligor's financial distress or default, the bank should have legal authority to sell or assign the receivables to other parties without consent of the receivables' obligors.

Requirements for recognition of financial receivables: risk management

36.134 The bank must have a sound process for determining the credit risk in the receivables. Such a process should include, among other things, analyses of the borrower's business and industry (e.g. effects of the business cycle) and the types of customers with whom the borrower does business. Where the bank relies on the borrower to ascertain the credit risk of the customers, the bank must review the borrower's credit policy to ascertain its soundness and credibility.

36.135

The margin between the amount of the exposure and the value of the receivables must reflect all appropriate factors, including the cost of collection, concentration within the receivables pool pledged by an individual borrower, and potential concentration risk within the bank's total exposures.

36.136 The bank must maintain a continuous monitoring process that is appropriate for the specific exposures (either immediate or contingent) attributable to the collateral to be utilised as a risk mitigant. This process may include, as appropriate and relevant, ageing reports, control of trade documents, borrowing base certificates, frequent audits of collateral, confirmation of accounts, control of the proceeds of accounts paid, analyses of dilution (credits given by the borrower to the issuers) and regular financial analysis of both the borrower and the issuers of the receivables, especially in the case when a small number of large-sized receivables are taken as collateral. Observance of the bank's overall concentration limits should be monitored. Additionally, compliance with loan covenants, environmental restrictions, and other legal requirements should be reviewed on a regular basis.

36.137 The receivables pledged by a borrower should be diversified and not be unduly correlated with the borrower. Where the correlation is high, e.g. where some issuers of the receivables are reliant on the borrower for their viability or the borrower and the issuers belong to a common industry, the attendant risks should be taken into account in the setting of margins for the collateral pool as a whole. Receivables from affiliates of the borrower (including subsidiaries and employees) will not be recognised as risk mitigants.

36.138 The bank should have a documented process for collecting receivable payments in distressed situations. The requisite facilities for collection should be in place, even when the bank normally looks to the borrower for collections.

Requirements for recognition of other physical collateral

36.139 Supervisors may allow for recognition of the credit risk mitigating effect of certain other physical collateral. Each supervisor will determine which, if any, collateral types in its jurisdiction meet the following two standards:

- (1) Existence of liquid markets for disposal of collateral in an expeditious and economically efficient manner.

- (2) Existence of well established, publicly available market prices for the collateral. Supervisors will seek to ensure that the amount a bank receives when collateral is realised does not deviate significantly from these market prices.

36.140 In order for a given bank to receive recognition for additional physical collateral, it must meet all the standards in [CRE36.127](#) and [CRE36.128](#), subject to the following modifications.

- (1) With the sole exception of permissible prior claims specified in the footnote to [CRE36.127](#), only first liens on, or charges over, collateral are permissible. As such, the bank must have priority over all other lenders to the realised proceeds of the collateral.
- (2) The loan agreement must include detailed descriptions of the collateral plus detailed specifications of the manner and frequency of revaluation.
- (3) The types of physical collateral accepted by the bank and policies and practices in respect of the appropriate amount of each type of collateral relative to the exposure amount must be clearly documented in internal credit policies and procedures and available for examination and/or audit review.
- (4) Bank credit policies with regard to the transaction structure must address appropriate collateral requirements relative to the exposure amount, the ability to liquidate the collateral readily, the ability to establish objectively a price or market value, the frequency with which the value can readily be obtained (including a professional appraisal or valuation), and the volatility of the value of the collateral. The periodic revaluation process must pay particular attention to "fashion-sensitive" collateral to ensure that valuations are appropriately adjusted downward of fashion, or model-year, obsolescence as well as physical obsolescence or deterioration.
- (5) In cases of inventories (eg raw materials, work-in-process, finished goods, dealers' inventories of autos) and equipment, the periodic revaluation process must include physical inspection of the collateral.

Section 10: requirements for recognition of leasing

36.141 Leases other than those that expose the bank to residual value risk (see [CRE36.142](#) below) will be accorded the same treatment as exposures collateralised by the same type of collateral. The minimum requirements for the collateral type must be met (commercial or residential real estate or other collateral). In addition, the bank must also meet the following standards:

- (1) Robust risk management on the part of the lessor with respect to the location of the asset, the use to which it is put, its age, and planned obsolescence;
- (2) A robust legal framework establishing the lessor's legal ownership of the asset and its ability to exercise its rights as owner in a timely fashion; and
- (3) The difference between the rate of depreciation of the physical asset and the rate of amortisation of the lease payments must not be so large as to overstate the credit risk mitigation attributed to the leased assets.

36.142 Leases that expose the bank to residual value risk will be treated in the following manner. Residual value risk is the bank's exposure to potential loss due to the fair value of the equipment declining below its residual estimate at lease inception.

- (1) The discounted lease payment stream will receive a risk weight appropriate for the lessee's financial strength (PD) and supervisory or own-estimate of LGD, whichever is appropriate.
- (2) The residual value will be risk-weighted at 100%.

Section 11: calculation of capital charges for equity exposures

The internal models market-based approach

36.143 To be eligible for the internal models market-based approach a bank must demonstrate to its supervisor that it meets certain quantitative and qualitative minimum requirements at the outset and on an ongoing basis. A bank that fails to demonstrate continued compliance with the minimum requirements must develop a plan for rapid return to compliance, obtain its supervisor's approval of the plan, and implement that plan in a timely fashion. In the interim, banks would be expected to compute capital charges using a simple risk weight approach.

36.144 The Committee recognises that differences in markets, measurement methodologies, equity investments and management practices require banks and supervisors to customise their operational procedures. It is not the Committee's intention to dictate the form or operational detail of banks' risk management policies and measurement practices for their banking book equity holdings. However, some of the minimum requirements are specific. Each supervisor will develop detailed examination procedures to ensure that banks' risk measurement systems and management controls are adequate to serve as the basis for the internal models approach.

Capital charge and risk quantification

36.145 The following minimum quantitative standards apply for the purpose of calculating minimum capital charges under the internal models approach.

- (1) The capital charge is equivalent to the potential loss on the institution's equity portfolio arising from an assumed instantaneous shock equivalent to the 99th percentile, one-tailed confidence interval of the difference between quarterly returns and an appropriate risk-free rate computed over a long-term sample period.
- (2) The estimated losses should be robust to adverse market movements relevant to the long-term risk profile of the institution's specific holdings. The data used to represent return distributions should reflect the longest sample period for which data are available and meaningful in representing the risk profile of the bank's specific equity holdings. The data used should be sufficient to provide conservative, statistically reliable and robust loss estimates that are not based purely on subjective or judgmental considerations. Institutions must demonstrate to supervisors that the shock employed provides a conservative estimate of potential losses over a relevant long-term market or business cycle. Models estimated using data not reflecting realistic ranges of long-run experience, including a period of reasonably severe declines in equity market values relevant to a bank's holdings, are presumed to produce optimistic results unless there is credible evidence of appropriate adjustments built into the model. In the absence of built-in adjustments, the bank must combine empirical analysis of available data with adjustments based on a variety of factors in order to attain model outputs that achieve appropriate realism and conservatism. In constructing Value-at-Risk (VaR) models estimating potential quarterly losses, institutions may use quarterly data or convert shorter horizon period data to a quarterly equivalent using an analytically appropriate method supported by empirical evidence. Such adjustments must be applied through a well-developed and well-documented thought process and analysis. In general, adjustments must be applied conservatively and consistently over time. Furthermore, where only limited data are available, or where technical limitations are such that estimates from any single method will be of uncertain quality, banks must add appropriate margins of conservatism in order to avoid over-optimism.

- (3) No particular type of VaR model (eg variance-covariance, historical simulation, or Monte Carlo) is prescribed. However, the model used must be able to capture adequately all of the material risks embodied in equity returns including both the general market risk and specific risk exposure of the institution's equity portfolio. Internal models must adequately explain historical price variation, capture both the magnitude and changes in the composition of potential concentrations, and be robust to adverse market environments. The population of risk exposures represented in the data used for estimation must be closely matched to or at least comparable with those of the bank's equity exposures.
- (4) Banks may also use modelling techniques such as historical scenario analysis to determine minimum capital requirements for banking book equity holdings. The use of such models is conditioned upon the institution demonstrating to its supervisor that the methodology and its output can be quantified in the form of the loss percentile specified under (1).
- (5) Institutions must use an internal model that is appropriate for the risk profile and complexity of their equity portfolio. Institutions with material holdings with values that are highly non-linear in nature (eg equity derivatives, convertibles) must employ an internal model designed to capture appropriately the risks associated with such instruments.
- (6) Subject to supervisory review, equity portfolio correlations can be integrated into a bank's internal risk measures. The use of explicit correlations (eg utilisation of a variance/covariance VaR model) must be fully documented and supported using empirical analysis. The appropriateness of implicit correlation assumptions will be evaluated by supervisors in their review of model documentation and estimation techniques.
- (7) Mapping of individual positions to proxies, market indices, and risk factors should be plausible, intuitive, and conceptually sound. Mapping techniques and processes should be fully documented, and demonstrated with both theoretical and empirical evidence to be appropriate for the specific holdings. Where professional judgement is combined with quantitative techniques in estimating a holding's return volatility, the judgement must take into account the relevant and material information not considered by the other techniques utilised.

- (8) Where factor models are used, either single or multi-factor models are acceptable depending upon the nature of an institution's holdings. Banks are expected to ensure that the factors are sufficient to capture the risks inherent in the equity portfolio. Risk factors should correspond to the appropriate equity market characteristics (for example, public, private, market capitalisation industry sectors and sub-sectors, operational characteristics) in which the bank holds significant positions. While banks will have discretion in choosing the factors, they must demonstrate through empirical analyses the appropriateness of those factors, including their ability to cover both general and specific risk.
- (9) Estimates of the return volatility of equity investments must incorporate relevant and material available data, information, and methods. A bank may utilise independently reviewed internal data or data from external sources (including pooled data). The number of risk exposures in the sample, and the data period used for quantification must be sufficient to provide the bank with confidence in the accuracy and robustness of its estimates. Institutions should take appropriate measures to limit the potential of both sampling bias and survivorship bias in estimating return volatilities.
- (10) A rigorous and comprehensive stress-testing programme must be in place. Banks are expected to subject their internal model and estimation procedures, including volatility computations, to either hypothetical or historical scenarios that reflect worst-case losses given underlying positions in both public and private equities. At a minimum, stress tests should be employed to provide information about the effect of tail events beyond the level of confidence assumed in the internal models approach.

Risk management process and controls

36.146 Banks' overall risk management practices used to manage their banking book equity investments are expected to be consistent with the evolving sound practice guidelines issued by the Committee and national supervisors. With regard to the development and use of internal models for capital purposes, institutions must have established policies, procedures, and controls to ensure the integrity of the model and modelling process used to derive regulatory capital standards. These policies, procedures, and controls should include the following:

- (1) Full integration of the internal model into the overall management information systems of the institution and in the management of the banking book equity portfolio. Internal models should be fully integrated into the institution's risk management infrastructure including use in: (a) establishing investment hurdle rates and evaluating alternative investments; (b) measuring and assessing equity portfolio performance (including the risk-adjusted performance); and (c) allocating economic capital to equity holdings and evaluating overall capital adequacy as required the supervisory review process ([SRP](#)). The institution should be able to demonstrate, through for example, investment committee minutes, that internal model output plays an essential role in the investment management process.
- (2) Established management systems, procedures, and control functions for ensuring the periodic and independent review of all elements of the internal modelling process, including approval of model revisions, vetting of model inputs, and review of model results, such as direct verification of risk computations. Proxy and mapping techniques and other critical model components should receive special attention. These reviews should assess the accuracy, completeness, and appropriateness of model inputs and results and focus on both finding and limiting potential errors associated with known weaknesses and identifying unknown model weaknesses. Such reviews may be conducted as part of internal or external audit programmes, by an independent risk control unit, or by an external third party.
- (3) Adequate systems and procedures for monitoring investment limits and the risk exposures of equity investments.
- (4) The units responsible for the design and application of the model must be functionally independent from the units responsible for managing individual investments.
- (5) Parties responsible for any aspect of the modelling process must be adequately qualified. Management must allocate sufficient skilled and competent resources to the modelling function.

Validation and documentation

36.147 Institutions employing internal models for regulatory capital purposes are expected to have in place a robust system to validate the accuracy and consistency of the model and its inputs. They must also fully document all material elements of their internal models and modelling process. The modelling process itself as well as the systems used to validate internal models including all supporting documentation, validation results, and the findings of internal and external reviews are subject to oversight and review by the bank's supervisor.

Validation

- 36.148** Banks must have a robust system in place to validate the accuracy and consistency of their internal models and modelling processes. A bank must demonstrate to its supervisor that the internal validation process enables it to assess the performance of its internal model and processes consistently and meaningfully.
- 36.149** Banks must regularly compare actual return performance (computed using realised and unrealised gains and losses) with modelled estimates and be able to demonstrate that such returns are within the expected range for the portfolio and individual holdings. Such comparisons must make use of historical data that are over as long a period as possible. The methods and data used in such comparisons must be clearly documented by the bank. This analysis and documentation should be updated at least annually.
- 36.150** Banks should make use of other quantitative validation tools and comparisons with external data sources. The analysis must be based on data that are appropriate to the portfolio, are updated regularly, and cover a relevant observation period. Banks' internal assessments of the performance of their own model must be based on long data histories, covering a range of economic conditions, and ideally one or more complete business cycles.
- 36.151** Banks must demonstrate that quantitative validation methods and data are consistent through time. Changes in estimation methods and data (both data sources and periods covered) must be clearly and thoroughly documented.
- 36.152** Since the evaluation of actual performance to expected performance over time provides a basis for banks to refine and adjust internal models on an ongoing basis, it is expected that banks using internal models will have established well-articulated model review standards. These standards are especially important for situations where actual results significantly deviate from expectations and where the validity of the internal model is called into question. These standards must take account of business cycles and similar systematic variability in equity returns. All adjustments made to internal models in response to model reviews must be well documented and consistent with the bank's model review standards.

36.153 To facilitate model validation through backtesting on an ongoing basis, institutions using the internal model approach must construct and maintain appropriate databases on the actual quarterly performance of their equity investments as well on the estimates derived using their internal models. Institutions should also backtest the volatility estimates used within their internal models and the appropriateness of the proxies used in the model. Supervisors

may ask banks to scale their quarterly forecasts to a different, in particular shorter, time horizon, store performance data for this time horizon and perform backtests on this basis.

Documentation

36.154 The burden is on the bank to satisfy its supervisor that a model has good predictive power and that regulatory capital requirements will not be distorted as a result of its use. Accordingly, all critical elements of an internal model and the modelling process should be fully and adequately documented. Banks must document in writing their internal model's design and operational details. The documentation should demonstrate banks' compliance with the minimum quantitative and qualitative standards, and should address topics such as the application of the model to different segments of the portfolio, estimation methodologies, responsibilities of parties involved in the modelling, and the model approval and model review processes. In particular, the documentation should address the following points:

- (1) A bank must document the rationale for its choice of internal modelling methodology and must be able to provide analyses demonstrating that the model and modelling procedures are likely to result in estimates that meaningfully identify the risk of the bank's equity holdings. Internal models and procedures must be periodically reviewed to determine whether they remain fully applicable to the current portfolio and to external conditions. In addition, a bank must document a history of major changes in the model over time and changes made to the modelling process subsequent to the last supervisory review. If changes have been made in response to the bank's internal review standards, the bank must document that these changes are consistent with its internal model review standards.

- (2) In documenting their internal models banks should:
- (a) provide a detailed outline of the theory, assumptions and/or mathematical and empirical basis of the parameters, variables, and data source(s) used to estimate the model;
 - (b) establish a rigorous statistical process (including out-of-time and out-of-sample performance tests) for validating the selection of explanatory variables; and
 - (c) indicate circumstances under which the model does not work effectively.
- (3) Where proxies and mapping are employed, institutions must have performed and documented rigorous analysis demonstrating that all chosen proxies and mappings are sufficiently representative of the risk of the equity holdings to which they correspond. The documentation should show, for instance, the relevant and material factors (e.g. business lines, balance sheet characteristics, geographic location, company age, industry sector and subsector, operating characteristics) used in mapping individual investments into proxies. In summary, institutions must demonstrate that the proxies and mappings employed:
- (a) are adequately comparable to the underlying holding or portfolio;
 - (b) are derived using historical economic and market conditions that are relevant and material to the underlying holdings or, where not, that an appropriate adjustment has been made; and,
 - (c) are robust estimates of the potential risk of the underlying holding.

Section 12: disclosure requirements

36.155 In order to be eligible for the IRB approach, banks must meet the disclosure requirements set out in the disclosure requirements ([DIS](#)). These are minimum requirements for use of IRB: failure to meet these will render banks ineligible to use the relevant IRB approach.

CRE40

Securitisation: general provisions

This chapter describes the scope, definitions, operational and due diligence requirements and structure of capital requirements used to calculate risk-weighted assets for securitisation exposures in the banking book.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Scope and definitions of transactions covered under the securitisation framework

- 40.1** Banks must apply the securitisation framework for determining regulatory capital requirements on exposures arising from traditional and synthetic securitisations or similar structures that contain features common to both. Since securitisations may be structured in many different ways, the capital treatment of a securitisation exposure must be determined on the basis of its economic substance rather than its legal form. Similarly, supervisors will look to the economic substance of a transaction to determine whether it should be subject to the securitisation framework for purposes of determining regulatory capital. Banks are encouraged to consult with their national supervisors when there is uncertainty about whether a given transaction should be considered a securitisation. For example, transactions involving cash flows from real estate (eg rents) may be considered specialised lending exposures, if warranted.
- 40.2** A traditional securitisation is a structure where the cash flow from an underlying pool of exposures is used to service at least two different stratified risk positions or tranches reflecting different degrees of credit risk. Payments to the investors depend upon the performance of the specified underlying exposures, as opposed to being derived from an obligation of the entity originating those exposures. The stratified/tranched structures that characterise securitisations differ from ordinary senior/subordinated debt instruments in that junior securitisation tranches can absorb losses without interrupting contractual payments to more senior tranches, whereas subordination in a senior/subordinated debt structure is a matter of priority of rights to the proceeds of liquidation.
- 40.3** A synthetic securitisation is a structure with at least two different stratified risk positions or tranches that reflect different degrees of credit risk where credit risk of an underlying pool of exposures is transferred, in whole or in part, through the use of funded (eg credit-linked notes) or unfunded (eg credit default swaps) credit derivatives or guarantees that serve to hedge the credit risk of the portfolio. Accordingly, the investors' potential risk is dependent upon the performance of the underlying pool.
- 40.4** Banks' exposures to a securitisation are hereafter referred to as "securitisation exposures". Securitisation exposures can include but are not restricted to the following: asset-backed securities, mortgage-backed securities, credit enhancements, liquidity facilities, interest rate or currency swaps, credit derivatives and tranching cover as described in [CRE22.93](#). Reserve accounts, such as cash collateral accounts, recorded as an asset by the originating bank must also be treated as securitisation exposures.

40.5

A resecuritisation exposure is a securitisation exposure in which the risk associated with an underlying pool of exposures is tranching and at least one of the underlying exposures is a securitisation exposure. In addition, an exposure to one or more resecuritisation exposures is a resecuritisation exposure. An exposure resulting from retransferring of a securitisation exposure is not a resecuritisation exposure if the bank is able to demonstrate that the cash flows to and from the bank could be replicated in all circumstances and conditions by an exposure to the securitisation of a pool of assets that contains no securitisation exposures.

40.6 Underlying instruments in the pool being securitised may include but are not restricted to the following: loans, commitments, asset-backed and mortgage-backed securities, corporate bonds, equity securities, and private equity investments. The underlying pool may include one or more exposures.

Definitions and general terminology

40.7 For risk-based capital purposes, a bank is considered to be an originator with regard to a certain securitisation if it meets either of the following conditions:

- (1) the bank originates directly or indirectly underlying exposures included in the securitisation; or
- (2) the bank serves as a sponsor of an asset-backed commercial paper (ABCP) conduit or similar programme that acquires exposures from third-party entities. In the context of such programmes, a bank would generally be considered a sponsor and, in turn, an originator if it, in fact or in substance, manages or advises the programme, places securities into the market, or provides liquidity and/or credit enhancements.

40.8 An ABCP programme predominantly issues commercial paper to third-party investors with an original maturity of one year or less and is backed by assets or other exposures held in a bankruptcy-remote, special purpose entity.

40.9 A clean-up call is an option that permits the securitisation exposures (eg asset-backed securities) to be called before all of the underlying exposures or securitisation exposures have been repaid. In the case of traditional securitisations, this is generally accomplished by repurchasing the remaining securitisation exposures once the pool balance or outstanding securities have fallen below some specified level. In the case of a synthetic transaction, the clean-up call may take the form of a clause that extinguishes the credit protection.

40.10

A credit enhancement is a contractual arrangement in which the bank or other entity retains or assumes a securitisation exposure and, in substance, provides some degree of added protection to other parties to the transaction.

40.11 A credit-enhancing interest-only strip (I/O) is an on-balance sheet asset that

- (1) represents a valuation of cash flows related to future margin income, and
- (2) is subordinated.

40.12 An early amortisation provision is a mechanism that, once triggered, accelerates the reduction of the investor's interest in underlying exposures of a securitisation of revolving credit facilities and allows investors to be paid out prior to the originally stated maturity of the securities issued. A securitisation of revolving credit facilities is a securitisation in which one or more underlying exposures represent, directly or indirectly, current or future draws on a revolving credit facility. Examples of revolving credit facilities include but are not limited to credit card exposures, home equity lines of credit, commercial lines of credit, and other lines of credit.

40.13 Excess spread (or future margin income) is defined as gross finance charge collections and other income received by the trust or special purpose entity (SPE, as defined below) minus certificate interest, servicing fees, charge-offs, and other senior trust or SPE expenses.

40.14 Implicit support arises when a bank provides support to a securitisation in excess of its predetermined contractual obligation.

40.15 For risk-based capital purposes, an internal ratings-based (IRB) pool means a securitisation pool for which a bank is able to use an IRB approach to calculate capital requirements for all underlying exposures given that it has approval to apply IRB for the type of underlying exposures and it has sufficient information to calculate IRB capital requirements for these exposures. Supervisors should expect that a bank with supervisory approval to calculate capital requirements for the type of underlying exposures be able to obtain sufficient information to estimate capital requirements for the underlying pool of exposures using an IRB approach. A bank which has a supervisory-approved IRB approach for the entire pool of exposures underlying a given securitisation exposure that cannot estimate capital requirements for all underlying exposures using an IRB approach would be expected to demonstrate to its supervisor why it is unable to do so. However, a supervisor may prohibit a bank from treating an IRB pool as such in the case of particular structures or transactions, including transactions with highly complex loss allocations, tranches whose credit enhancement could be eroded for reasons other than portfolio losses, and tranches of portfolios with high internal correlations (such as portfolios with high exposure to single sectors or with high geographical concentration).

40.16 For risk-based capital purposes, a mixed pool means a securitisation pool for which a bank is able to calculate IRB parameters for some, but not all, underlying exposures in a securitisation.

40.17 For risk-based capital purposes, a standardised approach (SA) pool means a securitisation pool for which a bank does not have approval to calculate IRB parameters for any underlying exposures; or for which, while the bank has approval to calculate IRB parameters for some or all of the types of underlying exposures, it is unable to calculate IRB parameters for any underlying exposures because of lack of relevant data, or is prohibited by its supervisor from treating the pool as an IRB pool pursuant to [CRE40.15](#).

40.18 A securitisation exposure (tranche) is considered to be a senior exposure (tranche) if it is effectively backed or secured by a first claim on the entire amount of the assets in the underlying securitised pool.¹ While this generally includes only the most senior position within a securitisation transaction, in some instances there may be other claims that, in a technical sense, may be more senior in the waterfall (eg a swap claim) but may be disregarded for the purpose of determining which positions are treated as senior. Different maturities of several senior tranches that share pro rata loss allocation shall have no effect on the seniority of these tranches, since they benefit from the same level of credit enhancement. The material effects of differing tranche maturities are captured by maturity adjustments on the risk weights to be assigned to the securitisation exposures. For example:

- (1) In a typical synthetic securitisation, an unrated tranche would be treated as a senior tranche, provided that all of the conditions for inferring a rating from a lower tranche that meets the definition of a senior tranche are fulfilled.
- (2) In a traditional securitisation where all tranches above the first-loss piece are rated, the most highly rated position would be treated as a senior tranche. When there are several tranches that share the same rating, only the most senior tranche in the cash flow waterfall would be treated as senior (unless the only difference among them is the effective maturity). Also, when the different ratings of several senior tranches only result from a difference in maturity, all of these tranches should be treated as a senior tranche.
- (3) Usually, a liquidity facility supporting an ABCP programme would not be the most senior position within the programme; the commercial paper, which benefits from the liquidity support, typically would be the most senior position. However, a liquidity facility may be viewed as covering all losses on the underlying receivables pool that exceed the amount of overcollateralisation/reserves provided by the seller and as being most senior if it is sized to cover all of the outstanding commercial paper and other senior debt supported by the pool, so that no cash flows from the underlying pool could be transferred to the other creditors until any liquidity draws were repaid in full. In such a case, the liquidity facility can be treated as a senior exposure. Otherwise, if these conditions are not satisfied, or if for other reasons the liquidity facility constitutes a mezzanine position in economic substance rather than a senior position in the underlying pool, the liquidity facility should be treated as a non-senior exposure.

Footnotes

- ¹ *If a senior tranche is retranching or partially hedged (ie not on a pro rata basis), only the new senior part would be treated as senior for capital purposes.*

40.19 For risk-based capital purposes, the exposure amount of a securitisation exposure is the sum of the on-balance sheet amount of the exposure, or carrying value – which takes into account purchase discounts and writedowns/specific provisions the bank took on this securitisation exposure – and the off-balance sheet exposure amount, where applicable.

40.20 A bank must measure the exposure amount of its off-balance sheet securitisation exposures as follows:

- (1) for credit risk mitigants sold or purchased by the bank, use the treatment set out in [CRE40.56](#) to [CRE40.62](#);
- (2) for facilities that are not credit risk mitigants, use a credit conversion factor (CCF) of 100%. If contractually provided for, servicers may advance cash to ensure an uninterrupted flow of payments to investors so long as the servicer is entitled to full reimbursement and this right is senior to other claims on cash flows from the underlying pool of exposures. At national discretion, the undrawn portion of servicer cash advances or facilities that are unconditionally cancellable without prior notice may receive the CCF for unconditionally cancellable commitments under [CRE20](#). For this purpose, a national supervisor that uses this discretion must develop an appropriately conservative method for measuring the amount of the undrawn portion; and
- (3) for derivatives contracts other than credit risk derivatives contracts, such as interest rate or currency swaps sold or purchased by the bank, use the measurement approach set out in [CRE51](#).

40.21 An SPE is a corporation, trust or other entity organised for a specific purpose, the activities of which are limited to those appropriate to accomplish the purpose of the SPE, and the structure of which is intended to isolate the SPE from the credit risk of an originator or seller of exposures. SPEs, normally a trust or similar entity, are commonly used as financing vehicles in which exposures are sold to the SPE in exchange for cash or other assets funded by debt issued by the trust.

40.22 For risk-based capital purposes, tranche maturity (M_T) is the tranche's remaining effective maturity in years and can be measured at the bank's discretion in either of the following manners. In all cases, M_T will have a floor of one year and a cap of five years.

- (1) As the euro² weighted-average maturity of the contractual cash flows of the tranche, as expressed below, where CF_t denotes the cash flows (principal, interest payments and fees) contractually payable by the borrower in period t . The contractual payments must be unconditional and must not be dependent on the actual performance of the securitised assets. If such unconditional contractual payment dates are not available, the final legal maturity shall be used.

$$M_T = \frac{\sum_t tCF_t}{\sum_t CF_t}$$

- (2) On the basis of final legal maturity of the tranche, where M_L is the final legal maturity of the tranche.

$$M_T = 1 + 80\%(M_L - 1)$$

Footnotes

² *The euro designation is used for illustrative purposes only.*

40.23 When determining the maturity of a securitisation exposure, banks should take into account the maximum period of time they are exposed to potential losses from the securitised assets. In cases where a bank provides a commitment, the bank should calculate the maturity of the securitisation exposure resulting from this commitment as the sum of the contractual maturity of the commitment and the longest maturity of the asset(s) to which the bank would be exposed after a draw has occurred. If those assets are revolving, the longest contractually possible remaining maturity of the asset that might be added during the revolving period would apply, rather than the (longest) maturity of the assets currently in the pool. The same treatment applies to all other instruments where the risk of the commitment/protection provider is not limited to losses realised until the maturity of that instrument (eg total return swaps). For credit protection instruments that are only exposed to losses that occur up to the maturity of that instrument, a bank would be allowed to apply the contractual maturity of the instrument and would not have to look through to the protected position.

Operational requirements for the recognition of risk transference

40.24 An originating bank may exclude underlying exposures from the calculation of risk-weighted assets only if all of the following conditions have been met. Banks meeting these conditions must still hold regulatory capital against any securitisation exposures they retain.

- (1) Significant credit risk associated with the underlying exposures has been transferred to third parties.

- (2) The transferor does not maintain effective or indirect control over the transferred exposures. The exposures are legally isolated from the transferor in such a way (eg through the sale of assets or through subparticipation) that the exposures are put beyond the reach of the transferor and its creditors, even in bankruptcy or receivership. Banks should obtain legal opinion³ that confirms true sale. The transferor's retention of servicing rights to the

exposures will not necessarily constitute indirect control of the exposures. The transferor is deemed to have maintained effective control over the transferred credit risk exposures if it:

- (a) is able to repurchase from the transferee the previously transferred exposures in order to realise their benefits; or
 - (b) is obligated to retain the risk of the transferred exposures.
- (3) The securities issued are not obligations of the transferor. Thus, investors who purchase the securities only have claim to the underlying exposures.
- (4) The transferee is an SPE and the holders of the beneficial interests in that entity have the right to pledge or exchange them without restriction, unless such restriction is imposed by a risk retention requirement.
- (5) Clean-up calls must satisfy the conditions set out in [CRE40.28](#).
- (6) The securitisation does not contain clauses that
- (a) require the originating bank to alter the underlying exposures such that the pool's credit quality is improved unless this is achieved by selling exposures to independent and unaffiliated third parties at market prices;
 - (b) allow for increases in a retained first-loss position or credit enhancement provided by the originating bank after the transaction's inception; or
 - (c) increase the yield payable to parties other than the originating bank, such as investors and third-party providers of credit enhancements, in response to a deterioration in the credit quality of the underlying pool.
- (7) There must be no termination options/triggers except eligible clean-up calls, termination for specific changes in tax and regulation or early amortisation provisions such as those set out in [CRE40.27](#).

Footnotes

³ *Legal opinion is not limited to legal advice from qualified legal counsel, but allows written advice from in-house lawyers.*

40.25 For synthetic securitisations, the use of credit risk mitigation (CRM) techniques (ie collateral, guarantees and credit derivatives) for hedging the underlying exposure may be recognised for risk-based capital purposes only if the conditions outlined below are satisfied:

- (1) Credit risk mitigants must comply with the requirements set out in [CRE22](#).
- (2) Eligible collateral is limited to that specified in [CRE22.37](#) and [CRE22.39](#). Eligible collateral pledged by SPEs may be recognised.
- (3) Eligible guarantors are defined in [CRE22.90](#). Banks may not recognise SPEs as eligible guarantors in the securitisation framework.
- (4) Banks must transfer significant credit risk associated with the underlying exposures to third parties.

- (5) The instruments used to transfer credit risk may not contain terms or conditions that limit the amount of credit risk transferred, such as those provided below:
- (a) clauses that materially limit the credit protection or credit risk transference (eg an early amortisation provision in a securitisation of revolving credit facilities that effectively subordinates the bank's interest; significant materiality thresholds below which credit protection is deemed not to be triggered even if a credit event occurs; or clauses that allow for the termination of the protection due to deterioration in the credit quality of the underlying exposures);
 - (b) clauses that require the originating bank to alter the underlying exposures to improve the pool's average credit quality;
 - (c) clauses that increase the banks' cost of credit protection in response to deterioration in the pool's quality;
 - (d) clauses that increase the yield payable to parties other than the originating bank, such as investors and third-party providers of credit enhancements, in response to a deterioration in the credit quality of the reference pool; and
 - (e) clauses that provide for increases in a retained first-loss position or credit enhancement provided by the originating bank after the transaction's inception.
- (6) A bank should obtain legal opinion that confirms the enforceability of the contract.
- (7) Clean-up calls must satisfy the conditions set out in [CRE40.28](#).

40.26 A securitisation transaction is deemed to fail the operational requirements set out in [CRE40.24](#) or [CRE40.25](#) if the bank

- (1) originates/sponsors a securitisation transaction that includes one or more revolving credit facilities, and

- (2) the securitisation transaction incorporates an early amortisation or similar provision that, if triggered, would
 - (a) subordinate the bank's senior or pari passu interest in the underlying revolving credit facilities to the interest of other investors;
 - (b) subordinate the bank's subordinated interest to an even greater degree relative to the interests of other parties; or
 - (c) in other ways increases the bank's exposure to losses associated with the underlying revolving credit facilities.

40.27 If a securitisation transaction contains one of the following examples of an early amortisation provision and meets the operational requirements set forth in [CRE40.24](#) or [CRE40.25](#), an originating bank may exclude the underlying exposures associated with such a transaction from the calculation of risk-weighted assets, but must still hold regulatory capital against any securitisation exposures they retain in connection with the transaction:

- (1) replenishment structures where the underlying exposures do not revolve and the early amortisation ends the ability of the bank to add new exposures;
- (2) transactions of revolving credit facilities containing early amortisation features that mimic term structures (ie where the risk on the underlying revolving credit facilities does not return to the originating bank) and where the early amortisation provision in a securitisation of revolving credit facilities does not effectively result in subordination of the originator's interest;
- (3) structures where a bank securitises one or more revolving credit facilities and where investors remain fully exposed to future drawdowns by borrowers even after an early amortisation event has occurred; or
- (4) the early amortisation provision is solely triggered by events not related to the performance of the underlying assets or the selling bank, such as material changes in tax laws or regulations.

40.28 For securitisation transactions that include a clean-up call, no capital will be required due to the presence of a clean-up call if the following conditions are met:

- (1) the exercise of the clean-up call must not be mandatory, in form or in substance, but rather must be at the discretion of the originating bank;

- (2) the clean-up call must not be structured to avoid allocating losses to credit enhancements or positions held by investors or otherwise structured to provide credit enhancement; and
- (3) the clean-up call must only be exercisable when 10% or less of the original underlying portfolio or securities issued remains, or, for synthetic securitisations, when 10% or less of the original reference portfolio value remains.

40.29 Securitisation transactions that include a clean-up call that does not meet all of the criteria stated in [CRE40.28](#) result in a capital requirement for the originating bank. For a traditional securitisation, the underlying exposures must be treated as if they were not securitised. Additionally, banks must not recognise in regulatory capital any gain on sale, in accordance with [CAP30.14](#). For synthetic securitisations, the bank purchasing protection must hold capital against the entire amount of the securitised exposures as if they did not benefit from any credit protection. If a synthetic securitisation incorporates a call (other than a clean-up call) that effectively terminates the transaction and the purchased credit protection on a specific date, the bank must treat the transaction in accordance with [CRE40.65](#).

40.30 If a clean-up call, when exercised, is found to serve as a credit enhancement, the exercise of the clean-up call must be considered a form of implicit support provided by the bank and must be treated in accordance with the supervisory guidance pertaining to securitisation transactions.

Due diligence requirements

40.31 For a bank to use the risk weight approaches of the securitisation framework, it must have the information specified in [CRE40.32](#) to [CRE40.34](#). Otherwise, the bank must assign a 1250% risk weight to any securitisation exposure for which it cannot perform the required level of due diligence.

40.32 As a general rule, a bank must, on an ongoing basis, have a comprehensive understanding of the risk characteristics of its individual securitisation exposures, whether on- or off-balance sheet, as well as the risk characteristics of the pools underlying its securitisation exposures.

- 40.33** Banks must be able to access performance information on the underlying pools on an ongoing basis in a timely manner. Such information may include, as appropriate: exposure type; percentage of loans 30, 60 and 90 days past due; default rates; prepayment rates; loans in foreclosure; property type; occupancy; average credit score or other measures of creditworthiness; average loan-to-value ratio; and industry and geographical diversification. For resecuritisations, banks should have information not only on the underlying securitisation tranches, such as the issuer name and credit quality, but also on the characteristics and performance of the pools underlying the securitisation tranches.
- 40.34** A bank must have a thorough understanding of all structural features of a securitisation transaction that would materially impact the performance of the bank's exposures to the transaction, such as the contractual waterfall and waterfall-related triggers, credit enhancements, liquidity enhancements, market value triggers, and deal-specific definitions of default.

Calculation of capital requirements and risk-weighted assets

- 40.35** Regulatory capital is required for banks' securitisation exposures, including those arising from the provision of credit risk mitigants to a securitisation transaction, investments in asset-backed securities, retention of a subordinated tranche, and extension of a liquidity facility or credit enhancement, as set forth in the following sections. Repurchased securitisation exposures must be treated as retained securitisation exposures.
- 40.36** For the purposes of the expected loss (EL) provision calculation set out in [CRE35](#), securitisation exposures do not contribute to the EL amount. Similarly, neither general nor specific provisions against securitisation exposures or underlying assets still held on the balance sheet of the originator are to be included in the measurement of eligible provisions. However, originator banks can offset 1250% risk-weighted securitisation exposures by reducing the securitisation exposure amount by the amount of their specific provisions on underlying assets of that transaction and non-refundable purchase price discounts on such underlying assets. Specific provisions on securitisation exposures will be taken into account in the calculation of the exposure amount, as defined in [CRE40.19](#) and [CRE40.20](#). General provisions on underlying securitised exposures are not to be taken into account in any calculation.

- 40.37** The risk-weighted asset amount of a securitisation exposure is computed by multiplying the exposure amount by the appropriate risk weight determined in accordance with the hierarchy of approaches in [CRE40.41](#) to [CRE40.48](#). Risk weight caps for senior exposures in accordance with [CRE40.50](#) and [CRE40.51](#) or overall caps in accordance with [CRE40.52](#) to [CRE40.55](#) may apply. Overlapping exposures will be risk-weighted as defined in [CRE40.38](#) and [CRE40.40](#).
- 40.38** For the purposes of calculating capital requirements, a bank's exposure A overlaps another exposure B if in all circumstances the bank will preclude any loss for the bank on exposure B by fulfilling its obligations with respect to exposure A. For example, if a bank provides full credit support to some notes and holds a portion of these notes, its full credit support obligation precludes any loss from its exposure to the notes. If a bank can verify that fulfilling its obligations with respect to exposure A will preclude a loss from its exposure to B under any circumstance, the bank does not need to calculate risk-weighted assets for its exposure B.
- 40.39** To arrive at an overlap, a bank may, for the purposes of calculating capital requirements, split or expand⁴ its exposures. For example, a liquidity facility may not be contractually required to cover defaulted assets or may not fund an ABCP programme in certain circumstances. For capital purposes, such a situation would not be regarded as an overlap to the notes issued by that ABCP conduit. However, the bank may calculate risk-weighted assets for the liquidity facility as if it were expanded (either in order to cover defaulted assets or in terms of trigger events) to preclude all losses on the notes. In such a case, the bank would only need to calculate capital requirements on the liquidity facility

Footnotes

⁴ *That is, splitting exposures into portions that overlap with another exposure held by the bank and other portions that do not overlap; and expanding exposures by assuming for capital purposes that obligations with respect to one of the overlapping exposures are larger than those established contractually. The latter could be done, for instance, by expanding either the trigger events to exercise the facility and/or the extent of the obligation.*

- 40.40** Overlap could also be recognised between relevant capital charges for exposures in the trading book and capital charges for exposures in the banking book, provided that the bank is able to calculate and compare the capital charges for the relevant exposures.

40.41 Securitisation exposures will be treated differently depending on the type of underlying exposures and/or on the type of information available to the bank.

Securitisation exposures to which none of the approaches laid out in [CRE40.42](#) to [CRE40.48](#) can be applied must be assigned a 1250% risk weight.

40.42 A bank must use the Securitisation Internal Ratings-Based Approach (SEC-IRBA) as described in [CRE44](#) for a securitisation exposure of an IRB pool as defined in [CRE40.15](#), unless otherwise determined by the supervisor.

40.43 If a bank cannot use the SEC-IRBA, it must use the Securitisation External Ratings-Based Approach (SEC-ERBA) as described in [CRE42.1](#) to [CRE42.7](#) for a securitisation exposure to an SA pool as defined in [CRE40.17](#) provided that

- (1) the bank is located in a jurisdiction that permits use of the SEC-ERBA and
- (2) the exposure has an external credit assessment that meets the operational requirements for an external credit assessment in [CRE42.8](#), or there is an inferred rating that meets the operational requirements for inferred ratings in [CRE42.9](#) and [CRE42.10](#).

40.44 A bank that is located in a jurisdiction that permits use of the SEC-ERBA may use an Internal Assessment Approach (SEC-IAA) as described in [CRE43.1](#) to [CRE43.4](#) for an unrated securitisation exposure (eg liquidity facilities and credit enhancements) to an SA pool within an ABCP programme. In order to use an SEC-IAA, a bank must have supervisory approval to use the IRB approach for non-securitisation exposures. A bank should consult with its national supervisor on whether and when it can apply the SEC-IAA to its securitisation exposures, especially where the bank can apply the IRB for some, but not all, underlying exposures. To ensure appropriate capital levels, there may be instances where the supervisor requires a treatment other than this general rule.

40.45 A bank that cannot use the SEC-ERBA or an SEC-IAA for its exposure to an SA pool may use the Standardised Approach (SEC-SA) as described in [CRE41.1](#) to [CRE41.15](#).

40.46 Securitisation exposures of mixed pools: where a bank can calculate K_{IRB} on at least 95% of the underlying exposure amounts of a securitisation, the bank must apply the SEC-IRBA calculating the capital charge for the underlying pool as follows, where d is the percentage of the exposure amount of underlying exposures for which the bank can calculate K_{IRB} over the exposure amount of all underlying exposures; and K_{IRB} and K_{SA} are as defined in [CRE44.2](#) to [CRE44.5](#) and [CRE41.2](#) to [CRE41.4](#), respectively:

$$\text{capital charge for mixed pool} = d \times K_{IRB} + (1 - d) \times K_{SA}$$

- 40.47** Where the bank cannot calculate K_{IRB} on at least 95% of the underlying exposures, the bank must use the hierarchy for securitisation exposures of SA pools as set out in [CRE40.43](#) to [CRE40.45](#).
- 40.48** For resecuritisation exposures, banks must apply the SEC-SA, with the adjustments in [CRE41.16](#).
- 40.49** When a bank provides implicit support to a securitisation, it must, at a minimum, hold capital against all of the underlying exposures associated with the securitisation transaction as if they had not been securitised. Additionally, banks would not be permitted to recognise in regulatory capital any gain on sale, in accordance with [CAP30.14](#).

Caps for securitisation exposures

- 40.50** Banks may apply a “look-through” approach to senior securitisation exposures, whereby the senior securitisation exposure could receive a maximum risk weight equal to the exposure weighted-average risk weight applicable to the underlying exposures, provided that the bank has knowledge of the composition of the underlying exposures at all times. The applicable risk weight under the IRB framework would be calculated taking into account the application of the 1.06 scaling factor pursuant to [CRE30.4](#), and would also be inclusive of the expected loss portion multiplied by 12.5. In particular:
- (1) In the case of pools where the bank uses exclusively the SA or the IRB approach, the risk weight cap for senior exposures would equal the exposure weighted-average risk weight that would apply to the underlying exposures under the SA or IRB framework, respectively.
 - (2) In the case of mixed pools, when applying the SEC-IRBA, the SA part of the underlying pool would receive the corresponding SA risk weight, while the IRB portion would receive IRB risk weights. When applying the SEC-SA or the SEC-ERBA, the risk weight cap for senior exposures would be based on the SA exposure weighted-average risk weight of the underlying assets, whether or not they are originally IRB.
- 40.51** Where the risk weight cap results in a lower risk weight than the floor risk weight of 15%, the risk weight resulting from the cap should be used.

40.52 A bank (originator, sponsor or investors) using the SEC-IRBA for a securitisation exposure may apply a maximum capital requirement for the securitisation exposures it holds equal to the IRB capital requirement (including the expected loss portion and the scaling factor of 1.06 for the unexpected loss portion) that would have been assessed against the underlying exposures had they not been securitised and treated under the appropriate sections of [CRE30](#) to [CRE36](#). In the case of mixed pools, the overall cap should be calculated by adding up the capital before securitisation; that is, by adding up the capital required under the general credit risk framework for the IRB and for the SA part of the underlying pool.

40.53 An originating or sponsor bank using the SEC-ERBA or SEC-SA for a securitisation exposure may apply a maximum capital requirement for the securitisation exposures it holds equal to the capital requirement that would have been assessed against the underlying exposures had they not been securitised. In the case of mixed pools, the overall cap should be calculated by adding up the capital before securitisation; that is, by adding up the capital required under the general credit risk framework for the IRB and for the SA part of the underlying pool, respectively. The IRB part of the capital requirement includes the expected loss portion and the scaling factor of 1.06 of the unexpected loss portion.

40.54 The maximum aggregated capital requirement for a bank's securitisation exposures in the same transaction will be equal to $K_p * P$. In order to apply a maximum capital charge to a bank's securitisation exposure, a bank will need the following inputs:

- (1) The largest proportion of interest that the bank holds for each tranche of a given pool (P). In particular:
 - (a) For a bank that has one or more securitisation exposure(s) that reside in a single tranche of a given pool, P equals the proportion (expressed as a percentage) of securitisation exposure(s) that the bank holds in that given tranche (calculated as the total nominal amount of the bank's securitisation exposure(s) in the tranche) divided by the nominal amount of the tranche.
 - (b) For a bank that has securitisation exposures that reside in different tranches of a given securitisation, P equals the maximum proportion of interest across tranches, where the proportion of interest for each of the different tranches should be calculated as described above.

(2) Capital charge for underlying pool (K_p):

- (a) For an IRB pool, K_p equals K_{IRB} as defined in [CRE44.2](#) to [CRE44.13](#).
- (b) For an SA pool, K_p equals K_{SA} as defined in [CRE41.2](#) to [CRE41.5](#).
- (c) For a mixed pool, K_p equals the exposure-weighted average capital charge of the underlying pool using K_{SA} for the proportion of the underlying pool for which the bank cannot calculate K_{IRB} , and K_{IRB} for the proportion of the underlying pool for which a bank can calculate K_{IRB} .

40.55 In applying the capital charge cap, the entire amount of any gain on sale and credit-enhancing interest-only strips arising from the securitisation transaction must be deducted in accordance with [CAP30.14](#).

Treatment of credit risk mitigation for securitisation exposures

40.56 A bank may recognise credit protection purchased on a securitisation exposure when calculating capital requirements subject to the following:

- (1) collateral recognition is limited to that permitted under the credit risk mitigation framework – in particular, [CRE22.37](#) and [CRE22.39](#) when the bank applies the SEC-ERBA or SEC-SA, and [CRE32.7](#) when the bank applies the SEC-IRBA. Collateral pledged by SPEs may be recognised;
- (2) credit protection provided by the entities listed in [CRE22.90](#) may be recognised. SPEs cannot be recognised as eligible guarantors; and
- (3) where guarantees or credit derivatives fulfil the minimum operational conditions as specified in [CRE22.84](#) to [CRE22.89](#), banks can take account of such credit protection in calculating capital requirements for securitisation exposures.

40.57 When a bank provides full (or pro rata) credit protection to a securitisation exposure, the bank must calculate its capital requirements as if it directly holds the portion of the securitisation exposure on which it has provided credit protection (in accordance with the definition of tranche maturity given in [CRE40.22](#) and [CRE40.23](#)).

40.58 Provided that the conditions set out in [CRE40.56](#) are met, the bank buying full (or pro rata) credit protection may recognise the credit risk mitigation on the securitisation exposure in accordance with the CRM framework.

40.59 In the case of tranching credit protection, the original securitisation tranche will be decomposed into protected and unprotected sub-tranches:⁵

- (1) The protection provider must calculate its capital requirement as if directly exposed to the particular sub-tranche of the securitisation exposure on which it is providing protection, and as determined by the hierarchy of approaches for securitisation exposures and according to [CRE40.60](#) to [CRE40.62](#).
- (2) Provided that the conditions set out in [CRE40.56](#) are met, the protection buyer may recognise tranching protection on the securitisation exposure. In doing so, it must calculate capital requirements for each sub-tranche separately and as follows:
 - (a) For the resulting unprotected exposure(s), capital requirements will be calculated as determined by the hierarchy of approaches for securitisation exposures and according to [CRE40.60](#) to [CRE40.62](#).
 - (b) For the guaranteed/protected portion, capital requirements will be calculated according to the applicable CRM framework (in accordance with the definition of tranche maturity given in [CRE40.22](#) and [CRE40.23](#)).

Footnotes

⁵ *The envisioned decomposition is theoretical and it should not be viewed as a new securitisation transaction. The resulting subtranches should not be considered resecuritisations solely due to the presence of the credit protection.*

40.60 If, according to the hierarchy of approaches determined by [CRE40.41](#) to [CRE40.48](#), the bank must use the SEC-IRBA or SEC-SA, the parameters A and D should be calculated separately for each of the subtranches as if the latter would have been directly issued as separate tranches at the inception of the transaction. The value for K_{IRB} (respectively K_{SA}) will be computed on the underlying portfolio of the original transaction.

40.61 If, according to the hierarchy of approaches determined by [CRE40.41](#) to [CRE40.48](#), the bank must use the SEC-ERBA for the original securitisation exposure, the relevant risk weights for the different subtranches will be calculated subject to the following:

- (1) For the sub-tranche of highest priority,⁶ the bank will use the risk weight of the original securitisation exposure.
- (2) For a sub-tranche of lower priority:
 - (a) Banks must infer a rating from one of the subordinated tranches in the original transaction. The risk weight of the sub-tranche of lower priority will be then determined by applying the inferred rating to the SEC-ERBA. Thickness input T will be computed for the sub-tranche of lower priority only.
 - (b) Should it not be possible to infer a rating the risk weight for the sub-tranche of lower priority will be computed using the SEC-SA applying the adjustments to the determination of A and D described in [CRE40.60](#). The risk weight for this sub-tranche will be obtained as the greater of
 - (i) the risk weight determined through the application of the SEC-SA with the adjusted A, D points and
 - (ii) the SEC-ERBA risk weight of the original securitisation exposure prior to recognition of protection.

Footnotes

⁶ *'Sub-tranche of highest priority' only describes the relative priority of the decomposed tranche. The calculation of the risk weight of each sub-tranche is independent from the question if this sub-tranche is protected (ie risk is taken by the protection provider) or is unprotected (ie risk is taken by the protection buyer).*

- 40.62** Under all approaches, a lower-priority sub-tranche must be treated as a non-senior securitisation exposure even if the original securitisation exposure prior to protection qualifies as senior as defined in [CRE40.18](#).
- 40.63** A maturity mismatch exists when the residual maturity of a hedge is less than that of the underlying exposure.
- 40.64** When protection is bought on a securitisation exposure(s), for the purpose of setting regulatory capital against a maturity mismatch, the capital requirement will be determined in accordance with [CRE22.97](#) to [CRE22.100](#). When the exposures being hedged have different maturities, the longest maturity must be used.

40.65 When protection is bought on the securitised assets, maturity mismatches may arise in the context of synthetic securitisations (when, for example, a bank uses credit derivatives to transfer part or all of the credit risk of a specific pool of assets to third parties). When the credit derivatives unwind, the transaction will terminate. This implies that the effective maturity of all the tranches of the synthetic securitisation may differ from that of the underlying exposures. Banks that synthetically securitise exposures held on their balance sheet by purchasing tranching credit protection must treat such maturity mismatches in the following manner: For securitisation exposures that are assigned a risk weight of 1250%, maturity mismatches are not taken into account. For all other securitisation exposures, the bank must apply the maturity mismatch treatment set forth in [CRE22.97](#) to [CRE22.100](#). When the exposures being hedged have different maturities, the longest maturity must be used.

Simple, transparent and comparable securitisations: scope of and conditions for alternative treatment

40.66 Only traditional securitisations including exposures to ABCP conduits and exposures to transactions financed by ABCP conduits fall within the scope of the simple, transparent and comparable (STC) framework. Exposures to securitisations that are STC-compliant can be subject to alternative capital treatment as determined by [CRE41.20](#) to [CRE41.22](#), [CRE42.11](#) to [CRE42.14](#) and [CRE44.27](#) to [CRE44.29](#).

40.67 For regulatory capital purposes, the following will be considered STC-compliant:

- (1) Exposures to non-ABCP, traditional securitisations that meet the criteria in [CRE40.72](#) to [CRE40.95](#); and
- (2) Exposures to ABCP conduits and/or transactions financed by ABCP conduits, where the conduit and/or transactions financed by it meet the criteria in [CRE40.96](#) to [CRE40.165](#).

40.68 The originator/sponsor must disclose to investors all necessary information at the transaction level to allow investors to determine whether the securitisation is STC-compliant. Based on the information provided by the originator/sponsor, the investor must make its own assessment of the securitisation's STC compliance status as defined in [CRE40.67](#) before applying the alternative capital treatment.

40.69 For retained positions where the originator has achieved significant risk transfer in accordance with [CRE40.24](#), the determination shall be made only by the originator retaining the position.

40.70 STC criteria need to be met at all times. Checking the compliance with some of the criteria might only be necessary at origination (or at the time of initiating the exposure, in case of guarantees or liquidity facilities) to an STC securitisation. Notwithstanding, investors and holders of the securitisation positions are expected to take into account developments that may invalidate the previous compliance assessment, for example deficiencies in the frequency and content of the investor reports, in the alignment of interest, or changes in the transaction documentation at variance with relevant STC criteria.

40.71 In cases where the criteria refer to underlying assets – including, but not limited to [CRE40.94](#) and [CRE40.95](#) - and the pool is dynamic, the compliance with the criteria will be subject to dynamic checks every time that assets are added to the pool.

Simple, transparent and comparable term securitisations: criteria for regulatory capital purposes

40.72 All criteria must be satisfied in order for a securitisation to receive alternative regulatory capital treatment.

Criterion A1: Nature of assets

40.73 In simple, transparent and comparable securitisations, the assets underlying the securitisation should be credit claims or receivables that are homogeneous. In assessing homogeneity, consideration should be given to asset type, jurisdiction, legal system and currency. As more exotic asset classes require more complex and deeper analysis, credit claims or receivables should have contractually identified periodic payment streams relating to rental,⁷ principal, interest, or principal and interest payments. Any referenced interest payments or discount rates should be based on commonly encountered market interest rates,⁸ but should not reference complex or complicated formulae or exotic derivatives.⁹

- (1) For capital purposes, the "homogeneity" criterion should be assessed taking into account the following principles:
 - (a) The nature of assets should be such that investors would not need to analyse and assess materially different legal and/or credit risk factors and risk profiles when carrying out risk analysis and due diligence checks.
 - (b) Homogeneity should be assessed on the basis of common risk drivers, including similar risk factors and risk profiles.
 - (c) Credit claims or receivables included in the securitisation should have standard obligations, in terms of rights to payments and/or income from assets and that result in a periodic and well-defined stream of payments to investors. Credit card facilities should be deemed to result in a periodic and well-defined stream of payments to investors for the purposes of this criterion.
 - (d) Repayment of noteholders should mainly rely on the principal and interest proceeds from the securitised assets. Partial reliance on refinancing or re-sale of the asset securing the exposure may occur provided that re-financing is sufficiently distributed within the pool and the residual values on which the transaction relies are sufficiently low and that the reliance on refinancing is thus not substantial.
- (2) Examples of "commonly encountered market interest rates" would include:
 - (a) interbank rates and rates set by monetary policy authorities, such as the London Interbank Offered Rate (LIBOR), the Euro Interbank Offered Rate (Euribor) and the fed funds rate; and
 - (b) sectoral rates reflective of a lender's cost of funds, such as internal interest rates that directly reflect the market costs of a bank's funding or that of a subset of institutions.
- (3) Interest rate caps and/or floors would not automatically be considered exotic derivatives.

Footnotes

- ⁷ *Payments on operating and financing leases are typically considered to be rental payments rather than payments of principal and interest.*
- ⁸ *Commonly encountered market interest rates may include rates reflective of a lender's cost of funds, to the extent that sufficient data are provided to investors to allow them to assess their relation to other market rates.*
- ⁹ *The Global Association of Risk Professionals defines an exotic instrument as a financial asset or instrument with features making it more complex than simpler, plain vanilla, products.*

Criterion A2: Asset performance history

40.74 In order to provide investors with sufficient information on an asset class to conduct appropriate due diligence and access to a sufficiently rich data set to enable a more accurate calculation of expected loss in different stress scenarios, verifiable loss performance data, such as delinquency and default data, should be available for credit claims and receivables with substantially similar risk characteristics to those being securitised, for a time period long enough to permit meaningful evaluation by investors. Sources of and access to data and the basis for claiming similarity to credit claims or receivables being securitised should be clearly disclosed to all market participants.

- (1) In addition to the history of the asset class within a jurisdiction, investors should consider whether the originator, sponsor, servicer and other parties with a fiduciary responsibility to the securitisation have an established performance history for substantially similar credit claims or receivables to those being securitised and for an appropriately long period of time. It is not the intention of the criteria to form an impediment to the entry of new participants to the market, but rather that investors should take into account the performance history of the asset class and the transaction parties when deciding whether to invest in a securitisation.¹⁰

- (2) The originator/sponsor of the securitisation, as well as the original lender who underwrites the assets, must have sufficient experience in originating exposures similar to those securitised. For capital purposes, investors must determine whether the performance history of the originator and the original lender for substantially similar claims or receivables to those being securitised has been established for an "appropriately long period of time".

This performance history must be no shorter than a period of seven years for non-retail exposures. For retail exposures, the minimum performance history is five years.

Footnotes

[10](#)

This "additional consideration" may form part of investors' due diligence process, but does not form part of the criteria when determining whether a securitisation can be considered "simple, transparent and comparable".

Criterion A3: Payment status

40.75 Non-performing credit claims and receivables are likely to require more complex and heightened analysis. In order to ensure that only performing credit claims and receivables are assigned to a securitisation, credit claims or receivables being transferred to the securitisation may not, at the time of inclusion in the pool, include obligations that are in default or delinquent or obligations for which the transferor^{[11](#)} or parties to the securitisation^{[12](#)} are aware of evidence indicating a material increase in expected losses or of enforcement actions.

- (1) To prevent credit claims or receivables arising from credit-impaired borrowers from being transferred to the securitisation, the originator or sponsor should verify that the credit claims or receivables meet the following conditions:
 - (a) the obligor has not been the subject of an insolvency or debt restructuring process due to financial difficulties within three years prior to the date of origination;¹³ and
 - (b) the obligor is not recorded on a public credit registry of persons with an adverse credit history; and,
 - (c) the obligor does not have a credit assessment by an external credit assessment institution or a credit score indicating a significant risk of default; and
 - (d) the credit claim or receivable is not subject to a dispute between the obligor and the original lender.
- (2) The assessment of these conditions should be carried out by the originator or sponsor no earlier than 45 days prior to the closing date. Additionally, at the time of this assessment, there should to the best knowledge of the originator or sponsor be no evidence indicating likely deterioration in the performance status of the credit claim or receivable.
- (3) Additionally, at the time of their inclusion in the pool, at least one payment should have been made on the underlying exposures, except in the case of revolving asset trust structures such as those for credit card receivables, trade receivables, and other exposures payable in a single instalment, at maturity.

Footnotes

¹¹ *Eg the originator or sponsor.*

¹² *Eg the servicer or a party with a fiduciary responsibility.*

¹³ *This condition would not apply to borrowers that previously had credit incidents but were subsequently removed from credit registries as a result of the borrower cleaning their records. This is the case in jurisdictions in which borrowers have the "right to be forgotten".*

Criterion A4: Consistency of underwriting

40.76 Investor analysis should be simpler and more straightforward where the securitisation is of credit claims or receivables that satisfy materially non-deteriorating origination standards. To ensure that the quality of the securitised credit claims and receivables is not affected by changes in underwriting standards, the originator should demonstrate to investors that any credit claims or receivables being transferred to the securitisation have been originated in the ordinary course of the originator's business to materially non-deteriorating underwriting standards. Where underwriting standards change, the originator should disclose the timing and purpose of such changes. Underwriting standards should not be less stringent than those applied to credit claims and receivables retained on the balance sheet. These should be credit claims or receivables which have satisfied materially non-deteriorating underwriting criteria and for which the obligors have been assessed as having the ability and volition to make timely payments on obligations; or on granular pools of obligors originated in the ordinary course of the originator's business where expected cash flows have been modelled to meet stated obligations of the securitisation under prudently stressed loan loss scenarios.

- (1) In all circumstances, all credit claims or receivables must be originated in accordance with sound and prudent underwriting criteria based on an assessment that the obligor has the "ability and volition to make timely payments" on its obligations.
- (2) The originator/sponsor of the securitisation is expected, where underlying credit claims or receivables have been acquired from third parties, to review the underwriting standards (ie to check their existence and assess their quality) of these third parties and to ascertain that they have assessed the obligors' "ability and volition to make timely payments on obligations".

Criterion A5: Asset selection and transfer

40.77 Whilst recognising that credit claims or receivables transferred to a securitisation will be subject to defined criteria,¹⁴ the performance of the securitisation should not rely upon the ongoing selection of assets through active management¹⁵ on a discretionary basis of the securitisation's underlying portfolio. Credit claims or receivables transferred to a securitisation should satisfy clearly defined eligibility criteria. Credit claims or receivables transferred to a securitisation after the closing date may not be actively selected, actively managed or otherwise cherry-picked on a discretionary basis. Investors should be able to assess the credit risk of the asset pool prior to their investment decisions.

Footnotes

[14](#)

Eg the size of the obligation, the age of the borrower or the loan-to-value of the property, debt-to-income and/or debt service coverage ratios.

[15](#)

Provided they are not actively selected or otherwise cherry-picked on a discretionary basis, the addition of credit claims or receivables during the revolving periods or their substitution or repurchasing due to the breach of representations and warranties do not represent active portfolio management.

40.78 In order to meet the principle of true sale, the securitisation should effect true sale such that the underlying credit claims or receivables:

- (1) are enforceable against the obligor and their enforceability is included in the representations and warranties of the securitisation;
- (2) are beyond the reach of the seller, its creditors or liquidators and are not subject to material recharacterisation or clawback risks;
- (3) are not effected through credit default swaps, derivatives or guarantees, but by a transfer^{[16](#)} of the credit claims or the receivables to the securitisation;
- (4) demonstrate effective recourse to the ultimate obligation for the underlying credit claims or receivables and are not a securitisation of other securitisations; and
- (5) for regulatory capital purposes, an independent third-party legal opinion must support the claim that the true sale and the transfer of assets under the applicable laws comply with the points under [CRE40.78](#)(1) to [CRE40.78](#)(4).

Footnotes

[16](#)

The requirement should not affect jurisdictions whose legal frameworks provide for a true sale with the same effects as described above, but by means other than a transfer of the credit claims or receivables.

40.79 In applicable jurisdictions, securitisations employing transfers of credit claims or receivables by other means should demonstrate the existence of material obstacles preventing true sale at issuance¹⁷ and should clearly demonstrate the method of recourse to ultimate obligors.¹⁸ In such jurisdictions, any conditions where the transfer of the credit claims or receivable is delayed or contingent upon specific events and any factors affecting timely perfection of claims by the securitisation should be clearly disclosed. The originator should provide representations and warranties that the credit claims or receivables being transferred to the securitisation are not subject to any condition or encumbrance that can be foreseen to adversely affect enforceability in respect of collections due.

Footnotes

¹⁷ *Eg the immediate realisation of transfer tax or the requirement to notify all obligors of the transfer.*

¹⁸ *Eg equitable assignment, perfected contingent transfer.*

Criterion A6: Initial and ongoing data

40.80 To assist investors in conducting appropriate due diligence prior to investing in a new offering, sufficient loan-level data in accordance with applicable laws or, in the case of granular pools, summary stratification data on the relevant risk characteristics of the underlying pool should be available to potential investors before pricing of a securitisation. To assist investors in conducting appropriate and ongoing monitoring of their investments' performance and so that investors that wish to purchase a securitisation in the secondary market have sufficient information to conduct appropriate due diligence, timely loan-level data in accordance with applicable laws or granular pool stratification data on the risk characteristics of the underlying pool and standardised investor reports should be readily available to current and potential investors at least quarterly throughout the life of the securitisation. Cut-off dates of the loan-level or granular pool stratification data should be aligned with those used for investor reporting. To provide a level of assurance that the reporting of the underlying credit claims or receivables is accurate and that the underlying credit claims or receivables meet the eligibility requirements, the initial portfolio should be reviewed¹⁹ for conformity with the eligibility requirements by an appropriate legally accountable and independent third party, such as an independent accounting practice or the calculation agent or management company for the securitisation.

Footnotes

[19](#)

The review should confirm that the credit claims or receivables transferred to the securitisation meet the portfolio eligibility requirements. The review could, for example, be undertaken on a representative sample of the initial portfolio, with the application of a minimum confidence level. The verification report need not be provided but its results, including any material exceptions, should be disclosed in the initial offering documentation.

Criterion B7: Redemption cash flows

40.81 Liabilities subject to the refinancing risk of the underlying credit claims or receivables are likely to require more complex and heightened analysis. To help ensure that the underlying credit claims or receivables do not need to be refinanced over a short period of time, there should not be a reliance on the sale or refinancing of the underlying credit claims or receivables in order to repay the liabilities, unless the underlying pool of credit claims or receivables is sufficiently granular and has sufficiently distributed repayment profiles. Rights to receive income from the assets specified to support redemption payments should be considered as eligible credit claims or receivables in this regard.[20](#)

Footnotes

[20](#)

For example, associated savings plans designed to repay principal at maturity.

Criterion B8: Currency and interest rate asset and liability mismatches

40.82 To reduce the payment risk arising from the different interest rate and currency profiles of assets and liabilities and to improve investors' ability to model cash flows, interest rate and foreign currency risks should be appropriately mitigated[21](#) at all times, and if any hedging transaction is executed the transaction should be documented according to industry-standard master agreements. Only derivatives used for genuine hedging of asset and liability mismatches of interest rate and / or currency should be allowed.

- (1) For capital purposes, the term “appropriately mitigated” should be understood as not necessarily requiring a completely perfect hedge. The appropriateness of the mitigation of interest rate and foreign currency through the life of the transaction must be demonstrated by making available to potential investors, in a timely and regular manner, quantitative information including the fraction of notional amounts that are hedged, as well as sensitivity analysis that illustrates the effectiveness of the hedge under extreme but plausible scenarios.
- (2) If hedges are not performed through derivatives, then those risk-mitigating measures are only permitted if they are specifically created and used for the purpose of hedging an individual and specific risk, and not multiple risks at the same time (such as credit and interest rate risks). Non-derivative risk mitigation measures must be fully funded and available at all times.

Footnotes

[21](#)

The term “appropriately mitigated” should be understood as not necessarily requiring a matching hedge. The appropriateness of hedging through the life of the transaction should be demonstrated and disclosed on a continuous basis to investors.

Criterion B9: Payment priorities and observability

40.83 To prevent investors being subjected to unexpected repayment profiles during the life of a securitisation, the priorities of payments for all liabilities in all circumstances should be clearly defined at the time of securitisation and appropriate legal comfort regarding their enforceability should be provided. To ensure that junior noteholders do not have inappropriate payment preference over senior noteholders that are due and payable, throughout the life of a securitisation, or, where there are multiple securitisations backed by the same pool of credit claims or receivables, throughout the life of the securitisation programme, junior liabilities should not have payment preference over senior liabilities which are due and payable. The securitisation should not be structured as a "reverse" cash flow waterfall such that junior liabilities are paid where due and payable senior liabilities have not been paid. To help provide investors with full transparency over any changes to the cash flow waterfall, payment profile or priority of payments that might affect a securitisation, all triggers affecting the cash flow waterfall, payment profile or priority of payments of the securitisation should be clearly and fully disclosed both in offering documents and in investor reports, with information in the investor report that clearly identifies the breach status, the ability for the breach to be reversed and the consequences of the breach. Investor reports should contain information that allows investors to monitor the evolution over time of the indicators that are subject to triggers. Any triggers breached between payment dates should be disclosed to investors on a timely basis in accordance with the terms and conditions of all underlying transaction documents.

40.84 Securitisations featuring a replenishment period should include provisions for appropriate early amortisation events and/or triggers of termination of the replenishment period, including, notably:

- (1) deterioration in the credit quality of the underlying exposures;
- (2) a failure to acquire sufficient new underlying exposures of similar credit quality; and
- (3) the occurrence of an insolvency-related event with regard to the originator or the servicer.

40.85 Following the occurrence of a performance-related trigger, an event of default or an acceleration event, the securitisation positions should be repaid in accordance with a sequential amortisation priority of payments, in order of tranche seniority, and there should not be provisions requiring immediate liquidation of the underlying assets at market value

40.86

To assist investors in their ability to appropriately model the cash flow waterfall of the securitisation, the originator or sponsor should make available to investors, both before pricing of the securitisation and on an ongoing basis, a liability cash flow model or information on the cash flow provisions allowing appropriate modelling of the securitisation cash flow waterfall.

- 40.87** To ensure that debt forgiveness, forbearance, payment holidays and other asset performance remedies can be clearly identified, policies and procedures, definitions, remedies and actions relating to delinquency, default or restructuring of underlying debtors should be provided in clear and consistent terms, such that investors can clearly identify debt forgiveness, forbearance, payment holidays, restructuring and other asset performance remedies on an ongoing basis.

Criterion B10: Voting and enforcement rights

- 40.88** To help ensure clarity for securitisation note holders of their rights and ability to control and enforce on the underlying credit claims or receivables, upon insolvency of the originator or sponsor, all voting and enforcement rights related to the credit claims or receivables should be transferred to the securitisation. Investors' rights in the securitisation should be clearly defined in all circumstances, including the rights of senior versus junior note holders.

Criterion B11: Documentation disclosure and legal review

40.89 To help investors to fully understand the terms, conditions, legal and commercial information prior to investing in a new offering²² and to ensure that this information is set out in a clear and effective manner for all programmes and offerings, sufficient initial offering²³ and draft underlying²⁴ documentation should be made available to investors (and readily available to potential investors on a continuous basis) within a reasonably sufficient period of time prior to pricing, or when legally permissible, such that the investor is provided with full disclosure of the legal and commercial information and comprehensive risk factors needed to make informed investment decisions. Final offering documents should be available from the closing date and all final underlying transaction documents shortly thereafter. These should be composed such that readers can readily find, understand and use relevant information. To ensure that all the securitisation's underlying documentation has been subject to appropriate review prior to publication, the terms and documentation of the securitisation should be reviewed by an appropriately experienced third party legal practice, such as a legal counsel already instructed by one of the transaction parties, eg by the arranger or the trustee. Investors should be notified in a timely fashion of any changes in such documents that have an impact on the structural risks in the securitisation.

Footnotes

²² *For the avoidance of doubt, any type of securitisation should be allowed to fulfil the requirements of [CRE40.89](#) once it meets its prescribed standards of disclosure and legal review.*

²³ *Eg draft offering circular, draft offering memorandum, draft offering document or draft prospectus, such as a "red herring"*

²⁴ *Eg asset sale agreement, assignment, novation or transfer agreement; servicing, backup servicing, administration and cash management agreements; trust/management deed, security deed, agency agreement, account bank agreement, guaranteed investment contract, incorporated terms or master trust framework or master definitions agreement as applicable; any relevant inter-creditor agreements, swap or derivative documentation, subordinated loan agreements, start-up loan agreements and liquidity facility agreements; and any other relevant underlying documentation, including legal opinions.*

Criterion B12: Alignment of interest

40.90 In order to align the interests of those responsible for the underwriting of the credit claims or receivables with those of investors, the originator or sponsor of the credit claims or receivables should retain a material net economic exposure and demonstrate a financial incentive in the performance of these assets following their securitisation.

Criterion C13: Fiduciary and contractual responsibilities

40.91 To help ensure servicers have extensive workout expertise, thorough legal and collateral knowledge and a proven track record in loss mitigation, such parties should be able to demonstrate expertise in the servicing of the underlying credit claims or receivables, supported by a management team with extensive industry experience. The servicer should at all times act in accordance with reasonable and prudent standards. Policies, procedures and risk management controls should be well documented and adhere to good market practices and relevant regulatory regimes. There should be strong systems and reporting capabilities in place. In assessing whether "strong systems and reporting capabilities are in place" for capital purposes, well documented policies, procedures and risk management controls, as well as strong systems and reporting capabilities, may be substantiated by a third-party review for non-banking entities.

40.92 The party or parties with fiduciary responsibility should act on a timely basis in the best interests of the securitisation note holders, and both the initial offering and all underlying documentation should contain provisions facilitating the timely resolution of conflicts between different classes of note holders by the trustees, to the extent permitted by applicable law. The party or parties with fiduciary responsibility to the securitisation and to investors should be able to demonstrate sufficient skills and resources to comply with their duties of care in the administration of the securitisation vehicle. To increase the likelihood that those identified as having a fiduciary responsibility towards investors as well as the servicer execute their duties in full on a timely basis, remuneration should be such that these parties are incentivised and able to meet their responsibilities in full and on a timely basis.

Criterion C14: Transparency to investors

40.93 To help provide full transparency to investors, assist investors in the conduct of their due diligence and to prevent investors being subject to unexpected disruptions in cash flow collections and servicing, the contractual obligations, duties and responsibilities of all key parties to the securitisation, both those with a fiduciary responsibility and of the ancillary service providers, should be defined clearly both in the initial offering and all underlying documentation. Provisions should be documented for the replacement of servicers, bank account providers, derivatives counterparties and liquidity providers in the event of failure or non-performance or insolvency or other deterioration of creditworthiness of any such counterparty to the securitisation. To enhance transparency and visibility over all receipts, payments and ledger entries at all times, the performance reports to investors should distinguish and report the securitisation's income and disbursements, such as scheduled principal, redemption principal, scheduled interest, prepaid principal, past due interest and fees and charges, delinquent, defaulted and restructured amounts under debt forgiveness and payment holidays, including accurate accounting for amounts attributable to principal and interest deficiency ledgers.

- (1) For capital purposes, the terms "initial offering" and "underlying transaction documentation" should be understood in the context defined by [CRE40.89](#).
- (2) The term "income and disbursements" should also be understood as including deferment, forbearance, and repurchases among the items described.

Criterion D15: Credit risk of underlying exposures

40.94 At the portfolio cut-off date the underlying exposures have to meet the conditions under the Standardised Approach for credit risk, and after taking into account any eligible credit risk mitigation, for being assigned a risk weight equal to or smaller than:

- (1) 40% on a value-weighted average exposure basis for the portfolio where the exposures are loans secured by residential mortgages or fully guaranteed residential loans;
- (2) 50% on an individual exposure basis where the exposure is a loan secured by a commercial mortgage;
- (3) 75% on an individual exposure basis where the exposure is a retail exposure;
or

- (4) 100% on an individual exposure basis for any other exposure.

Criterion D16: Granularity of the pool

40.95 At the portfolio cut-off date, the aggregated value of all exposures to a single obligor shall not exceed 1%²⁵ of the aggregated outstanding exposure value of all exposures in the portfolio.

Footnotes

²⁵ *In jurisdictions with structurally concentrated corporate loan markets available for securitisation subject to ex ante supervisory approval and only for corporate exposures, the applicable maximum concentration threshold could be increased to 2% if the originator or sponsor retains subordinated tranche(s) that form loss absorbing credit enhancement, as defined in [CRE44.16](#), and which cover at least the first 10% of losses. These tranche(s) retained by the originator or sponsor shall not be eligible for the STC capital treatment.*

Simple, transparent and comparable short-term securitisations: criteria for regulatory capital purposes

40.96 The following definitions apply when the terms are used in [CRE40.97](#) to [CRE40.165](#) :

- (1) ABCP conduit/conduit – ABCP conduit, being the special purpose vehicle which can issue commercial paper;
- (2) ABCP programme – the programme of commercial paper issued by an ABCP conduit;
- (3) Assets/asset pool – the credit claims and/or receivables underlying a transaction in which the ABCP conduit holds a beneficial interest;
- (4) Investor – the holder of commercial paper issued under an ABCP programme, or any type of exposure to the conduit representing a financing liability of the conduit, such as loans;
- (5) Obligor – borrower underlying a credit claim or a receivable that is part of an asset pool;

(6) Seller – a party that:

- (a) concluded (in its capacity as original lender) the original agreement that created the obligations or potential obligations (under a credit claim or a receivable) of an obligor or purchased the obligations or potential obligations from the original lender(s); and
 - (b) transferred those assets through a transaction or passed on the interest ²⁶ to the ABCP conduit.
- (7) Sponsor – sponsor of an ABCP conduit. It may also be noted that other relevant parties with a fiduciary responsibility in the management and administration of the ABCP conduit could also undertake control of some of the responsibilities of the sponsor; and
- (8) Transaction – An individual transaction in which the ABCP conduit holds a beneficial interest. A transaction may qualify as a securitisation, but may also be a direct asset purchase, the acquisition of undivided interest in a replenishing pool of asset, a secured loan etc.

Footnotes

²⁶

For instance, transactions in which assets are sold to a special purpose entity sponsored by a bank's customer and then either a security interest in the assets is granted to the ABCP conduit to secure a loan made by the ABCP conduit to the sponsored special purpose entity, or an undivided interest is sold to the ABCP conduit.

40.97 For exposures at the conduit level (eg exposure arising from investing in the commercial papers issued by the ABCP programme or sponsoring arrangements at the conduit/programme level), compliance with the short-term STC capital criteria is only achieved if the criteria are satisfied at both the conduit and transaction levels.

40.98 In the case of exposures at the transaction level, compliance with the short-term STC capital criteria is considered to be achieved if the transaction level criteria are satisfied for the transactions to which support is provided.

Criterion A1: Nature of assets (conduit level)

40.99 The sponsor should make representations and warranties to investors that the criterion set out in [CRE40.100](#) are met, and explain how this is the case on an overall basis. Only if specified should this be done for each transaction. Provided that each individual underlying transaction is homogeneous in terms of asset type, a conduit may be used to finance transactions of different asset types. Programme wide credit enhancement should not prevent a conduit from qualifying for STC, regardless of whether such enhancement technically creates re-securitisation.

Criterion A1: Nature of assets (transaction level)

40.100 The assets underlying a transaction in a conduit should be credit claims or receivables that are homogeneous, in terms of asset type.^{[27](#)} The assets underlying each individual transaction in a conduit should not be composed of "securitisation exposures" as defined in [CRE40.4](#). Credit claims or receivables underlying a transaction in a conduit should have contractually identified periodic payment streams relating to rental,^{[28](#)} principal, interest, or principal and interest payments. Credit claims or receivables generating a single payment stream would equally qualify as eligible. Any referenced interest payments or discount rates should be based on commonly encountered market interest rates,^{[29](#)} but should not reference complex or complicated formulae or exotic derivatives.^{[30](#)}

Footnotes

^{[27](#)} *For the avoidance of doubt, this criterion does not automatically exclude securitisations of equipment leases and securitisations of auto loans and leases from the short-term STC framework.*

^{[28](#)} *Payments on operating and financing lease are typically considered to be rental payments rather than payments of principal and interest.*

^{[29](#)} *Commonly encountered market interest rates may include rates reflective of a lender's cost of funds, to the extent sufficient data is provided to the sponsors to allow them to assess their relation to other market rates.*

^{[30](#)} *The Global Association of Risk Professionals defines an exotic instrument as a financial asset or instrument with features making it more complex than simpler, plain vanilla, products.*

Additional guidance for Criterion A1

40.101 The “homogeneity” criterion should be assessed taking into account the following principles:

- (1) The nature of assets should be such that there would be no need to analyse and assess materially different legal and/or credit risk factors and risk profiles when carrying out risk analysis and due diligence checks for the transaction.
- (2) Homogeneity should be assessed on the basis of common risk drivers, including similar risk factors and risk profiles.
- (3) Credit claims or receivables included in the securitisation should have standard obligations, in terms of rights to payments and/or income from assets and that result in a periodic and well-defined stream of payments to investors. Credit card facilities should be deemed to result in a periodic and well-defined stream of payments to investors for the purposes of this criterion.
- (4) Repayment of the securitisation exposure should mainly rely on the principal and interest proceeds from the securitised assets. Partial reliance on refinancing or re-sale of the asset securing the exposure may occur provided that re-financing is sufficiently distributed within the pool and the residual values on which the transaction relies are sufficiently low and that the reliance on refinancing is thus not substantial.

40.102 Examples of “commonly encountered market interest rates” would include:

- (1) interbank rates and rates set by monetary policy authorities, such as LIBOR, Euribor and the fed funds rate; and
- (2) sectoral rates reflective of a lender’s cost of funds, such as internal interest rates that directly reflect the market costs of a bank’s funding or that of a subset of institutions.

40.103 Interest rate caps and/or floors would not automatically be considered exotic derivatives.

40.104 The transaction level requirement is still met if the conduit does not purchase the underlying asset with a refundable purchase price discount but instead acquires a beneficial interest in the form of a note which itself might qualify as a securitisation exposure, as long as the securitisation exposure is not subject to any further tranching (ie has the same economic characteristic as the purchase of the underlying asset with a refundable purchase price discount).

Criterion A2: Asset performance history (conduit level)

40.105 In order to provide investors with sufficient information on the performance history of the asset types backing the transactions, the sponsor should make available to investors, sufficient loss performance data of claims and receivables with substantially similar risk characteristics, such as delinquency and default data of similar claims, and for a time period long enough to permit meaningful evaluation. The sponsor should disclose to investors the sources of such data and the basis for claiming similarity to credit claims or receivables financed by the conduit. Such loss performance data may be provided on a stratified basis.^{[31](#)}

Footnotes

^{[31](#)} *Stratified means by way of example, all materially relevant data on the conduit's composition (outstanding balances, industry sector, obligor concentrations, maturities, etc) and conduit's overview and all materially relevant data on the credit quality and performance of underlying transactions, allowing investors to identify collections, and as applicable, debt restructuring, forgiveness, forbearance, payment holidays, repurchases, delinquencies and defaults.*

Criterion A2: Asset performance history (transaction level)

40.106 In order to provide the sponsor with sufficient information on the performance history of each asset type backing the transactions and to conduct appropriate due diligence and to have access to a sufficiently rich data set to enable a more accurate calculation of expected loss in different stress scenarios, verifiable loss performance data, such as delinquency and default data, should be available for credit claims and receivables with substantially similar risk characteristics to those being financed by the conduit, for a time period long enough to permit meaningful evaluation by the sponsor.

Additional requirement for Criterion A2

40.107 The sponsor of the securitisation, as well as the original lender who underwrites the assets, must have sufficient experience in the risk analysis/underwriting of exposures or transactions with underlying exposures similar to those securitised. The sponsor should have well documented procedures and policies regarding the underwriting of transactions and the ongoing monitoring of the performance of the securitised exposures. The sponsor should ensure that the seller(s) and all other parties involved in the origination of the receivables have experience in originating same or similar assets, and are supported by a management with industry experience. For the purpose of meeting the short-term STC capital criteria, investors must request confirmation from the sponsor that the performance history of the originator and the original lender for substantially similar claims or receivables to those being securitised has been established for an "appropriately long period of time". This performance history must be no shorter than a period of five years for non-retail exposures. For retail exposures, the minimum performance history is three years.

Criterion A3: Asset performance history (conduit level)

40.108 The sponsor should, to the best of its knowledge and based on representations from sellers, make representations and warranties to investors that [CRE40.109](#) is met with respect to each transaction.

Criterion A3: Asset performance history (transaction level)

40.109 The sponsor should obtain representations from sellers that the credit claims or receivables underlying each individual transaction are not, at the time of acquisition of the interests to be financed by the conduit, in default or delinquent or subject to a material increase in expected losses or of enforcement actions.

Additional requirement for Criterion A3

40.110 To prevent credit claims or receivables arising from credit-impaired borrowers from being transferred to the securitisation, the original seller or sponsor should verify that the credit claims or receivables meet the following conditions for each transaction:

- (1) the obligor has not been the subject of an insolvency or debt restructuring process due to financial difficulties in the three years prior to the date of origination;^{[32](#)}

- (2) the obligor is not recorded on a public credit registry of persons with an adverse credit history;
- (3) the obligor does not have a credit assessment by an external credit assessment institution or a credit score indicating a significant risk of default; and
- (4) the credit claim or receivable is not subject to a dispute between the obligor and the original lender.

Footnotes

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This condition would not apply to borrowers that previously had credit incidents but were subsequently removed from credit registries as a result of the borrowers cleaning their records. This is the case in jurisdictions in which borrowers have the "right to be forgotten".

40.111 The assessment of these conditions should be carried out by the original seller or sponsor no earlier than 45 days prior to acquisition of the transaction by the conduit or, in the case of replenishing transactions, no earlier than 45 days prior to new exposures being added to the transaction. In addition, at the time of the assessment, there should to the best knowledge of the original seller or sponsor be no evidence indicating likely deterioration in the performance status of the credit claim or receivable. Further, at the time of their inclusion in the pool, at least one payment should have been made on the underlying exposures, except in the case of replenishing asset trust structures such as those for credit card receivables, trade receivables, and other exposures payable in a single instalment, at maturity.

Criterion A4: Consistency of underwriting (conduit level)

40.112 The sponsor should make representations and warranties to investors that:

- (1) it has taken steps to verify that for the transactions in the conduit, any underlying credit claims and receivables have been subject to consistent underwriting standards, and explain how.
- (2) when there are material changes to underwriting standards, it will receive from sellers disclosure about the timing and purpose of such changes.

40.113 The sponsor should also inform investors of the material selection criteria applied when selecting sellers (including where they are not financial institutions).

Criterion A4: Consistency of underwriting (transaction level)

40.114 The sponsor should ensure that sellers (in their capacity of original lenders) in transactions with the conduit demonstrate to it that:

- (1) any credit claims or receivables being transferred to or through a transaction held by the conduit have been originated in the ordinary course of the seller's business subject to materially non-deteriorating underwriting standards. Those underwriting standards should also not be less stringent than those applied to credit claims and receivables retained on the balance sheet of the seller and not financed by the conduit; and
- (2) the obligors have been assessed as having the ability and volition to make timely payments on obligations.

40.115 The sponsor should also ensure that sellers disclose to it the timing and purpose of material changes to underwriting standards.

Additional requirement for Criterion A4

40.116 In all circumstances, all credit claims or receivables must be originated in accordance with sound and prudent underwriting criteria based on an assessment that the obligor has the "ability and volition to make timely payments" on its obligations. The sponsor of the securitisation is expected, where underlying credit claims or receivables have been acquired from third parties, to review the underwriting standards (ie to check their existence and assess their quality) of these third parties and to ascertain that they have assessed the obligors' "ability and volition to make timely payments" on their obligations.

Criterion A5: Asset selection and transfer (conduit level)

40.117 The sponsor should:

- (1) provide representations and warranties to investors about the checks, in nature and frequency, it has conducted regarding enforceability of underlying assets.
- (2) disclose to investors the receipt of appropriate representations and warranties from sellers that the credit claims or receivables being transferred to the transactions in the conduit are not subject to any condition or encumbrance that can be foreseen to adversely affect enforceability in respect of collections due.

Criterion A5: Asset selection and transfer (transaction level)

40.118 The sponsor should be able to assess thoroughly the credit risk of the asset pool prior to its decision to provide full support to any given transaction or to the conduit. The sponsor should ensure that credit claims or receivables transferred to or through a transaction financed by the conduit:

- (1) satisfy clearly defined eligibility criteria; and
- (2) are not actively selected after the closing date, actively managed³³ or otherwise cherry-picked on a discretionary basis.

Footnotes

³³ *Provided they are not actively selected or otherwise cherry picked on a discretionary basis, the addition of credit claims or receivables during the replenishment periods or their substitution or repurchasing due to the breach of representations and warranties do not represent active portfolio management.*

40.119 The sponsor should ensure that the transactions in the conduit effect true sale such that the underlying credit claims or receivables:

- (1) are enforceable against the obligor;
- (2) are beyond the reach of the seller, its creditors or liquidators and are not subject to material re-characterisation or clawback risks;
- (3) are not effected through credit default swaps, derivatives or guarantees, but by a transfer³⁴ of the credit claims or the receivables to the transaction; and
- (4) demonstrate effective recourse to the ultimate obligation for the underlying credit claims or receivables and are not a re-securitisation position.

Footnotes

³⁴ *This requirement should not affect jurisdictions whose legal frameworks provide for a true sale with the same effects as described above, but by means other than a transfer of the credit claims or receivables.*

40.120The sponsor should ensure that in applicable jurisdictions, for conduits employing transfers of credit claims or receivables by other means, sellers can demonstrate to it the existence of material obstacles preventing true sale at issuance (eg the immediate realisation of transfer tax or the requirement to notify all obligors of the transfer) and should clearly demonstrate the method of recourse to ultimate obligors (eg equitable assignment, perfected contingent transfer). In such jurisdictions, any conditions where the transfer of the credit claims or receivables is delayed or contingent upon specific events and any factors affecting timely perfection of claims by the conduit should be clearly disclosed.

40.121The sponsor should ensure that it receives from the individual sellers (either in their capacity as original lender or servicer) representations and warranties that the credit claims or receivables being transferred to or through the transaction are not subject to any condition or encumbrance that can be foreseen to adversely affect enforceability in respect of collections due.

Additional requirement for Criterion A5

40.122An in-house legal opinion or an independent third-party legal opinion must support the claim that the true sale and the transfer of assets under the applicable laws comply with [CRE40.118](#)(1) and [CRE40.118](#)(2) at the transaction level.

Criterion A6: Initial and ongoing data (conduit level)

40.123To assist investors in conducting appropriate due diligence prior to investing in a new programme offering, the sponsor should provide to potential investors sufficient aggregated data that illustrate the relevant risk characteristics of the underlying asset pools in accordance with applicable laws. To assist investors in conducting appropriate and ongoing monitoring of their investments' performance and so that investors who wish to purchase commercial paper have sufficient information to conduct appropriate due diligence, the sponsor should provide timely and sufficient aggregated data that provide the relevant risk characteristics of the underlying pools in accordance with applicable laws. The sponsor should ensure that standardised investor reports are readily available to current and potential investors at least monthly. Cut off dates of the aggregated data should be aligned with those used for investor reporting.

Criterion A6: Initial and ongoing data (transaction level)

40.124 The sponsor should ensure that the individual sellers (in their capacity of servicers) provide it with:

- (1) sufficient asset level data in accordance with applicable laws or, in the case of granular pools, summary stratification data on the relevant risk characteristics of the underlying pool before transferring any credit claims or receivables to such underlying pool.
- (2) timely asset level data in accordance with applicable laws or granular pool stratification data on the risk characteristics of the underlying pool on an ongoing basis. Those data should allow the sponsor to fulfil its fiduciary duty at the conduit level in terms of disclosing information to investors including the alignment of cut off dates of the asset level or granular pool stratification data with those used for investor reporting.

40.125 The seller may delegate some of these tasks and, in this case, the sponsor should ensure that there is appropriate oversight of the outsourced arrangements.

Additional requirement for Criterion A6

40.126 The standardised investor reports which are made readily available to current and potential investors at least monthly should include the following information:

- (1) materially relevant data on the credit quality and performance of underlying assets, including data allowing investors to identify dilution, delinquencies and defaults, restructured receivables, forbearance, repurchases, losses, recoveries and other asset performance remedies in the pool;
- (2) the form and amount of credit enhancement provided by the seller and sponsor at transaction and conduit levels, respectively;
- (3) relevant information on the support provided by the sponsor; and
- (4) the status and definitions of relevant triggers (such as performance, termination or counterparty replacement triggers).

Criterion B7: Full support (conduit level only)

40.127 The sponsor should provide the liquidity facility(ies) and the credit protection support³⁵ for any ABCP programme issued by a conduit. Such facility(ies) and support should ensure that investors are fully protected against credit risks, liquidity risks and any material dilution risks of the underlying asset pools financed by the conduit. As such, investors should be able to rely on the sponsor to ensure timely and full repayment of the commercial paper.

Footnotes

³⁵ *A sponsor can provide full support either at ABCP programme level or at transaction level, ie by fully supporting each transaction within an ABCP programme.*

Additional requirement for Criterion B7

40.128 While liquidity and credit protection support at both the conduit level and transaction level can be provided by more than one sponsor, the majority of the support (assessed in terms of coverage) has to be made by a single sponsor (referred to as the "main sponsor").³⁶ An exception can however be made for a limited period of time, where the main sponsor has to be replaced due to a material deterioration in its credit standing.

Footnotes

³⁶ *"Liquidity and credit protection support" refers to support provided by the sponsors. Any support provided by the seller is excluded.*

40.129 The full support provided should be able to irrevocably and unconditionally pay the ABCP liabilities in full and on time. The list of risks provided in [CRE40.127](#) that have to be covered is not comprehensive but rather provides typical examples.

40.130 Under the terms of the liquidity facility agreement:

- (1) Upon specified events affecting its creditworthiness, the sponsor shall be obliged to collateralise its commitment in cash to the benefit of the investors or otherwise replace itself with another liquidity provider.

- (2) If the sponsor does not renew its funding commitment for a specific transaction or the conduit in its entirety, the sponsor shall collateralise its commitments regarding a specific transaction or, if relevant, to the conduit in cash at the latest 30 days prior to the expiration of the liquidity facility, and no new receivables should be purchased under the affected commitment.

40.131 The sponsor should provide investors with full information about the terms of the liquidity facility (facilities) and the credit support provided to the ABCP conduit and the underlying transactions (in relation to the transactions, redacted where necessary to protect confidentiality).

Criterion B8: Redemption cash flow (transaction level only)

40.132 Unless the underlying pool of credit claims or receivables is sufficiently granular and has sufficiently distributed repayment profiles, the sponsor should ensure that the repayment of the credit claims or receivables underlying any of the individual transactions relies primarily on the general ability and willingness of the obligor to pay rather than the possibility that the obligor refinances or sells the collateral and that such repayment does not primarily rely on the drawing of an external liquidity facility provided to this transaction.

Additional requirement for Criterion B8

40.133 Sponsors cannot use support provided by their own liquidity and credit facilities towards meeting this criterion. For the avoidance of doubt, the requirement that the repayment shall not primarily rely on the drawing of an external liquidity facility does not apply to exposures in the form of the notes issued by the ABCP conduit.

Criterion B9: Currency and interest rate asset and liability mismatches (conduit level)

40.134 The sponsor should ensure that any payment risk arising from different interest rate and currency profiles not mitigated at transaction-level or arising at conduit level is appropriately mitigated. The sponsor should also ensure that derivatives are used for genuine hedging purposes only and that hedging transactions are documented according to industry-standard master agreements. The sponsor should provide sufficient information to investors to allow them to assess how the payment risk arising from the different interest rate and currency profiles of assets and liabilities are appropriately mitigated, whether at the conduit or at transaction level.

Criterion B9: Currency and interest rate asset and liability mismatches (transaction level)

40.135 To reduce the payment risk arising from the different interest rate and currency profiles of assets and liabilities, if any, and to improve the sponsor's ability to analyse cash flows of transactions, the sponsor should ensure that interest rate and foreign currency risks are appropriately mitigated. The sponsor should also ensure that derivatives are used for genuine hedging purposes only and that hedging transactions are documented according to industry-standard master agreements.

Additional requirement for Criterion B9

40.136 The term "appropriately mitigated" should be understood as not necessarily requiring a completely perfect hedge. The appropriateness of the mitigation of interest rate and foreign currency risks through the life of the transaction must be demonstrated by making available, in a timely and regular manner, quantitative information including the fraction of notional amounts that are hedged, as well as sensitivity analysis that illustrates the effectiveness of the hedge under extreme but plausible scenarios. The use of risk-mitigating measures other than derivatives is permitted only if the measures are specifically created and used for the purpose of hedging an individual and specific risk. Non-derivative risk mitigation measures must be fully funded and available at all times.

Criterion B10: Payment priorities and observability (conduit level)

40.137 The commercial paper issued by the ABCP programme should not include extension options or other features which may extend the final maturity of the asset-backed commercial paper, where the right of trigger does not belong exclusively to investors. The sponsor should:

- (1) make representations and warranties to investors that the criterion set out in [CRE40.138](#) to [CRE40.143](#) is met and in particular, that it has the ability to appropriately analyse the cash flow waterfall for each transaction which qualifies as a securitisation; and
- (2) make available to investors a summary (illustrating the functioning) of these waterfalls and of the credit enhancement available at programme level and transaction level.

Criterion B10: Payment priorities and observability (transaction level)

- 40.138** To prevent the conduit from being subjected to unexpected repayment profiles from the transactions, the sponsor should ensure that priorities of payments are clearly defined at the time of acquisition of the interests in these transactions by the conduit; and appropriate legal comfort regarding the enforceability is provided.
- 40.139** For all transactions which qualify as a securitisation, the sponsor should ensure that all triggers affecting the cash flow waterfall, payment profile or priority of payments are clearly and fully disclosed to the sponsor both in the transactions' documentation and reports, with information in the reports that clearly identifies any breach status, the ability for the breach to be reversed and the consequences of the breach. Reports should contain information that allows sponsors to easily ascertain the likelihood of a trigger being breached or reversed. Any triggers breached between payment dates should be disclosed to sponsors on a timely basis in accordance with the terms and conditions of the transaction documents.
- 40.140** For any of the transactions where the beneficial interest held by the conduit qualifies as a securitisation position, the sponsor should ensure that any subordinated positions do not have inappropriate payment preference over payments to the conduit (which should always rank senior to any other position) and which are due and payable.
- 40.141** Transactions featuring a replenishment period should include provisions for appropriate early amortisation events and/or triggers of termination of the replenishment period, including, notably, deterioration in the credit quality of the underlying exposures; a failure to replenish sufficient new underlying exposures of similar credit quality; and the occurrence of an insolvency related event with regard to the individual sellers.
- 40.142** To ensure that debt forgiveness, forbearance, payment holidays, restructuring, dilution and other asset performance remedies can be clearly identified, policies and procedures, definitions, remedies and actions relating to delinquency, default, dilution or restructuring of underlying debtors should be provided in clear and consistent terms, such that the sponsor can clearly identify debt forgiveness, forbearance, payment holidays, restructuring, dilution and other asset performance remedies on an ongoing basis.
- 40.143** For each transaction which qualifies as a securitisation, the sponsor should ensure it receives both before the conduit acquires a beneficial interest in the transaction and on an ongoing basis, the liability cash flow analysis or information on the cash flow provisions allowing appropriate analysis of the cash flow waterfall of these transactions.

Criterion B11: Voting and enforcement rights (conduit level)

40.144 To provide clarity to investors, the sponsor should make sufficient information available in order for investors to understand their enforcement rights on the underlying credit claims or receivables in the event of insolvency of the sponsor.

Criterion B11: Voting and enforcement rights (transaction level)

40.145 For each transaction, the sponsor should ensure that, in particular upon insolvency of the seller or where the obligor is in default on its obligation, all voting and enforcement rights related to the credit claims or receivables are, if applicable:

- (1) transferred to the conduit; and
- (2) clearly defined under all circumstances, including with respect to the rights of the conduit versus other parties with an interest (eg sellers), where relevant.

Criterion B12: Documentation, disclosure and legal review (conduit level only)

40.146 To help investors understand fully the terms, conditions, and legal information prior to investing in a new programme offering and to ensure that this information is set out in a clear and effective manner for all programme offerings, the sponsor should ensure that sufficient initial offering documentation for the ABCP programme is provided to investors (and readily available to potential investors on a continuous basis) within a reasonably sufficient period of time prior to issuance, such that the investor is provided with full disclosure of the legal information and comprehensive risk factors needed to make informed investment decisions. These should be composed such that readers can readily find, understand and use relevant information.

40.147 The sponsor should ensure that the terms and documentation of a conduit and the ABCP programme it issues are reviewed and verified by an appropriately experienced and independent legal practice prior to publication and in the case of material changes. The sponsor should notify investors in a timely fashion of any changes in such documents that have an impact on the structural risks in the ABCP programme.

Additional requirement for Criterion B12

40.148 To understand fully the terms, conditions and legal information prior to including a new transaction in the ABCP conduit and ensure that this information is set out in a clear and effective manner, the sponsor should ensure that it receives sufficient initial offering documentation for each transaction and that it is provided within a reasonably sufficient period of time prior to the inclusion in the conduit, with full disclosure of the legal information and comprehensive risk factors needed to supply liquidity and/or credit support facilities. The initial offering document for each transaction should be composed such that readers can readily find, understand and use relevant information. The sponsor should also ensure that the terms and documentation of a transaction are reviewed and verified by an appropriately experienced and independent legal practice prior to the acquisition of the transaction and in the case of material changes.

Criterion B13: Alignment of interest (conduit level only)

40.149 In order to align the interests of those responsible for the underwriting of the credit claims and receivables with those of investors, a material net economic exposure should be retained by the sellers or the sponsor at transaction level, or by the sponsor at the conduit level. Ultimately, the sponsor should disclose to investors how and where a material net economic exposure is retained by the seller at transaction level or by the sponsor at transaction or conduit level, and demonstrate the existence of a financial incentive in the performance of the assets.

Criterion B14: Cap on maturity transformation (conduit level only)

40.150 Maturity transformation undertaken through ABCP conduits should be limited. The sponsor should verify and disclose to investors that the weighted average maturity of all the transactions financed under the ABCP conduit is three years or less. This number should be calculated as the higher of:

- (1) the exposure-weighted average residual maturity of the conduit's beneficial interests held or the assets purchased by the conduit in order to finance the transactions of the conduit³⁷; and

- (2) the exposure-weighted average maturity of the underlying assets financed by the conduit calculated by:
 - (a) taking an exposure-weighted average of residual maturities of the underlying assets in each pool; and
 - (b) taking an exposure-weighted average across the conduit of the pool-level averages as calculated in Step 2a.³⁸

Footnotes

³⁷ Including purchased securitisation notes, loans, asset-backed deposits and purchased credit claims and/or receivables held directly on the conduit's balance sheet.

³⁸ Where it is impractical for the sponsor to calculate the pool-level weighted average maturity in Step 2a (because the pool is very granular or dynamic), sponsors may instead use the maximum maturity of the assets in the pool as defined in the legal agreements governing the pool (eg investment guidelines).

Criterion C15: Financial institution (conduit level only)

40.151 The sponsor should be a financial institution that is licensed to take deposits from the public, and is subject to appropriate prudential standards and levels of supervision. National supervisors should decide what prudential standards and level of supervision is appropriate for their domestic banks. For internationally active banks, prudential standards and the level of supervision should be in accordance with the Basel framework. Subject to the determination of the national supervisor, in addition to risk-based regulatory capital this may include liquidity, leverage capital requirements and other requirements, such as related to the governance of banks.

Criterion C16: Fiduciary and contractual responsibilities (conduit level)

40.152 The sponsor should, based on the representations received from seller(s) and all other parties responsible for originating and servicing the asset pools, make representations and warranties to investors that:

- (1) the various criteria defined at the level of each underlying transaction are met, and explain how;

- (2) seller(s)'s policies, procedures and risk management controls are well-documented, adhere to good market practices and comply with the relevant regulatory regimes; and that strong systems and reporting capabilities are in place to ensure appropriate origination and servicing of the underlying assets.

40.153 The sponsor should be able to demonstrate expertise in providing liquidity and credit support in the context of ABCP conduits, and is supported by a management team with extensive industry experience. The sponsor should at all times act in accordance with reasonable and prudent standards. Policies, procedures and risk management controls of the sponsor should be well documented and the sponsor should adhere to good market practices and relevant regulatory regime. There should be strong systems and reporting capabilities in place at the sponsor. The party or parties with fiduciary responsibility should act on a timely basis in the best interests of the investors.

Criterion C16: Fiduciary and contractual responsibilities (transaction level)

40.154 The sponsor should ensure that it receives representations from the sellers(s) and all other parties responsible for originating and servicing the asset pools that they:

- (1) have well-documented procedures and policies in place to ensure appropriate servicing of the underlying assets;
- (2) have expertise in the origination of same or similar assets to those in the asset pools;
- (3) have extensive servicing and workout expertise, thorough legal and collateral knowledge and a proven track record in loss mitigation for the same or similar assets;
- (4) have expertise in the servicing of the underlying credit claims or receivables; and
- (5) are supported by a management team with extensive industry experience.

Additional requirement for Criterion C16

40.155 In assessing whether "strong systems and reporting capabilities are in place", well documented policies, procedures and risk management controls, as well as strong systems and reporting capabilities, may be substantiated by a third-party review for sellers that are non-banking entities.

Criterion C17: Transparency to investors (conduit level)

40.156 The sponsor should ensure that the contractual obligations, duties and responsibilities of all key parties to the conduit, both those with a fiduciary responsibility and the ancillary service providers, are defined clearly both in the initial offering and any relevant underlying documentation of the conduit and the ABCP programme it issues. The “underlying documentation” does not refer to the documentation of the underlying transactions.

40.157 The sponsor should also make representations and warranties to investors that the duties and responsibilities of all key parties are clearly defined at transaction level.

40.158 The sponsor should ensure that the initial offering documentation disclosed to investors contains adequate provisions regarding the replacement of key counterparties of the conduit (eg bank account providers and derivatives counterparties) in the event of failure or non-performance or insolvency or deterioration of creditworthiness of any such counterparty.

40.159 The sponsor should also make representations and warranties to investors that provisions regarding the replacement of key counterparties at transaction level are well-documented.

40.160 The sponsor should provide sufficient information to investors about the liquidity facility(ies) and credit support provided to the ABCP programme for them to understand its functioning and key risks.

Criterion C17: Transparency to investors (transaction level)

40.161 The sponsor should conduct due diligence with respect to the transactions on behalf of the investors. To assist the sponsor in meeting its fiduciary and contractual obligations, the duties and responsibilities of all key parties to all transactions (both those with a fiduciary responsibility and of the ancillary service providers) should be defined clearly in all underlying documentation of these transactions and made available to the sponsor.

40.162 The sponsor should ensure that provisions regarding the replacement of key counterparties (in particular the servicer or liquidity provider) in the event of failure or non-performance or insolvency or other deterioration of any such counterparty for the transactions are well-documented (in the documentation of these individual transactions).

40.163 The sponsor should ensure that for all transactions the performance reports include all of the following: the transactions' income and disbursements, such as scheduled principal, redemption principal, scheduled interest, prepaid principal, past due interest and fees and charges, delinquent, defaulted, restructured and diluted amounts, as well as accurate accounting for amounts attributable to principal and interest deficiency ledgers.

Criterion D18: Credit risk of underlying exposures (transaction level only)

40.164 At the date of acquisition of the assets, the underlying exposures have to meet the conditions under the Standardised Approach for credit risk and, after account is taken of any eligible credit risk mitigation, be assigned a risk weight equal to or smaller than:

- (1) 40% on a value-weighted average exposure basis for the portfolio where the exposures are loans secured by residential mortgages or fully guaranteed residential loans;
- (2) 50% on an individual exposure basis where the exposure is a loan secured by a commercial mortgage;
- (3) 75% on an individual exposure basis where the exposure is a retail exposure; or
- (4) 100% on an individual exposure basis for any other exposure.

Criterion D19: Granularity of the pool (conduit level only)

40.165 At the date of acquisition of any assets securitised by one of the conduits' transactions, the aggregated value of all exposures to a single obligor at that date shall not exceed 2%³⁹ of the aggregated outstanding exposure value of all exposures in the programme.

Footnotes

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In jurisdictions with structurally concentrated corporate loan markets, subject to ex ante supervisory approval and only for corporate exposures, the applicable maximum concentration threshold could be increased to 3% if the sellers or sponsor retain subordinated tranche(s) that form loss-absorbing credit enhancement, as defined in [CRE44.16](#), and which cover at least the first 10% of losses. These tranche(s) retained by the sellers or sponsor shall not be eligible for the STC capital treatment.

CRE41

Securitisation: standardised approach

This chapter describes how to calculate capital requirements for securitisation exposures using a standardised approach (SEC-SA).

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Standardised approach (SEC-SA)

- 41.1** To calculate capital requirements for a securitisation exposure to a standardised approach (SA) pool using the securitisation standardised approach (SEC-SA), a bank would use a supervisory formula and the following bank-supplied inputs: the SA capital charge had the underlying exposures not been securitised (K_{SA}); the ratio of delinquent underlying exposures to total underlying exposures in the securitisation pool (W); the tranche attachment point (A); and the tranche detachment point (D). The inputs A and D are defined in [CRE44.14](#) and [CRE44.15](#) respectively. Where the only difference between exposures to a transaction is related to maturity, A and D will be the same. K_{SA} and W are defined in [CRE41.2](#) to [CRE41.4](#) and [CRE41.6](#).
- 41.2** K_{SA} is defined as the weighted-average capital charge of the entire portfolio of underlying exposures, calculated using the risk-weighted asset amounts in [CRE20](#) in relation to the sum of the exposure amounts of underlying exposures, multiplied by 8%. This calculation should reflect the effects of any credit risk mitigant that is applied to the underlying exposures (either individually or to the entire pool), and hence benefits all of the securitisation exposures. K_{SA} is expressed as a decimal between zero and one (that is, a weighted-average risk weight of 100% means that K_{SA} would equal 0.08).
- 41.3** For structures involving a special purpose entity (SPE), all of the SPE's exposures related to the securitisation are to be treated as exposures in the pool. Exposures related to the securitisation that should be treated as exposures in the pool include assets in which the SPE may have invested, comprising reserve accounts, cash collateral accounts and claims against counterparties resulting from interest swaps or currency swaps.¹ Notwithstanding, the bank can exclude the SPE's exposures from the pool for capital calculation purposes if the bank can demonstrate to its national supervisor that the risk does not affect its particular securitisation exposure or that the risk is immaterial – for example, because it has been mitigated.²

Footnotes

¹ *In particular, in the case of swaps other than credit derivatives, the numerator of K_{SA} must include the positive current market value times the risk weight of the swap provider times 8%. In contrast, the denominator should not take into account such a swap, as such a swap would not provide a credit enhancement to any tranche.*

² *Certain best market practices can eliminate or at least significantly reduce the potential risk from a default of a swap provider. Examples of such features could be cash collateralisation of the market value in combination with an agreement of prompt additional payments in case of an increase of the market value of the swap and minimum credit quality of the swap provider with the obligation to post collateral or present an alternative swap provider without any costs for the SPE in the event of a credit deterioration on the part of the original swap provider. If national supervisors are satisfied with these risk mitigants and accept that the contribution of these exposures to the risk of the holder of a securitisation exposure is insignificant, supervisors may allow the bank to exclude these exposures from the K_{SA} calculation.*

41.4 In the case of funded synthetic securitisations, any proceeds of the issuances of credit-linked notes or other funded obligations of the SPE that serve as collateral for the repayment of the securitisation exposure in question, and for which the bank cannot demonstrate to its national supervisor that they are immaterial, have to be included in the calculation of K_{SA} if the default risk of the collateral is subject to the tranching loss allocation.³

Footnotes

³ *As in the case of swaps other than credit derivatives, the numerator of K_{SA} (ie weighted-average capital charge of the entire portfolio of underlying exposures) must include the exposure amount of the collateral times its risk weight times 8%, but the denominator should be calculated without recognition of the collateral.*

41.5 In cases where a bank has set aside a specific provision or has a non-refundable purchase price discount on an exposure in the pool, K_{SA} must be calculated using the gross amount of the exposure without the specific provision and/or non-refundable purchase price discount.

41.6

The variable W equals the ratio of the sum of the nominal amount of delinquent underlying exposures (as defined in [CRE41.7](#)) to the nominal amount of underlying exposures.

41.7 Delinquent underlying exposures are underlying exposures that are 90 days or more past due, subject to bankruptcy or insolvency proceedings, in the process of foreclosure, held as real estate owned, or in default, where default is defined within the securitisation deal documents.

41.8 The inputs K_{SA} and W are used as inputs to calculate K_A , as follows:

$$K_A = (1 - W) \times K_{SA} + 0.5W$$

41.9 In case a bank does not know the delinquency status, as defined above, for no more than 5% of underlying exposures in the pool, the bank may still use the SEC-SA by adjusting its calculation of K_A as follows:

$$K_A = \left(\frac{EAD_{\text{subpool 1 where } W \text{ known}}}{EAD_{\text{Total}}} \times K_A^{\text{subpool 1 where } W \text{ known}} \right) + \frac{EAD_{\text{subpool 2 where } W \text{ unknown}}}{EAD_{\text{Total}}}$$

41.10 If the bank does not know the delinquency status for more than 5%, the securitisation exposure must be risk weighted at 1250%.

41.11 Capital requirements are calculated under the SEC-SA as follows, where $K_{SSFA(K_A)}$ is the capital requirement per unit of the securitisation exposure and the variables a , u , and l are defined as:

$$(1) \quad a = -(1 / (p * K_A))$$

$$(2) \quad u = D - K_A$$

$$(3) \quad l = \max (A - K_A; 0)$$

$$K_{SSFA(K_A)} = \frac{e^{au} - e^{al}}{a(u - l)}$$

41.12 The supervisory parameter p in the context of the SEC-SA is set equal to 1 for a securitisation exposure that is not a resecuritisation exposure.

41.13 The risk weight assigned to a securitisation exposure when applying the SEC-SA would be calculated as follows:

- (1) When D for a securitisation exposure is less than or equal to K_A , the exposure must be assigned a risk weight of 1250%.
- (2) When A for a securitisation exposure is greater than or equal to K_A , the risk weight of the exposure, expressed as a percentage, would equal $K_{SSFA(K_A)}$ times 12.5.
- (3) When A is less than K_A and D is greater than K_A , the applicable risk weight is a weighted average of 1250% and 12.5 times $K_{SSFA(K_A)}$ according to the following formula:

$$RW = \left(12.5 \times \frac{K_A - A}{D - A} \right) + \left(12.5 \times K_{SSFA(K_A)} \times \frac{D - K_A}{D - A} \right)$$

41.14 The risk weight for market risk hedges such as currency or interest rate swaps will be inferred from a securitisation exposure that is pari passu to the swaps or, if such an exposure does not exist, from the next subordinated tranche.

41.15 The resulting risk weight is subject to a floor risk weight of 15%. Moreover, when a bank applies the SEC-SA to an unrated junior exposure in a transaction where the more senior tranches (exposures) are rated and therefore no rating can be inferred for the junior exposure, the resulting risk weight under SEC-SA for the junior unrated exposure shall not be lower than the risk weight for the next more senior rated exposure.

Resecuritisation exposures

41.16 For resecuritisation exposures, banks must apply the SEC-SA specified in [CRE41.1](#) to [CRE41.15](#), with the following adjustments:

- (1) the capital requirement of the underlying securitisation exposures is calculated using the securitisation framework;
- (2) delinquencies (W) are set to zero for any exposure to a securitisation tranche in the underlying pool; and
- (3) the supervisory parameter p is set equal to 1.5, rather than 1 as for securitisation exposures.

41.17 If the underlying portfolio of a resecuritisation consists in a pool of exposures to securitisation tranches and to other assets, one should separate the exposures to securitisation tranches from exposures to assets that are not securitisations. The K_A

parameter should be calculated for each subset individually, applying separate W parameters; these calculated in accordance with [CRE41.6](#) and [CRE41.7](#) in the subsets where the exposures are to assets that are not securitisation tranches, and set to zero where the exposures are to securitisation tranches. The K_A for the resecuritisation exposure is then obtained as the nominal exposure weighted-average of the K_A 's for each subset considered.

41.18 The resulting risk weight is subject to a floor risk weight of 100%.

41.19 The caps described in [CRE40.50](#) to [CRE40.55](#) cannot be applied to resecuritisation exposures.

Alternative capital treatment for term STC securitisations and short-term STC securitisations meeting the STC criteria for capital purposes

41.20 Securitisation transactions that are assessed as simple, transparent and comparable (STC)-compliant for capital purposes as defined in [CRE40.67](#) can be subject to capital requirements under the securitisation framework, taking into account that, when the SEC-SA is used, [CRE41.21](#) and [CRE41.22](#) are applicable instead of [CRE41.12](#) and [CRE41.15](#) respectively.

41.21 The supervisory parameter p in the context of the SEC-SA is set equal to 0.5 for an exposure to an STC securitisation.

41.22 The resulting risk weight is subject to a floor risk weight of 10% for senior tranches, and 15% for non-senior tranches.

CRE42

Securitisation: External-ratings-based approach (SEC-ERBA)

This chapter describes how to calculate capital requirements for securitisation exposures that are externally rated or for which an inferred rating is available (SEC-ERBA).

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

External-ratings-based approach (SEC-ERBA)

42.1 For securitisation exposures that are externally rated, or for which an inferred rating is available, risk-weighted assets under the securitisation external ratings-based approach (SEC-ERBA) will be determined by multiplying securitisation exposure amounts (as defined in [CRE40.19](#)) by the appropriate risk weights as determined by [CRE42.2](#) to [CRE42.7](#), provided that the operational criteria in [CRE42.8](#) to [CRE42.10](#) are met.¹

Footnotes

¹ *The rating designations used in Tables 1 and 2 are for illustrative purposes only and do not indicate any preference for, or endorsement of, any particular external assessment system.*

42.2 For exposures with short-term ratings, or when an inferred rating based on a short-term rating is available, the following risk weights will apply:

ERBA risk weights for short-term ratings				Table 1
External credit assessment	A-1/P-1	A-2/P-2	A-3/P-3	All other ratings
Risk weight	15%	50%	100%	1250%

42.3 For exposures with long-term ratings, or when an inferred rating based on a long-term rating is available, the risk weights depend on

- (1) the external rating grade or an available inferred rating;
- (2) the seniority of the position;
- (3) the tranche maturity; and
- (4) in the case of non-senior tranches, the tranche thickness.

42.4 Specifically, for exposures with long-term ratings, risk weights will be determined according to Table 2 and will be adjusted for tranche maturity (calculated according to [CRE40.22](#) and [CRE40.23](#)), and tranche thickness for non-senior tranches according to [CRE42.5](#).

Rating	Senior tranche		Non-senior (thin) tranche	
	Tranche maturity (M_T)		Tranche maturity (M_T)	
	1 year	5 years	1 year	5 years
AAA	15%	20%	15%	70%
AA+	15%	30%	15%	90%
AA	25%	40%	30%	120%
AA-	30%	45%	40%	140%
A+	40%	50%	60%	160%
A	50%	65%	80%	180%
A-	60%	70%	120%	210%
BBB+	75%	90%	170%	260%
BBB	90%	105%	220%	310%
BBB-	120%	140%	330%	420%
BB+	140%	160%	470%	580%
BB	160%	180%	620%	760%
BB-	200%	225%	750%	860%
B+	250%	280%	900%	950%
B	310%	340%	1050%	1050%
B-	380%	420%	1130%	1130%
CCC+/CCC/CCC-	460%	505%	1250%	1250%
Below CCC-	1250%	1250%	1250%	1250%

42.5 The risk weight assigned to a securitisation exposure when applying the SEC-ERBA is calculated as follows:

- (1) To account for tranche maturity, banks shall use linear interpolation between the risk weights for one and five years.
- (2) To account for tranche thickness, banks shall calculate the risk weight for non-senior tranches as follows, where T equals tranche thickness, and is measured as T minus A, as defined, respectively, in [CRE44.15](#) and [CRE44.14](#):

$$\text{Risk weight} = (\text{risk weight from table after adjusting for maturity}) \times (1 - \min(T, 50\%))$$

- 42.6** In the case of market risk hedges such as currency or interest rate swaps, the risk weight will be inferred from a securitisation exposure that is pari passu to the swaps or, if such an exposure does not exist, from the next subordinated tranche.
- 42.7** The resulting risk weight is subject to a floor risk weight of 15%. In addition, the resulting risk weight should never be lower than the risk weight corresponding to a senior tranche of the same securitisation with the same rating and maturity.

Operational requirements for use of external credit assessments

- 42.8** The following operational criteria concerning the use of external credit assessments apply in the securitisation framework:
- (1) To be eligible for risk-weighting purposes, the external credit assessment must take into account and reflect the entire amount of credit risk exposure the bank has with regard to all payments owed to it. For example, if a bank is owed both principal and interest, the assessment must fully take into account and reflect the credit risk associated with timely repayment of both principal and interest.
 - (2) The external credit assessments must be from an eligible external credit assessment institution (ECAI) as recognised by the bank's national supervisor in accordance with [CRE21](#) with the following exception. In contrast with [CRE21.2\(3\)](#), an eligible credit assessment, procedures, methodologies, assumptions and the key elements underlying the assessments must be publicly available, on a non-selective basis and free of charge.² In other words, a rating must be published in an accessible form and included in the ECAI's transition matrix. Also, loss and cash flow analysis as well as sensitivity of ratings to changes in the underlying rating assumptions should be publicly available. Consequently, ratings that are made available only to the parties to a transaction do not satisfy this requirement.
 - (3) Eligible ECAIs must have a demonstrated expertise in assessing securitisations, which may be evidenced by strong market acceptance.

- (4) Where two or more eligible ECAs can be used and these assess the credit risk of the same securitisation exposure differently, [CRE21.6](#) to [CRE21.8](#) will apply.
- (5) Where credit risk mitigation (CRM) is provided to specific underlying exposures or the entire pool by an eligible guarantor as defined in [CRE22](#) and is reflected in the external credit assessment assigned to a securitisation exposure(s), the risk weight associated with that external credit assessment should be used. In order to avoid any double-counting, no additional capital recognition is permitted. If the CRM provider is not recognised as an eligible guarantor under [CRE22](#), the covered securitisation exposures should be treated as unrated.
- (6) In the situation where a credit risk mitigant solely protects a specific securitisation exposure within a given structure (eg asset-backed security tranche) and this protection is reflected in the external credit assessment, the bank must treat the exposure as if it is unrated and then apply the CRM treatment outlined in [CRE22](#) or in the foundation internal ratings-based (IRB) approach of [CRE30](#) to [CRE36](#), to recognise the hedge.
- (7) A bank is not permitted to use any external credit assessment for risk-weighting purposes where the assessment is at least partly based on unfunded support provided by the bank. For example, if a bank buys asset-backed commercial paper (ABCP) where it provides an unfunded securitisation exposure extended to the ABCP programme (eg liquidity facility or credit enhancement), and that exposure plays a role in determining the credit assessment on the ABCP, the bank must treat the ABCP as if it were not rated. The bank must continue to hold capital against the other securitisation exposures it provides (eg against the liquidity facility and/or credit enhancement).

Footnotes

- ² *Where the eligible credit assessment is not publicly available free of charge, the ECAI should provide an adequate justification, within its own publicly available code of conduct, in accordance with the “comply or explain” nature of the International Organization of Securities Commissions’ Code of Conduct Fundamentals for Credit Rating Agencies.*

Operational requirements for inferred ratings

42.9 In accordance with the hierarchy of approaches determined in [CRE40.41](#) to [CRE40.47](#), a bank must infer a rating for an unrated position and use the SEC-ERBA provided that the requirements set out in [CRE42.10](#) are met. These requirements are intended to ensure that the unrated position is pari passu or senior in all respects to an externally-rated securitisation exposure termed the “reference securitisation exposure”.

42.10 The following operational requirements must be satisfied to recognise inferred ratings:

- (1) The reference securitisation exposure (eg asset-backed security) must rank pari passu or be subordinate in all respects to the unrated securitisation exposure. Credit enhancements, if any, must be taken into account when assessing the relative subordination of the unrated exposure and the reference securitisation exposure. For example, if the reference securitisation exposure benefits from any third-party guarantees or other credit enhancements that are not available to the unrated exposure, then the latter may not be assigned an inferred rating based on the reference securitisation exposure.
- (2) The maturity of the reference securitisation exposure must be equal to or longer than that of the unrated exposure.
- (3) On an ongoing basis, any inferred rating must be updated continuously to reflect any subordination of the unrated position or changes in the external rating of the reference securitisation exposure.
- (4) The external rating of the reference securitisation exposure must satisfy the general requirements for recognition of external ratings as delineated in [CRE42.8](#).

Alternative capital treatment for term STC securitisations and short-term STC securitisations meeting the STC criteria for capital purposes

42.11 Securitisation transactions that are assessed as simple, transparent and comparable (STC)-compliant for capital purposes as defined in [CRE40.67](#) can be subject to capital requirements under the securitisation framework, taking into account that, when the SEC-ERBA is used, [CRE42.12](#), [CRE42.13](#) and [CRE42.14](#) are applicable instead of [CRE42.2](#), [CRE42.4](#) and [CRE42.7](#) respectively.

42.12 For exposures with short-term ratings, or when an inferred rating based on a short-term rating is available, the following risk weights will apply:

ERBA STC risk weights for short-term ratings				Table 3
External credit assessment	A-1/P-1	A-2/P-2	A-3/P-3	All other ratings
Risk weight	10%	30%	60%	1250%

42.13 For exposures with long-term ratings, risk weights will be determined according to Table 4 and will be adjusted for tranche maturity (calculated according to [CRE40.22](#) and [CRE40.23](#)), and tranche thickness for non-senior tranches according to [CRE42.5](#) and [CRE42.6](#).

ERBA STC risk weights for long-term ratings

Table 4

Rating	Senior tranche		Non-senior (thin) tranche	
	Tranche maturity (M_T)		Tranche maturity (M_T)	
	1 year	5 years	1 year	5 years
AAA	10%	10%	15%	40%
AA+	10%	15%	15%	55%
AA	15%	20%	15%	70%
AA-	15%	25%	25%	80%
A+	20%	30%	35%	95%
A	30%	40%	60%	135%
A-	35%	40%	95%	170%
BBB+	45%	55%	150%	225%
BBB	55%	65%	180%	255%
BBB-	70%	85%	270%	345%
BB+	120%	135%	405%	500%
BB	135%	155%	535%	655%
BB-	170%	195%	645%	740%
B+	225%	250%	810%	855%
B	280%	305%	945%	945%
B-	340%	380%	1015%	1015%
CCC+/CCC/CCC-	415%	455%	1250%	1250%
Below CCC-	1250%	1250%	1250%	1250%

42.14 The resulting risk weight is subject to a floor risk weight of 10% for senior tranches, and 15% for non-senior tranches.

CRE43

Securitisation: Internal assessment approach (SEC- IAA)

This chapter describes how to calculate capital requirements for short-term securitisation exposures according to the internal assessment by the bank of the credit quality of the exposures (SEC-IAA).

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Internal assessment approach (SEC-IAA)

- 43.1** Subject to supervisory approval, a bank may use its internal assessments of the credit quality of its securitisation exposures extended to ABCP programmes (eg liquidity facilities and credit enhancements) provided that the bank has at least one approved IRB model (which does not need to be applicable to the securitised exposures) and if the bank's internal assessment process meets the operational requirements set out below. Internal assessments of exposures provided to ABCP programmes must be mapped to equivalent external ratings of an ECAI. Those rating equivalents are used to determine the appropriate risk weights under the SEC-ERBA for the exposures.
- 43.2** A bank's internal assessment process must meet the following operational requirements in order to use internal assessments in determining the IRB capital requirement arising from liquidity facilities, credit enhancements, or other exposures extended to an ABCP programme:
- (1) For the unrated exposure to qualify for the internal assessment approach (SEC-IAA), the ABCP must be externally rated. The ABCP itself is subject to the SEC-ERBA.
 - (2) The internal assessment of the credit quality of a securitisation exposure to the ABCP programme must be based on ECAI criteria for the asset type purchased, and must be the equivalent of at least investment grade when initially assigned to an exposure. In addition, the internal assessment must be used in the bank's internal risk management processes, including management information and economic capital systems, and generally must meet all the relevant requirements of the IRB framework.
 - (3) In order for banks to use the SEC-IAA, their supervisors must be satisfied
 - (a) that the ECAI meets the ECAI eligibility criteria outlined in [CRE21](#) and
 - (b) with the ECAI rating methodologies used in the process.
 - (4) Banks demonstrate to the satisfaction of their supervisors how these internal assessments correspond to the relevant ECAI's standards. For instance, when calculating the credit enhancement level in the context of the SEC-IAA, supervisors may, if warranted, disallow on a full or partial basis any seller-provided recourse guarantees or excess spread, or any other first-loss credit enhancements that provide limited protection to the bank.

- (5) The bank's internal assessment process must identify gradations of risk. Internal assessments must correspond to the external ratings of ECAs so that supervisors can determine which internal assessment corresponds to each external rating category of the ECAs.

- (6) The bank's internal assessment process, particularly the stress factors for determining credit enhancement requirements, must be at least as conservative as the publicly available rating criteria of the major ECAIs that are externally rating the ABCP programme's commercial paper for the asset type being purchased by the programme. However, banks should consider, to some extent, all publicly available ECAI rating methodologies in developing their internal assessments.
- (a) In the case where the commercial paper issued by an ABCP programme is externally rated by two or more ECAIs and the different ECAIs' benchmark stress factors require different levels of credit enhancement to achieve the same external rating equivalent, the bank must apply the ECAI stress factor that requires the most conservative or highest level of credit protection. For example, if one ECAI required enhancement of 2.5 to 3.5 times historical losses for an asset type to obtain a single A rating equivalent and another required two to three times historical losses, the bank must use the higher range of stress factors in determining the appropriate level of seller-provided credit enhancement.
 - (b) When selecting ECAIs to externally rate an ABCP, a bank must not choose only those ECAIs that generally have relatively less restrictive rating methodologies. In addition, if there are changes in the methodology of one of the selected ECAIs, including the stress factors, that adversely affect the external rating of the programme's commercial paper, then the revised rating methodology must be considered in evaluating whether the internal assessments assigned to ABCP programme exposures are in need of revision.
 - (c) A bank cannot utilise an ECAI's rating methodology to derive an internal assessment if the ECAI's process or rating criteria are not publicly available. However, banks should consider the non-publicly available methodology - to the extent that they have access to such information - in developing their internal assessments, particularly if it is more conservative than the publicly available criteria.
 - (d) In general, if the ECAI rating methodologies for an asset or exposure are not publicly available, then the IAA may not be used. However, in certain instances - for example, for new or uniquely structured transactions, which are not currently addressed by the rating criteria of an ECAI rating the programme's commercial paper - a bank may discuss the specific transaction with its supervisor to determine whether the IAA may be applied to the related exposures

- (7) Internal or external auditors, an ECAI, or the bank's internal credit review or risk management function must perform regular reviews of the internal assessment process and assess the validity of those internal assessments. If the bank's internal audit, credit review or risk management functions perform the reviews of the internal assessment process, then these functions must be independent of the ABCP programme business line, as well as the underlying customer relationships.
- (8) The bank must track the performance of its internal assessments over time to evaluate the performance of the assigned internal assessments and make adjustments, as necessary, to its assessment process when the performance of the exposures routinely diverges from the assigned internal assessments on those exposures.
- (9) The ABCP programme must have credit and investment guidelines, ie underwriting standards, for the ABCP programme. In the consideration of an asset purchase, the ABCP programme (ie the programme administrator) should develop an outline of the structure of the purchase transaction. Factors that should be discussed include the type of asset being purchased; type and monetary value of the exposures arising from the provision of liquidity facilities and credit enhancements; loss waterfall; and legal and economic isolation of the transferred assets from the entity selling the assets.
- (10) A credit analysis of the asset seller's risk profile must be performed and should consider, for example, past and expected future financial performance; current market position; expected future competitiveness; leverage, cash flow and interest coverage; and debt rating. In addition, a review of the seller's underwriting standards, servicing capabilities and collection processes should be performed.
- (11) The ABCP programme's underwriting policy must establish minimum asset eligibility criteria that, among other things:
- (a) exclude the purchase of assets that are significantly past due or defaulted;
 - (b) limit excess concentration to individual obligor or geographical area; and
 - (c) limit the tenor of the assets to be purchased.

- (12) The ABCP programme should have collection processes established that consider the operational capability and credit quality of the servicer. The programme should mitigate to the extent possible seller/servicer risk through various methods, such as triggers based on current credit quality that would preclude commingling of funds and impose lockbox arrangements that would help ensure the continuity of payments to the ABCP programme.
- (13) The aggregate estimate of loss on an asset pool that the ABCP programme is considering purchasing must consider all sources of potential risk, such as credit and dilution risk. If the seller-provided credit enhancement is sized based on only credit-related losses, then a separate reserve should be established for dilution risk, if dilution risk is material for the particular exposure pool. In addition, in sizing the required enhancement level, the bank should review several years of historical information, including losses, delinquencies, dilutions and the turnover rate of the receivables. Furthermore, the bank should evaluate the characteristics of the underlying asset pool (eg weighted-average credit score) and should identify any concentrations to an individual obligor or geographical region and the granularity of the asset pool.
- (14) The ABCP programme must incorporate structural features into the purchase of assets in order to mitigate potential credit deterioration of the underlying portfolio. Such features may include wind-down triggers specific to a pool of exposures.

43.3 The exposure amount of the securitisation exposure to the ABCP programme must be assigned to the risk weight in the SEC-ERBA appropriate to the credit rating equivalent assigned to the bank's exposure.

43.4 If a bank's internal assessment process is no longer considered adequate, the bank's supervisor may preclude the bank from applying the SEC-IAA to its ABCP exposures, both existing and newly originated, for determining the appropriate capital treatment until the bank has remedied the deficiencies. In this instance, the bank must revert to the SEC-SA described in [CRE41.1](#) to [CRE41.15](#).

CRE44

Securitisation: Internal-ratings-based approach

This chapter describes how to calculate capital requirements for securitisation exposures under the SEC-IRBA.

**Version effective as of
15 Dec 2019**

First version in the format of the consolidated framework.

Internal ratings-based approach (SEC-IRBA)

44.1 To calculate capital requirements for a securitisation exposure to an internal ratings-based (IRB) pool, a bank must use the securitisation internal ratings-based approach (SEC-IRBA) and the following bank-supplied inputs: the IRB capital charge had the underlying exposures not been securitised (K_{IRB}), the tranche attachment point (A), the tranche detachment point (D) and the supervisory parameter p , as defined below. Where the only difference between exposures to a transaction is related to maturity, A and D will be the same.

Definition of K_{IRB}

44.2 K_{IRB} is the ratio of the following measures, expressed in decimal form (eg a capital charge equal to 15% of the pool would be expressed as 0.15):

- (1) the IRB capital requirement (including the expected loss portion and, where applicable, dilution risk as discussed in [CRE44.11](#) to [CRE44.13](#)) for the underlying exposures in the pool; to
- (2) the exposure amount of the pool (eg the sum of drawn amounts related to securitised exposures plus the exposure-at-default associated with undrawn commitments related to securitised exposures).^{[123](#)}

Footnotes

^{[1](#)} K_{IRB} must also include the unexpected loss and the expected loss associated with defaulted exposures in the underlying pool.

^{[2](#)} The scaling factor of 1.06 referenced in [CRE30.4](#) is applied to the unexpected loss portion of the calculation of K_{IRB} . The calculation of K_{IRB} and the calculation of caps as determined in [CRE40.50](#) to [CRE40.55](#) are the only occurrence of use of the scaling factor in the securitisation framework, ie the risk-weighted assets resulting from the different approaches (SEC-IRBA, SEC-ERBA or SEC-SA) are not subject to the scaling factor.

^{[3](#)} Undrawn balances should not be included in the calculation of K_{IRB} in cases where only the drawn balances of revolving facilities have been securitised.

- 44.3** Notwithstanding the clarification in [CRE40.46](#) and [CRE40.47](#) for mixed pools, [CRE44.2](#)(1) must be calculated in accordance with applicable minimum IRB standards in [CRE30](#) to [CRE36](#) as if the exposures in the pool were held directly by the bank. This calculation should reflect the effects of any credit risk mitigant that is applied on the underlying exposures (either individually or to the entire pool), and hence benefits all of the securitisation exposures.
- 44.4** For structures involving a special purpose entity (SPE), all of the SPE's exposures related to the securitisation are to be treated as exposures in the pool. Exposures related to the securitisation that should be treated as exposures in the pool could include assets in which the SPE may have invested a reserve account, such as a cash collateral account or claims against counterparties resulting from interest swaps or currency swaps.⁴ Notwithstanding, the bank can exclude the SPE's exposures from the pool for capital calculation purposes if the bank can demonstrate to its national supervisor that the risk of the SPE's exposures is immaterial (for example, because it has been mitigated⁵) or that it does not affect the bank's securitisation exposure.

Footnotes

⁴ *In particular, in the case of swaps other than credit derivatives, the numerator of K_{IRB} must include the positive current market value times the risk weight of the swap provider times 8%. In contrast, the denominator should not take into account such a swap, as such a swap would not provide a credit enhancement to any tranche.*

⁵ *Certain best market practices can eliminate or at least significantly reduce the potential risk from a default of a swap provider. Examples of such features could be: cash collateralisation of the market value in combination with an agreement of prompt additional payments in case of an increase of the market value of the swap; and minimum credit quality of the swap provider with the obligation to post collateral or present an alternative swap provider without any costs for the SPE in the event of a credit deterioration on the part of the original swap provider. If national supervisors are satisfied with these risk mitigants and accept that the contribution of these exposures to the risk of the holder of a securitisation exposure is insignificant, supervisors may allow the bank to exclude these exposures from the K_{IRB} calculation.*

44.5 In the case of funded synthetic securitisations, any proceeds of the issuances of credit-linked notes or other funded obligations of the SPE that serve as collateral for the repayment of the securitisation exposure in question and for which the bank cannot demonstrate to its national supervisor that it is immaterial must be included in the calculation of K_{IRB} if the default risk of the collateral is subject to the tranching loss allocation.⁶

Footnotes

⁶ *As in the case of swaps other than credit derivatives, the numerator of K_{IRB} (ie quantity [CRE44.2\(1\)](#)) must include the exposure amount of the collateral times its risk weight times 8%, but the denominator should be calculated without recognition of the collateral.*

44.6 To calculate K_{IRB} , the treatment for eligible purchased receivables described in [CRE30.29](#) to [CRE30.33](#), [CRE34.2](#) to [CRE34.7](#), [CRE36.103](#), [CRE36.105](#), [CRE36.109](#) to [CRE36.117](#) may be used, with the particularities specified in [CRE44.7](#) to [CRE44.9](#), if, according to IRB minimum requirements:

- (1) for non-retail assets, it would be an undue burden on a bank to assess the default risk of individual obligors; and
- (2) for retail assets, a bank is unable to primarily rely on internal data.

44.7 [CRE44.6](#) applies to any securitised exposure, not just purchased receivables. For this purpose, "eligible purchased receivables" should be understood as referring to any securitised exposure for which the conditions of [CRE44.6](#) are met, and "eligible purchased corporate receivables" should be understood as referring to any securitised non-retail exposure. All other IRB minimum requirements must be met by the bank.

44.8 Supervisors may deny the use of a top-down approach for eligible purchased receivables for securitised exposures depending on the bank's compliance with minimum requirements.

44.9 The requirements to use a top-down approach for the eligible purchased receivables are generally unchanged when applied to securitisations except in the following cases:

- (1) the requirement in [CRE30.32](#) for the bank to have a claim on all proceeds from the pool of receivables or a pro-rata interest in the proceeds does not apply. Instead, the bank must have a claim on all proceeds from the pool of securitised exposures that have been allocated to the bank's exposure in the securitisation in accordance with the terms of the related securitisation documentation;
- (2) in [CRE36.110](#), the purchasing bank should be interpreted as the bank calculating K_{IRB} ;
- (3) in [CRE36.112](#) to [CRE36.117](#) "a bank" should be read as "the bank estimating probability of default, loss-given-default (LGD) or expected loss for the securitised exposures"; and
- (4) if the bank calculating K_{IRB} cannot itself meet the requirements in [CRE36.112](#) to [CRE36.116](#), it must instead ensure that it meets these requirements through a party to the securitisation acting for and in the interest of the investors in the securitisation, in accordance with the terms of the related securitisation documents. Specifically, requirements for effective control and ownership must be met for all proceeds from the pool of securitised exposures that have been allocated to the bank's exposure to the securitisation. Further, in [CRE36.114](#)(1), the relevant eligibility criteria and advancing policies are those of the securitisation, not those of the bank calculating K_{IRB} .

44.10 In cases where a bank has set aside a specific provision or has a non-refundable purchase price discount on an exposure in the pool, the quantities defined in [CRE44.2](#)(1) and [CRE44.2](#)(2) must be calculated using the gross amount of the exposure without the specific provision and/or non-refundable purchase price discount.

44.11 Dilution risk in a securitisation must be recognised if it is not immaterial, as demonstrated by the bank to its national supervisor (see [CRE34.8](#)), whereby the provisions of [CRE44.2](#) to [CRE44.5](#) shall apply.

44.12 Where default and dilution risk are treated in an aggregate manner (eg an identical reserve or overcollateralisation is available to cover losses for both risks), in order to calculate capital requirements for the securitisation exposure, a bank must determine K_{IRB} for dilution risk and default risk, respectively, and combine them into a single K_{IRB} prior to applying the SEC-IRBA. [CRE99.4](#) to [CRE99.8](#) provides an illustration of such a calculation.

44.13 In certain circumstances, pool level credit enhancement will not be available to cover losses from either credit risk or dilution risk. In the case of separate waterfalls for credit risk and dilution risk, a bank should consult with its national supervisor as to how the capital calculation should be performed. To guide banks and supervisors, [CRE99.9](#) to [CRE99.19](#) includes an example of how such calculations could be made in a prudent manner.

Definition of attachment point (A), detachment point (D) and supervisory parameter (p)

44.14 The input A represents the threshold at which losses within the underlying pool would first be allocated to the securitisation exposure. This input, which is a decimal value between zero and one, equals the greater of

- (1) zero and
- (2) the ratio of
 - (a) the outstanding balance of all underlying assets in the securitisation minus the outstanding balance of all tranches that rank senior or pari passu to the tranche that contains the securitisation exposure of the bank (including the exposure itself) to
 - (b) the outstanding balance of all underlying assets in the securitisation.

44.15 The input D represents the threshold at which losses within the underlying pool result in a total loss of principal for the tranche in which a securitisation exposure resides. This input, which is a decimal value between zero and one, equals the greater of

- (1) zero and
- (2) the ratio of
 - (a) the outstanding balance of all underlying assets in the securitisation minus the outstanding balance of all tranches that rank senior to the tranche that contains the securitisation exposure of the bank to
 - (b) the outstanding balance of all underlying assets in the securitisation.

44.16 For the calculation of A and D, overcollateralisation and funded reserve accounts must be recognised as tranches; and the assets forming these reserve accounts must be recognised as underlying assets. Only the loss-absorbing part of the funded reserve accounts that provide credit enhancement can be recognised as tranches and underlying assets. Unfunded reserve accounts, such as those to be funded from future receipts from the underlying exposures (eg unrealised excess spread) and assets that do not provide credit enhancement like pure liquidity support, currency or interest-rate swaps, or cash collateral accounts related to these instruments must not be included in the above calculation of A and D. Banks should take into consideration the economic substance of the transaction and apply these definitions conservatively in the light of the structure.

44.17 The supervisory parameter p in the context of the SEC-IRBA is expressed as follows, where:

- (1) 0.3 denotes the p -parameter floor;
- (2) N is the effective number of loans in the underlying pool, calculated as described in [CRE44.20](#);
- (3) K_{IRB} is the capital charge of the underlying pool (as defined in [CRE44.2](#) to [CRE44.5](#));
- (4) LGD is the exposure-weighted average loss-given-default of the underlying pool, calculated as described in [CRE44.21](#);
- (5) M_T is the maturity of the tranche calculated according to [CRE40.22](#) and [CRE40.23](#); and

(6) the parameters A, B, C, D, and E are determined according to Table 1:

$$p = \max \left[0.3, \left(A + \frac{B}{N} + (C \times K_{IRB}) + (D \times LGD) + (E \times M_T) \right) \right]$$

Look-up table for supervisory parameters A, B, C, D and E

Table 1

		A	B	C	D	E
Wholesale	Senior, granular (N≥25)	0	3.56	-1.85	0.55	0.07
	Senior, non-granular (N<25)	0.11	2.61	-2.91	0.68	0.07
	Non-senior, granular (N≥25)	0.16	2.87	-1.03	0.21	0.07
	Non-senior, non-granular (N<25)	0.22	2.35	-2.46	0.48	0.07
Retail	Senior	0	0	-7.48	0.71	0.24
	Non-senior	0	0	-5.78	0.55	0.27

44.18 If the underlying IRB pool consists of both retail and wholesale exposures, the pool should be divided into one retail and one wholesale subpool and, for each subpool, a separate p-parameter (and the corresponding input parameters N, K_{IRB} and LGD) should be estimated. Subsequently, a weighted average p-parameter for the transaction should be calculated on the basis of the p-parameters of each subpool and the nominal size of the exposures in each subpool.

44.19 If a bank applies the SEC-IRBA to a mixed pool as described in [CRE40.46](#) and [CRE40.47](#), the calculation of the p-parameter should be based on the IRB underlying assets only. The SA underlying assets should not be considered for this purpose.

44.20 The effective number of exposures, N, is calculated as follows, where EAD_i represents the exposure-at-default associated with the i^{th} instrument in the pool. Multiple exposures to the same obligor must be consolidated (ie treated as a single instrument).

$$N = \frac{(\sum_i EAD_i)^2}{\sum_i EAD_i^2}$$

44.21 The exposure-weighted average LGD is calculated as follows, where LGD_i represents the average LGD associated with all exposures to the i^{th} obligor. When default and dilution risks for purchased receivables are treated in an aggregate manner (eg a single reserve or overcollateralisation is available to cover losses from either source) within a securitisation, the LGD input must be constructed as a weighted average of the LGD for default risk and the 100% LGD for dilution risk. The weights are the stand-alone IRB capital charges for default risk and dilution risk, respectively.

$$LGD = \frac{\sum_i LGD_i \times EAD_i}{\sum_i EAD_i}$$

44.22 Under the conditions outlined below, banks may employ a simplified method for calculating the effective number of exposures and the exposure-weighted average LGD. Let C_m in the simplified calculation denote the share of the pool corresponding to the sum of the largest m exposures (eg a 15% share corresponds to a value of 0.15). The level of m is set by each bank.

- (1) If the portfolio share associated with the largest exposure, C_1 , is no more than 0.03 (or 3% of the underlying pool), then for purposes of the SEC-IRBA the bank may set LGD as 0.50 and N equal to the following amount:

$$N = \left((C_1 \times C_m) + \frac{(C_m - C_1) \times \max(1 - m \times C_1, 0)}{m - 1} \right)^{-1}$$

- (2) Alternatively, if only C_1 is available and this amount is no more than 0.03, then the bank may set LGD as 0.50 and N as $1/C_1$.

Calculation of risk weight

44.23 The formulation of the SEC-IRBA is expressed as follows, where:

- (1) $K_{SSFA(K_{IRB})}$ is the capital requirement per unit of securitisation exposure under the SEC-IRBA, which is a function of three variables;
- (2) the constant e is the base of the natural logarithm (which equals 2.71828);

- (3) the variable a is defined as $-(1 / (p * K_{IRB}))$;
- (4) the variable u is defined as $D - K_{IRB}$; and
- (5) the variable l is defined as the maximum of $A - K_{IRB}$ and zero.

$$K_{SSFA(K_{IRB})} = \frac{e^{au} - e^{al}}{a(u-l)}$$

44.24 The risk weight assigned to a securitisation exposure when applying the SEC-IRBA is calculated as follows:

- (1) When D for a securitisation exposure is less than or equal to K_{IRB} , the exposure must be assigned a risk weight of 1250%.
- (2) When A for a securitisation exposure is greater than or equal to K_{IRB} , the risk weight of the exposure, expressed as a percentage, would equal $K_{SSFA(K_{IRB})}$ times 12.5.
- (3) When A is less than K_{IRB} and D is greater than K_{IRB} , the applicable risk weight is a weighted average of 1250% and 12.5 times $K_{SSFA(K_{IRB})}$ according to the following formula:

$$RW = \frac{12.5 \times (K_{IRB} - A)}{D - A} + \frac{12.5 \times K_{SSFA(K_{IRB})} \times (D - K_{IRB})}{D - A}$$

44.25 The risk weight for market risk hedges such as currency or interest rate swaps will be inferred from a securitisation exposure that is *pari passu* to the swaps or, if such an exposure does not exist, from the next subordinated tranche.

44.26 The resulting risk weight is subject to a floor risk weight of 15%.

Alternative capital treatment for term securitisations and short-term securitisations meeting the STC criteria for capital purposes

44.27 Securitisation transactions that are assessed as simple, transparent and comparable (STC)-compliant for capital purposes in [CRE40.67](#) can be subject to capital requirements under the securitisation framework, taking into account that, when the SEC-IRBA is used, [CRE44.28](#) and [CRE44.29](#) are applicable instead of [CRE44.17](#) and [CRE44.26](#) respectively.

44.28

The supervisory parameter p in SEC-IRBA for an exposure to an STC securitisation is expressed as follows, where:

- (1) 0.3 denotes the p -parameter floor;
- (2) N is the effective number of loans in the underlying pool, calculated as described in [CRE44.20](#);
- (3) K_{IRB} is the capital charge of the underlying pool (as defined in [CRE44.2](#) to [CRE44.5](#));
- (4) LGD is the exposure-weighted average loss-given-default of the underlying pool, calculated as described in [CRE44.21](#);
- (5) M_T is the maturity of the tranche calculated according to [CRE40.22](#) and [CRE40.23](#); and
- (6) the parameters A, B, C, D, and E are determined according to Table 2:

$$p = \max \left[0.3, 0.5 \left(A + \frac{B}{N} + (C \times K_{IRB}) + (D \times LGD) + (E \times M_T) \right) \right]$$

Look-up table for supervisory parameters A, B, C, D and E

Table 2

		A	B	C	D	E
Wholesale	Senior, granular ($N \geq 25$)	0	3.56	-1.85	0.55	0.07
	Senior, non-granular ($N < 25$)	0.11	2.61	-2.91	0.68	0.07
	Non-senior, granular ($N \geq 25$)	0.16	2.87	-1.03	0.21	0.07
	Non-senior, non-granular ($N < 25$)	0.22	2.35	-2.46	0.48	0.07
Retail	Senior	0	0	-7.48	0.71	0.24
	Non-senior	0	0	-5.78	0.55	0.27

44.29 The resulting risk weight is subject to a floor risk weight of 10% for senior tranches, and 15% for non-senior tranches.

CRE50

Counterparty credit risk definitions and terminology

This chapter defines terms that are used in the chapters of the credit risk standard relating to counterparty credit risk.

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First version in the format of the consolidated framework.

General terms

- 50.1 Counterparty credit risk (CCR)** is the risk that the counterparty to a transaction could default before the final settlement of the transaction's cash flows. An economic loss would occur if the transactions or portfolio of transactions with the counterparty has a positive economic value at the time of default. Unlike a firm's exposure to credit risk through a loan, where the exposure to credit risk is unilateral and only the lending bank faces the risk of loss, CCR creates a bilateral risk of loss: the market value of the transaction can be positive or negative to either counterparty to the transaction. The market value is uncertain and can vary over time with the movement of underlying market factors.
- 50.2 A central counterparty (CCP)** is a clearing house that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the future performance of open contracts. A CCP becomes counterparty to trades with market participants through novation, an open offer system, or another legally binding arrangement. For the purposes of the capital framework, a CCP is a financial institution.
- 50.3 A qualifying central counterparty (QCCP)** is an entity that is licensed to operate as a CCP (including a license granted by way of confirming an exemption), and is permitted by the appropriate regulator/overseer to operate as such with respect to the products offered. This is subject to the provision that the CCP is based and prudentially supervised in a jurisdiction where the relevant regulator/overseer has established, and publicly indicated that it applies to the CCP on an ongoing basis, domestic rules and regulations that are consistent with the Principles for Financial Market Infrastructures issued by the Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions.
- (1) Where the CCP is in a jurisdiction that does not have a CCP regulator applying the Principles to the CCP, then the banking supervisor may make the determination of whether the CCP meets this definition.
 - (2) In addition, for a CCP to be considered a QCCP, the requirements of [CRE54.37](#) must be met to permit each clearing member bank to calculate its capital requirement for its default fund exposures.
- 50.4 A clearing member** is a member of, or a direct participant in, a CCP that is entitled to enter into a transaction with the CCP, regardless of whether it enters into trades with a CCP for its own hedging, investment or speculative purposes or whether it also enters into trades as a financial intermediary between the CCP and other market participants.

For the purposes of the CCR standard, where a CCP has a link to a second CCP, that second CCP is to be treated as a clearing member of the first CCP. Whether the second CCP's collateral contribution to the first CCP is treated as initial margin or a default fund contribution will depend upon the legal arrangement between the CCPs. National supervisors should be consulted to determine the treatment of this initial margin and default fund contributions.

- 50.5** A **client** is a party to a transaction with a CCP through either a clearing member acting as a financial intermediary, or a clearing member guaranteeing the performance of the client to the CCP.
- 50.6** A **multi-level client structure** is one in which banks can centrally clear as indirect clients; that is, when clearing services are provided to the bank by an institution which is not a direct clearing member, but is itself a client of a clearing member or another clearing client. For exposures between clients and clients of clients, we use the term **higher level client** for the institution providing clearing services; and the term **lower level client** for the institution clearing through that client.
- 50.7** **Initial margin** means a clearing member's or client's funded collateral posted to the CCP to mitigate the potential future exposure (PFE) of the CCP to the clearing member arising from the possible future change in the value of their transactions. For the purposes of the calculation of counterparty credit risk capital requirements, initial margin does not include contributions to a CCP for mutualised loss sharing arrangements (ie in case a CCP uses initial margin to mutualise losses among the clearing members, it will be treated as a default fund exposure). Initial margin includes collateral deposited by a clearing member or client in excess of the minimum amount required, provided the CCP or clearing member may, in appropriate cases, prevent the clearing member or client from withdrawing such excess collateral.
- 50.8** **Variation margin** means a clearing member's or client's funded collateral posted on a daily or intraday basis to a CCP based upon price movements of their transactions.
- 50.9** **Trade exposures** (in [CRE54](#)) include the current and potential future exposure of a clearing member or a client to a CCP arising from over-the-counter derivatives, exchange traded derivatives transactions or securities financing transactions, as well as initial margin. For the purposes of this definition, the current exposure of a clearing member includes the variation margin due to the clearing member but not yet received.

50.10 Default funds also known as clearing deposits or guaranty fund contributions (or any other names), are clearing members' funded or unfunded contributions towards, or underwriting of, a CCP's mutualised loss sharing arrangements. The

description given by a CCP to its mutualised loss sharing arrangements is not determinative of their status as a default fund; rather, the substance of such arrangements will govern their status.

50.11 Offsetting transaction means the transaction leg between the clearing member and the CCP when the clearing member acts on behalf of a client (eg when a clearing member clears or novates a client's trade).

Transaction types

50.12 Long settlement transactions are transactions where a counterparty undertakes to deliver a security, a commodity, or a foreign exchange amount against cash, other financial instruments, or commodities, or vice versa, at a settlement or delivery date that is contractually specified as more than the lower of the market standard for this particular instrument and five business days after the date on which the bank enters into the transaction.

50.13 Securities financing transactions (SFTs) are transactions such as repurchase agreements, reverse repurchase agreements, security lending and borrowing, and margin lending transactions, where the value of the transactions depends on market valuations and the transactions are often subject to margin agreements.

50.14 Margin lending transactions are transactions in which a bank extends credit in connection with the purchase, sale, carrying or trading of securities. Margin lending transactions do not include other loans that happen to be secured by securities collateral. Generally, in margin lending transactions, the loan amount is collateralised by securities whose value is greater than the amount of the loan.

Netting sets, hedging sets, and related terms

50.15 Netting set is a group of transactions with a single counterparty that are subject to a legally enforceable bilateral netting arrangement and for which netting is recognised for regulatory capital purposes under the provisions of [CRE52.7](#) and [CRE52.8](#) that are applicable to the group of transactions, this framework text on credit risk mitigation techniques in [CRE22](#), or the cross product netting rules set out in [CRE53.61](#) to [CRE53.71](#). Each transaction that is not subject to a legally enforceable bilateral netting arrangement that is recognised for regulatory capital purposes should be interpreted as its own netting set for the purpose of these rules.

50.16 Hedging set is a set of transactions within a single netting set within which full or partial offsetting is recognised for the purpose of calculating the PFE add-on of the Standardised Approach for counterparty credit risk.

50.17 Margin agreement is a contractual agreement or provisions to an agreement under which one counterparty must supply variation margin to a second counterparty when an exposure of that second counterparty to the first counterparty exceeds a specified level.

50.18 Margin threshold is the largest amount of an exposure that remains outstanding until one party has the right to call for variation margin.

50.19 Margin period of risk is the time period from the last exchange of collateral covering a netting set of transactions with a defaulting counterparty until that counterparty is closed out and the resulting market risk is re-hedged.

50.20 Effective maturity under the Internal Models Method for a netting set with maturity greater than one year is the ratio of the sum of expected exposure over the life of the transactions in a netting set discounted at the risk-free rate of return divided by the sum of expected exposure over one year in a netting set discounted at the risk-free rate. This effective maturity may be adjusted to reflect rollover risk by replacing expected exposure with effective expected exposure for forecasting horizons under one year. The formula is given in [CRE53.20](#).

50.21 Cross-product netting refers to the inclusion of transactions of different product categories within the same netting set pursuant to the cross-product netting rules set out in [CRE53](#).

Distributions

50.22 Distribution of market values is the forecast of the probability distribution of net market values of transactions within a netting set for some future date (the forecasting horizon) given the realised market value of those transactions up to the present time.

50.23 Distribution of exposures is the forecast of the probability distribution of market values that is generated by setting forecast instances of negative net market values equal to zero (this takes account of the fact that, when the bank owes the counterparty money, the bank does not have an exposure to the counterparty).

50.24 Risk-neutral distribution is a distribution of market values or exposures at a future time period where the distribution is calculated using market implied values such as implied volatilities.

50.25 Actual distribution is a distribution of market values or exposures at a future time period where the distribution is calculated using historic or realised values such as volatilities calculated using past price or rate changes.

Exposure measures and adjustments

50.26 Current exposure is the larger of zero, or the current market value of a transaction or portfolio of transactions within a netting set with a counterparty that would be lost upon the immediate default of the counterparty, assuming no recovery on the value of those transactions in bankruptcy. Current exposure is often also called Replacement Cost.

50.27 Peak exposure is a high percentile (typically 95% or 99%) of the distribution of exposures at any particular future date before the maturity date of the longest transaction in the netting set. A peak exposure value is typically generated for many future dates up until the longest maturity date of transactions in the netting set.

50.28 Expected exposure is the mean (average) of the distribution of exposures at any particular future date before the longest-maturity transaction in the netting set matures. An expected exposure value is typically generated for many future dates up until the longest maturity date of transactions in the netting set.

50.29 Effective expected exposure at a specific date is the maximum expected exposure that occurs at that date or any prior date. Alternatively, it may be defined for a specific date as the greater of the expected exposure at that date, or the effective exposure at the previous date. In effect, the Effective Expected Exposure is the Expected Exposure that is constrained to be non-decreasing over time.

50.30 Expected positive exposure (EPE) is the weighted average over time of expected exposure where the weights are the proportion that an individual expected exposure represents of the entire time interval. When calculating the minimum capital requirement, the average is taken over the first year or, if all the contracts in the netting set mature before one year, over the time period of the longest-maturity contract in the netting set.

50.31 Effective expected positive exposure (Effective EPE) is the weighted average over time of effective expected exposure over the first year, or, if all the contracts in the netting set mature before one year, over the time period of the longest-maturity contract in the netting set where the weights are the proportion that an individual expected exposure represents of the entire time interval.

50.32 Credit valuation adjustment is an adjustment to the mid-market valuation of the portfolio of trades with a counterparty. This adjustment reflects the market value of the credit risk due to any failure to perform on contractual agreements with a counterparty. This adjustment may reflect the market value of the credit risk of the counterparty or the market value of the credit risk of both the bank and the counterparty.

50.33 One-sided credit valuation adjustment is a credit valuation adjustment that reflects the market value of the credit risk of the counterparty to the firm, but does not reflect the market value of the credit risk of the bank to the counterparty.

CCR-related risks

50.34 Rollover risk is the amount by which expected positive exposure is understated when future transactions with a counterparty are expected to be conducted on an ongoing basis, but the additional exposure generated by those future transactions is not included in calculation of expected positive exposure.

50.35 General wrong-way risk arises when the probability of default of counterparties is positively correlated with general market risk factors.

50.36 Specific wrong-way risk arises when the exposure to a particular counterparty is positively correlated with the probability of default of the counterparty due to the nature of the transactions with the counterparty.

CRE51

Counterparty credit risk overview

This chapter explains the meaning of counterparty credit risk and sets out the various approaches within the Basel framework that banks can use to measure counterparty credit risk exposures.

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First version in the format of the consolidated framework.

Introduction

51.1 Banks are required to identify their transactions that expose them to counterparty credit risk and calculate a counterparty credit risk charge. This chapter starts by explaining the definition of counterparty credit risk. It then sets out the various approaches that banks can use to measure their counterparty credit risk exposures and then calculate the related capital requirement.

Counterparty credit risk definition and explanation

51.2 Counterparty credit risk is defined in [CRE50](#). It is the risk that the counterparty to a transaction could default before the final settlement of the transaction in cases where there is a bilateral risk of loss. The bilateral risk of loss is the key concept on which the definition of counterparty credit risk is based and is explained further below.

51.3 When a bank makes a loan to a borrower the credit risk exposure is unilateral. That is, the bank is exposed to the risk of loss arising from the default of the borrower, but the transaction does not expose the borrower to a risk of loss from the default of the bank. By contrast, some transactions give rise to a bilateral risk of loss and therefore give rise to a counterparty credit risk charge. For example:

- (1) A bank makes a loan to a borrower and receives collateral from the borrower.
[1](#)
 - (a) The bank is exposed to the risk that the borrower defaults and the sale of the collateral is insufficient to cover the loss on the loan.
 - (b) The borrower is exposed to the risk that the bank defaults and does not return the collateral. Even in cases where the customer has the legal right to offset the amount it owes on the loan in compensation for the lost collateral, the customer is still exposed to the risk of loss at the outset of the loan because the value of the loan may be less than the value of the collateral the time of default of the bank.

- (2) A bank borrows cash from a counterparty and posts collateral to the counterparty (or undertakes a transaction that is economically equivalent, such as the sale and repurchase (repo) of a security).
 - (a) The bank is exposed to the risk that its counterparty defaults and does not return the collateral that the bank posted.
 - (b) The counterparty is exposed to the risk that the bank defaults and the amount the counterparty raises from the sale of the collateral that the bank posted is insufficient to cover the loss on the counterparty's loan to the bank.
- (3) A bank borrows a security from a counterparty and posts cash to the counterparty as collateral (or undertakes a transaction that is economically equivalent, such as a reverse repo).
 - (a) The bank is exposed to the risk that its counterparty defaults and does not return the cash that the bank posted as collateral.
 - (b) The counterparty is exposed to the risk that the bank defaults and the cash that the bank posted as collateral is insufficient to cover the loss of the security that the bank borrowed.
- (4) A bank enters a derivatives transaction with a counterparty (eg it enters a swap transaction or purchases an option). The value of the transaction can vary over time with the movement of underlying market factors.²
 - (a) The bank is exposed to the risk that the counterparty defaults when the derivative has a positive value for the bank.
 - (b) The counterparty is exposed to the risk that the bank defaults when the derivative has a positive value for the counterparty.

Footnotes

1

The bilateral risk of loss in this example arises because the bank receives, ie takes possession of, the collateral as part of the transaction. By contrast, collateralized loans where the collateral is not exchanged prior to default, do not give rise to a bilateral risk of loss; for example a corporate or retail loan secured on a property of the borrower where the bank may only take possession of the property when the borrower defaults does not give rise to counterparty credit risk.

2

The counterparty credit risk rules capture the risk of loss to the bank from the default of the derivative counterparty. The risk of gains or losses on the changing market value of the derivative is captured by the market risk framework. The market risk framework captures the risk that the bank will suffer a loss as a result of market movements in underlying risk factors referenced by the derivative (eg interest rates for an interest rate swap); however, it also captures the risk of losses that can result from the derivative declining in value due to a deterioration in the creditworthiness of the derivative counterparty. The latter risk is the credit valuation adjustment risk set out in [MAR50](#).

Scope of counterparty credit risk charge

51.4 Banks must calculate a counterparty credit risk charge for all exposures that give rise to counterparty credit risk, with the exception of those transactions listed in [CRE51.16](#) below. The categories of transaction that give rise to counterparty credit risk are:

- (1) Over-the-counter (OTC) derivatives
- (2) Exchange-traded derivatives
- (3) Long settlement transactions
- (4) Securities financing transactions

51.5 The transactions listed in [CRE51.4](#) above generally exhibit the following abstract characteristics:

- (1) The transactions generate a current exposure or market value.
- (2) The transactions have an associated random future market value based on market variables.

- (3) The transactions generate an exchange of payments or an exchange of a financial instrument (including commodities) against payment.
- (4) The transactions are undertaken with an identified counterparty against which a unique probability of default can be determined.

51.6 Other common characteristics of the transactions listed in [CRE51.4](#) include the following:

- (1) Collateral may be used to mitigate risk exposure and is inherent in the nature of some transactions.
- (2) Short-term financing may be a primary objective in that the transactions mostly consist of an exchange of one asset for another (cash or securities) for a relatively short period of time, usually for the business purpose of financing. The two sides of the transactions are not the result of separate decisions but form an indivisible whole to accomplish a defined objective.
- (3) Netting may be used to mitigate the risk.
- (4) Positions are frequently valued (most commonly on a daily basis), according to market variables.
- (5) Remargining may be employed.

Methods to calculate counterparty credit risk exposure

51.7 For the transaction types listed in [CRE51.4](#) above, banks must calculate their counterparty credit risk exposure, or exposure at default (EAD),³ using one of the methods set out in [CRE51.8](#) to [CRE51.9](#) below. The methods vary according to the type of the transaction, the counterparty to the transaction, and whether the bank has received supervisory approval to use the method (if such approval is required).

Footnotes

³

The terms "exposure" and "EAD" are used interchangeable in the counterparty credit risk chapters of the credit risk standard. This reflects the fact that the amounts calculated under the counterparty credit risk rules must typically be used as either the "exposure" within the standardised approach to credit risk, or the EAD within the internal ratings-based (IRB) approach to credit risk, as described in [CRE51.13](#).

51.8 For exposures that are not cleared through a central counterparty (CCP) the following methods must be used to calculate the counterparty credit risk exposure:

- (1) Standardised approach for measuring counterparty credit risk exposures (SA-CCR), which is set out in [CRE52](#). This method is to be used for exposures arising from OTC derivatives, exchange-traded derivatives and long settlement transactions. This method must be used if the bank does not have approval to use the internal model method (IMM).
- (2) The simple approach or comprehensive approach to the recognition of collateral, which are both set out in the credit risk mitigation chapter of the standardised approach to credit risk (see [CRE22](#)). These methods are to be used for securities financing transactions (SFTs) and must be used if the bank does not have approval to use the value-at-risk (VaR) models or the IMM.
- (3) The VaR models approach, which is set out in [CRE22.74](#) to [CRE22.77](#). The VaR models approach may be used to calculate EAD for SFTs, subject to supervisory approval, as an alternative to the method set out in (2) above.
- (4) The IMM, which is set out in [CRE53](#). This method may be used, subject to supervisory approval, as an alternative to the methods to calculate counterparty credit risk exposures set out in (1) and (2) above (for all of the exposures referenced in those bullets).

51.9 For exposures that are cleared through a CCP, banks must apply the method set out [CRE54](#). This method covers:

- (1) the exposures of a bank to a CCPs when the bank is a clearing member of the CCP;
- (2) the exposures of a bank to its clients, when the bank is a clearing members and act as an intermediary between the client and the CCP; and
- (3) the exposures of a bank to a clearing member of a CCP, when the bank is a client of the clearing member and the clearing member is acting as an intermediary between the bank and the CCP.

51.10 Exposures to central counterparties arising from the settlement of cash transactions (equities, fixed income, spot foreign exchange and spot commodities), are excluded from the requirements of [CRE54](#). They are instead subject to the requirements of [CRE70](#).

51.11

Under the methods outlined above, the exposure amount or EAD for a given counterparty is equal to the sum of the exposure amounts or EADs calculated for each netting set with that counterparty, subject to the exception outlined in [CRE51.12](#) below.

- 51.12** The exposure or EAD for a given OTC derivative counterparty is defined as the greater of zero and the difference between the sum of EADs across all netting sets with the counterparty and the credit valuation adjustment (CVA) for that counterparty which has already been recognised by the bank as an incurred write-down (ie a CVA loss). This CVA loss is calculated without taking into account any offsetting debit valuation adjustments which have been deducted from capital under [CAP30.15](#). This reduction of EAD by incurred CVA losses does not apply to the determination of the CVA risk capital requirement.

Methods to calculate CCR risk-weighted assets

- 51.13** After banks have calculated their counterparty credit risk exposures, or EAD, according to the methods outlined above, they must apply the standardised approach to credit risk, the IRB approach to credit risk, or, in the case of the exposures to CCPs, the capital requirements set out in [CRE54](#). For counterparties to which the bank applies the standardised approach, the counterparty credit risk exposure amount will be risk weighted according to the relevant risk weight of the counterparty. For counterparties to which the bank applies the IRB approach, the counterparty credit risk exposure amount defines the EAD that is used within the IRB approach to determine risk-weighted assets (RWA) and expected loss amounts.

- 51.14** For IRB exposures, the risk weights applied to OTC derivative exposures should be calculated with the full maturity adjustment (as defined in [CRE31.6](#)) set equal to 1, provided the bank can demonstrate to its national supervisor that its specific VaR model applied in [MAR50.3](#) contains effects of rating migrations. If the bank cannot demonstrate this to the satisfaction of its national supervisor, the full maturity adjustment function will apply.

- 51.15** For banks that have supervisory approval to use IMM, RWA for credit risk must be calculated as the higher of:

- (1) the sum of RWA calculated using IMM with current parameter calibrations;
- and

- (2) the sum of RWA calculated using IMM with stressed parameter calibrations.

FAQ

FAQ1 *How often is Effective expected positive exposure (EPE) using current market data to be compared with Effective EPE using a stress calibration?*

The frequency of calculation should be discussed with your national supervisor.

FAQ2 *How this requirement is to be applied to the use test in the context of credit risk management and CVA (eg can a multiplier to the Effective EPE be used between comparisons)?*

The use test only applies to the Effective EPE calculated using current market data.

Exemptions

51.16 As an exception to the requirements of [CRE51.4](#) above, banks are not required to calculate a counterparty credit risk charge for the following types of transactions (ie the exposure amount or EAD for counterparty credit risk for the transaction will be zero):

- (1) Credit derivative protection purchased by the bank against a banking book exposure, or against a counterparty credit risk exposure. In such cases, the bank will determine its capital requirement for the hedged exposure according to the criteria and general rules for the recognition of credit derivatives within the standardised approach or IRB approach to credit risk (ie substitution approach).
- (2) Sold credit default swaps in the banking book where they are treated in the framework as a guarantee provided by the bank and subject to a credit risk charge for the full notional amount.

CRE52

Standardised approach to counterparty credit risk

This chapter sets out the standardised approach for counterparty credit risk (SA-CCR).

Version effective as of 15 Dec 2019

Updated to include the following FAQ: CRE52.51
FAQ2.

Overview and scope

52.1 The Standardised Approach for Counterparty Credit Risk (SA-CCR) applies to over-the-counter (OTC) derivatives, exchange-traded derivatives and long settlement transactions. Banks that do not have approval to apply the internal model method (IMM) for the relevant transactions must use SA-CCR, as set out in this chapter. EAD is to be calculated separately for each netting set (as set out in [CRE50.15](#), each transaction that is not subject to a legally enforceable bilateral netting arrangement that is recognised for regulatory capital purposes should be interpreted as its own netting set). It is determined using the following formula, where:

- (1) $\alpha = 1.4$
- (2) RC = the replacement cost calculated according to [CRE52.3](#) to [CRE52.19](#)
- (3) PFE = the amount for potential future exposure calculated according to [CRE52.20](#) to [CRE52.76](#)

$$\text{EAD} = \alpha * (\text{RC} + \text{PFE})$$

FAQ

FAQ1 *How should the EAD be determined for sold options where premiums have been paid up front?*

The EAD can be set to zero only for sold options that are outside netting and margin agreements.

FAQ2 *How should the EAD be determined for credit derivatives where the bank is the protection seller?*

For credit derivatives where the bank is the protection seller and that are outside netting and margin agreements, the EAD may be capped to the amount of unpaid premia. Banks have the option to remove such credit derivatives from their legal netting sets and treat them as individual unmargined transactions in order to apply the cap.

FAQ3 *Are banks permitted to decompose certain types of products for which no specific treatment is specified in the SA-CCR standard into several simpler contracts resulting in the same cash flows?*

In the case of options (eg interest rate caps/floors that may be represented as the portfolio of individual caplets/floorlets), banks may decompose those products in a manner consistent with [CRE52.43](#).

Banks may not decompose linear products (eg ordinary interest rate swaps).

- 52.2** The replacement cost (RC) and the potential future exposure (PFE) components are calculated differently for margined and unmargined netting sets. Margined netting sets are netting sets covered by a margin agreement under which the bank's counterparty has to post variation margin; all other netting sets, including those covered by a one-way margin agreement where only the bank posts variation margin, are treated as unmargined for the purposes of the SA-CCR. The EAD for a margined netting set is capped at the EAD of the same netting set calculated on an unmargined basis.

FAQ

FAQ1 *The capping of the exposure at default (EAD) at the otherwise unmargined EAD is motivated by the need to ignore exposure from a large threshold amount that would not realistically be hit by some small (or non-existent) transactions. There is, however, a potential anomaly relating to this capping, namely in the case of margined netting sets comprising short-term transactions with a residual maturity of 10 business days or less. In this situation, the maturity factor (MF) weighting will be greater for a margined set than for a non-margined set, because of the 3/2 multiplier in [CRE52.52](#). That multiplier will, however, be negated by the capping. The anomaly would be magnified if there were some disputes under the margin agreement, ie where the margin period or risk (MPOR) would be doubled to 20 days but, again, negated by the capping to an unmargined calculation. Does this anomaly exist?*

Yes, such an anomaly does exist. Nonetheless, this anomaly is generally expected to have no significant impact on banks' capital requirements. Thus, no modification to the standard is required.

Replacement Cost and Net Independent Collateral Amount

- 52.3** For unmargined transactions, the RC intends to capture the loss that would occur if a counterparty were to default and were closed out of its transactions immediately. The PFE add-on represents a potential conservative increase in exposure over a one-year time horizon from the present date (ie the calculation date).

52.4

For margined trades, the RC intends to capture the loss that would occur if a counterparty were to default at the present or at a future time, assuming that the closeout and replacement of transactions occur instantaneously. However, there may be a period (the margin period of risk) between the last exchange of collateral before default and replacement of the trades in the market. The PFE add-on represents the potential change in value of the trades during this time period.

52.5 In both cases, the haircut applicable to noncash collateral in the replacement cost formulation represents the potential change in value of the collateral during the appropriate time period (one year for unmargined trades and the margin period of risk for margined trades).

52.6 Replacement cost is calculated at the netting set level, whereas PFE add-ons are calculated for each asset class within a given netting set and then aggregated (see [CRE52.24](#) to [CRE52.76](#) below).

52.7 For capital adequacy purposes, banks may net transactions (eg when determining the RC component of a netting set) subject to novation under which any obligation between a bank and its counterparty to deliver a given currency on a given value date is automatically amalgamated with all other obligations for the same currency and value date, legally substituting one single amount for the previous gross obligations. Banks may also net transactions subject to any legally valid form of bilateral netting not covered in the preceding sentence, including other forms of novation. In every such case where netting is applied, a bank must satisfy its national supervisor that it has:

- (1) A netting contract with the counterparty or other agreement which creates a single legal obligation, covering all included transactions, such that the bank would have either a claim to receive or obligation to pay only the net sum of the positive and negative mark-to-market values of included individual transactions in the event a counterparty fails to perform due to any of the following: default, bankruptcy, liquidation or similar circumstances.¹

- (2) Written and reasoned legal reviews that, in the event of a legal challenge, the relevant courts and administrative authorities would find the bank's exposure to be such a net amount under:
 - (a) The law of the jurisdiction in which the counterparty is chartered and, if the foreign branch of a counterparty is involved, then also under the law of the jurisdiction in which the branch is located;
 - (b) The law that governs the individual transactions; and
 - (c) The law that governs any contract or agreement necessary to effect the netting.
- (3) Procedures in place to ensure that the legal characteristics of netting arrangements are kept under review in light of the possible changes in relevant law.

Footnotes

- 1 *The netting contract must not contain any clause which, in the event of default of a counterparty, permits a non-defaulting counterparty to make limited payments only, or no payments at all, to the estate of the defaulting party, even if the defaulting party is a net creditor.*

52.8 The national supervisor, after consultation when necessary with other relevant supervisors, must be satisfied that the netting is enforceable under the laws of each of the relevant jurisdictions. Thus, if any of these supervisors is dissatisfied about enforceability under its laws, the netting contract or agreement will not meet this condition and neither counterparty could obtain supervisory benefit.

52.9 There are two formulations of replacement cost depending on whether the trades with a counterparty are margined or unmarginated. The margined formulation could apply both to bilateral transactions and to central clearing relationships. The formulation also addresses the various arrangements that a bank may have to post and/or receive collateral that may be referred to as initial margin.

Formulation for unmargined transactions

52.10 For unmargined transactions, RC is defined as the greater of: (i) the current market value of the derivative contracts less net haircut collateral held by the bank (if any), and (ii) zero. This is consistent with the use of replacement cost as the measure of current exposure, meaning that when the bank owes the counterparty money it has no exposure to the counterparty if it can instantly replace its trades and sell collateral at current market prices. The formula for RC is as follows, where:

- (1) V is the value of the derivative transactions in the netting set
- (2) C is the haircut value of net collateral held, which is calculated in accordance with the net independent collateral amount (NICA) methodology defined in [CRE52.17²](#)

$$RC = \max\{V - C; 0\}$$

Footnotes

² As set out in [CRE52.2](#), netting sets that include a one-way margin agreement in favour of the bank's counterparty (ie the bank posts, but does not receive variation margin) are treated as unmargined for the purposes of SA-CCR. For such netting sets, C also includes, with a negative sign, the variation margin amount posted by the bank to the counterparty.

FAQ

FAQ1 How must banks calculate the haircut applicable in the replacement cost calculation for unmargined trades?

The haircut applicable in the replacement cost calculation for unmargined trades should follow the formula in [CRE22.63](#). In applying the formula, banks must use the maturity of the longest transaction in the netting set as the value for N_R , capped at 250 days, in order to scale haircuts for unmargined trades, which is capped at 100%.

- 52.11** For the purpose of [CRE52.10](#) above, the value of non-cash collateral posted by the bank to its counterparty is increased and the value of the non-cash collateral received by the bank from its counterparty is decreased using haircuts (which are the same as those that apply to repo-style transactions) for the time periods described in [CRE52.5](#) above.
- 52.12** The formulation set out in [CRE52.10](#) above, does not permit the replacement cost, which represents today's exposure to the counterparty, to be less than zero. However, banks sometimes hold excess collateral (even in the absence of a margin agreement) or have out-of-the-money trades which can further protect the bank from the increase of the exposure. As discussed in [CRE52.21](#) to [CRE52.23](#) below, the SA-CCR allows such over-collateralisation and negative mark-to-market value to reduce PFE, but they are not permitted to reduce replacement cost.

Formulation for margined transactions

- 52.13** The RC formula for margined transactions builds on the RC formula for unmargined transactions. It also employs concepts used in standard margining agreements, as discussed more fully below.
- 52.14** The RC for margined transactions in the SA-CCR is defined as the greatest exposure that would not trigger a call for VM, taking into account the mechanics of collateral exchanges in margining agreements.³ Such mechanics include, for example, "Threshold", "Minimum Transfer Amount" and "Independent Amount" in the standard industry documentation,⁴ which are factored into a call for VM.⁵ A defined, generic formulation has been created to reflect the variety of margining approaches used and those being considered by supervisors internationally.

Footnotes

- ³ See [CRE99](#) for illustrative examples of the effect of standard margin agreements on the SA-CCR formulation.
- ⁴ For example, the 1992 (Multicurrency-Cross Border) Master Agreement and the 2002 Master Agreement published by the International Swaps & Derivatives Association, Inc. (ISDA Master Agreement). The ISDA Master Agreement includes the ISDA Credit Support Annexes: the 1994 Credit Support Annex (Security Interest – New York Law), or, as applicable, the 1995 Credit Support Annex (Transfer – English Law) and the 1995 Credit Support Deed (Security Interest – English Law).
- ⁵ For example, in the ISDA Master Agreement, the term “Credit Support Amount”, or the overall amount of collateral that must be delivered between the parties, is defined as the greater of the Secured Party’s Exposure plus the aggregate of all Independent Amounts applicable to the Pledgor minus all Independent Amounts applicable to the Secured Party, minus the Pledgor’s Threshold and zero.

Incorporating NICA into replacement cost

- 52.15** One objective of the SA-CCR is to reflect the effect of margining agreements and the associated exchange of collateral in the calculation of CCR exposures. The following paragraphs address how the exchange of collateral is incorporated into the SA-CCR.
- 52.16** To avoid confusion surrounding the use of terms initial margin and independent amount which are used in various contexts and sometimes interchangeably, the term independent collateral amount (ICA) is introduced. ICA represents: (i) collateral (other than VM) posted by the counterparty that the bank may seize upon default of the counterparty, the amount of which does not change in response to the value of the transactions it secures and/or (ii) the Independent Amount (IA) parameter as defined in standard industry documentation. ICA can change in response to factors such as the value of the collateral or a change in the number of transactions in the netting set.

52.17 Because both a bank and its counterparty may be required to post ICA, it is necessary to introduce a companion term, net independent collateral amount (NICA), to describe the amount of collateral that a bank may use to offset its exposure on the default of the counterparty. NICA does not include collateral that a bank has posted to a segregated, bankruptcy remote account, which presumably would be returned upon the bankruptcy of the counterparty. That is, NICA represents any collateral (segregated or unsegregated) posted by the counterparty less the unsegregated collateral posted by the bank. With respect to IA, NICA takes into account the differential of IA required for the bank minus IA required for the counterparty.

52.18 For margined trades, the replacement cost is calculated using the following formula, where:

- (1) V and C are defined as in the unmargined formulation, except that C now includes the net variation margin amount, where the amount received by the bank is accounted with a positive sign and the amount posted by the bank is accounted with a negative sign
- (2) TH is the positive threshold before the counterparty must send the bank collateral
- (3) MTA is the minimum transfer amount applicable to the counterparty

$$RC = \max\{V - C; TH + MTA - NICA; 0\}$$

52.19 TH + MTA – NICA represents the largest exposure that would not trigger a VM call and it contains levels of collateral that need always to be maintained. For example, without initial margin or IA, the greatest exposure that would not trigger a variation margin call is the threshold plus any minimum transfer amount. In the adapted formulation, NICA is subtracted from TH + MTA. This makes the calculation more accurate by fully reflecting both the actual level of exposure that would not trigger a margin call and the effect of collateral held and /or posted by a bank. The calculation is floored at zero, recognising that the bank may hold NICA in excess of TH + MTA, which could otherwise result in a negative replacement cost.

PFE add-on for each netting set

52.20 The PFE add-on consists of: (i) an aggregate add-on component; and (ii) a multiplier that allows for the recognition of excess collateral or negative mark-to-market value for the transactions within the netting set. The formula for PFE is as follows, where:

- (1) $AddOn^{aggregate}$ is the aggregate add-on component (see [CRE52.25](#) below)
- (2) multiplier is defined as a function of three inputs: V, C and $AddOn^{aggregate}$

$$PFE = multiplier * AddOn^{aggregate}$$

Multiplier (recognition of excess collateral and negative mark-to-market)

52.21 As a general principle, over-collateralisation should reduce capital requirements for counterparty credit risk. In fact, many banks hold excess collateral (ie collateral greater than the net market value of the derivatives contracts) precisely to offset potential increases in exposure represented by the add-on. As discussed in [CRE52.10](#) and [CRE52.18](#), collateral may reduce the replacement cost component of the exposure under the SA-CCR. The PFE component also reflects the risk-reducing property of excess collateral.

52.22 For prudential reasons, the Basel Committee decided to apply a multiplier to the PFE component that decreases as excess collateral increases, without reaching zero (the multiplier is floored at 5% of the PFE add-on). When the collateral held is less than the net market value of the derivative contracts ("under-collateralisation"), the current replacement cost is positive and the multiplier is equal to one (ie the PFE component is equal to the full value of the aggregate add-on). Where the collateral held is greater than the net market value of the derivative contracts ("over-collateralisation"), the current replacement cost is zero and the multiplier is less than one (ie the PFE component is less than the full value of the aggregate add-on).

52.23 This multiplier will also be activated when the current value of the derivative transactions is negative. This is because out-of-the-money transactions do not currently represent an exposure and have less chance to go in-the-money. The formula for the multiplier is as follows, where:

- (1) $\exp(\dots)$ is the exponential function
- (2) Floor is 5%
- (3) V is the value of the derivative transactions in the netting set
- (4) C is the haircut value of net collateral held

$$multiplier = \min \left\{ 1; Floor + (1-Floor) * \exp \left(\frac{V - C}{2 * (1-Floor) * AddOn^{aggregate}} \right) \right\}$$

Aggregate add-on and asset classes

52.24 To calculate the aggregate add-on, banks must calculate add-ons for each asset class within the netting set. The SA-CCR uses the following five asset classes:

- (1) Interest rate derivatives
- (2) Foreign exchange derivatives
- (3) Credit derivatives
- (4) Equity derivatives.
- (5) Commodity derivatives

52.25 Diversification benefits across asset classes are not recognised. Instead, the respective add-ons for each asset class are simply aggregated using the following formula (where the sum is across the asset classes):

$$AddOn^{aggregate} = \sum_{assetclass} AddOn^{(assetclass)}$$

Allocation of derivative transactions to one or more asset classes

52.26 The designation of a derivative transaction to an asset class is to be made on the basis of its primary risk driver. Most derivative transactions have one primary risk driver, defined by its reference underlying instrument (eg an interest rate curve for an interest rate swap, a reference entity for a credit default swap, a foreign exchange rate for a foreign exchange (FX) call option, etc). When this primary risk driver is clearly identifiable, the transaction will fall into one of the asset classes described above.

52.27 For more complex trades that may have more than one risk driver (eg multi-asset or hybrid derivatives), banks must take sensitivities and volatility of the underlying into account for determining the primary risk driver.

52.28 Bank supervisors may also require more complex trades to be allocated to more than one asset class, resulting in the same position being included in multiple classes. In this case, for each asset class to which the position is allocated, banks must determine appropriately the sign and delta adjustment of the relevant risk driver (the role of delta adjustments in SA-CCR is outlined further in [CRE52.30](#) below).

General steps for calculating the PFE add-on for each asset class

52.29 For each transaction, the primary risk factor or factors need to be determined and attributed to one or more of the five asset classes: interest rate, foreign exchange, credit, equity or commodity. The add-on for each asset class is calculated using asset-class-specific formulas.⁶

Footnotes

⁶ *The formulas for calculating the asset class add-ons represent stylised Effective EPE calculations under the assumption that all trades in the asset class have zero current mark-to-market value (ie they are at-the-money).*

52.30 Although the formulas for the asset class add-ons vary between asset classes, they all use the following general steps:

- (1) The **effective notional (D)** must be calculated for each derivative (ie each individual trade) in the netting set. The effective notional is a measure of the sensitivity of the trade to movements in underlying risk factors (ie interest rates, exchange rates, credit spreads, equity prices and commodity prices). The effective notional is calculated as the product of the following parameters (ie $D = d * MF * \delta$):
- (a) The **adjusted notional (d)**. The adjusted notional is a measure of the size of the trade. For derivatives in the foreign exchange asset class this is simply the notional value of the foreign currency leg of the derivative contract, converted to the domestic currency. For derivatives in the equity and commodity asset classes, it is simply the current price of the relevant share or unit of commodity multiplied by the number of shares /units that the derivative references. For derivatives in the interest rate and credit asset classes, the notional amount is adjusted by a measure of the duration of the instrument to account for the fact that the value of instruments with longer durations are more sensitive to movements in underlying risk factors (ie interest rates and credit spreads).
 - (b) The **maturity factor (MF)**. The maturity factor is a parameter that takes account of the time period over which the potential future exposure is calculated. The calculation of the maturity factor varies depending on whether the netting set is margined or unmargined.
 - (c) The **supervisory delta (δ)**. The supervisory delta is used to ensure that the effective notional take into account the direction of the trade, ie whether the trade is long or short, by having a positive or negative sign. It also takes into account whether the trade has a non-linear relationship with the underlying risk factor (which is the case for options and collateralised debt obligation tranches).
- (2) A **supervisory factor (SF)** is identified for each individual trade in the netting set. The supervisory factor is the supervisory specified change in value of the underlying risk factor on which the potential future exposure calculation is based, which has been calibrated to take into account the volatility of underlying risk factors.
- (3) The trades within each asset class are separated into supervisory specified hedging sets. The purpose of the hedging sets is to group together trades within the netting set where long and short positions should be permitted to offset each other in the calculation of potential future exposure.

- (4) Aggregation formulas are applied to aggregate the effective notionals and supervisory factors across all trades within each hedging set and finally at the asset-class level to give the asset class level add-on. The method of

aggregation varies between asset classes and for credit, equity and commodity derivatives it also involves the application of supervisory correlation parameters to capture diversification of trades and basis risk.

Time period parameters: M_i , E_i , S_i and T_i

52.31 There are four time period parameters that are used in the SA-CCR (all expressed in years):

- (1) For all asset classes, the maturity M_i of a contract is the time period (starting today) until the latest day when the contract may still be active. This time period appears in the maturity factor defined in [CRE52.48](#) to [CRE52.53](#) that scales down the adjusted notionals for unmargined trades for all asset classes. If a derivative contract has another derivative contract as its underlying (for example, a swaption) and may be physically exercised into the underlying contract (ie a bank would assume a position in the underlying contract in the event of exercise), then maturity of the contract is the time period until the final settlement date of the underlying derivative contract.
- (2) For interest rate and credit derivatives, S_i is the period of time (starting today) until start of the time period referenced by an interest rate or credit contract. If the derivative references the value of another interest rate or credit instrument (eg swaption or bond option), the time period must be determined on the basis of the underlying instrument. S_i appears in the definition of supervisory duration defined in [CRE52.34](#).
- (3) For interest rate and credit derivatives, E_i is the period of time (starting today) until the end of the time period referenced by an interest rate or credit contract. If the derivative references the value of another interest rate or credit instrument (eg swaption or bond option), the time period must be determined on the basis of the underlying instrument. E_i appears in the definition of supervisory duration defined in [CRE52.34](#). In addition, E_i is used for allocating derivatives in the interest rate asset class to maturity buckets, which are used in the calculation of the asset class add-on (see [CRE52.57\(3\)](#)).

- (4) For options in all asset classes, T_i is the time period (starting today) until the latest contractual exercise date as referenced by the contract. This period shall be used for the determination of the option's supervisory delta in [CRE52.38](#) to [CRE52.41](#).

52.32 Table 1 includes example transactions and provides each transaction's related maturity M_i , start date S_i and end date E_i . In addition, the option delta in [CRE52.38](#) to [CRE52.41](#) depends on the latest contractual exercise date T_i (not separately shown in the table).

Table 1

Instrument	M_i	S_i	E_i
Interest rate or credit default swap maturing in 10 years	10 years	0	10 years
10-year interest rate swap, forward starting in 5 years	15 years	5 years	15 years
Forward rate agreement for time period starting in 6 months and ending in 12 months	1 year	0.5 year	1 year
Cash-settled European swaption referencing 5-year interest rate swap with exercise date in 6 months	0.5 year	0.5 year	5.5 years
Physically-settled European swaption referencing 5-year interest rate swap with exercise date in 6 months	5.5 years	0.5 year	5.5 years
10-year Bermudan swaption with annual exercise dates	10 years	1 year	10 years
Interest rate cap or floor specified for semi-annual interest rate with maturity 5 years	5 years	0	5 years
Option on a bond maturing in 5 years with the latest exercise date in 1 year	1 year	1 year	5 years
3-month Eurodollar futures that matures in 1 year	1 year	1 year	1.25 years
Futures on 20-year treasury bond that matures in 2 years	2 years	2 years	22 years
6-month option on 2-year futures on 20-year treasury bond	2 years	2 years	22 years

FAQ

FAQ1

According to Table 1 in [CRE52.32](#), the “3-month Eurodollar futures that matures in 1 year” has an M_i of 1 year and an E_i of 1.25 years. This is in accordance with [CRE52.31](#). However, is this the correct treatment given that these contracts settle daily?

The example of the three-month Eurodollar future in Table 1 did not include the effect of margining or settlement and would apply only in the case where a futures contract were neither margined nor settled. With regard to the remaining maturity parameter (M_i), [CRE52.37\(5\)](#) states: “For a derivative contract that is structured so that on specified dates any outstanding exposure is settled and the terms are reset so that the fair value of the contract is zero, the remaining maturity equals the time until the next reset date.” This means that exchanges where daily settlement occurs are different from exchanges where daily margining occurs. Trades with daily settlement should be treated as unmargined transactions with a maturity factor given by the formula in [CRE52.48](#), with the parameter M_i set to its floor value of 10 business days. For trades subject to daily margining, the maturity factor is given in [CRE52.52](#) depending on the margin period of risk (MPOR), which can be as short as five business days. With regard to the end date (E_i), the value of 1.25 years applies. Margining or daily settlement have no influence on the time period referenced by the interest rate contract. Note that, the parameter E_i defines the maturity bucket for the purpose of netting. This means that the trade in this example will be attributed to the intermediate maturity bucket “between one and five years” and not to the short maturity bucket “less than one year” irrespective of daily settlement.

FAQ2

Regarding row 3 of Table 1, as forward rate agreements are cash-settled at the start of the underlying interest rate period (the “effective date”), the effective date represents the “end-of-risk” date, ie “M” in the SA-CCR notation. Therefore, in this example, should M be 0.5 years instead of 1 year.

In Table 1 it is assumed that the payment is made at the end of the period (similar to vanilla interest rate swaps). If the payment is made at the beginning of the period, as it is typically the case according to market convention, M should indeed be 0.5 years.

Trade-level adjusted notional (for trade i): d_i

52.33 The adjusted notionals are defined at the trade level and take into account both the size of a position and its maturity dependency, if any.

52.34 For interest rate and credit derivatives, the trade-level adjusted notional is the product of the trade notional amount, converted to the domestic currency, and the supervisory duration SD_i which is given by the formula below (ie $d_i = \text{notional} * SD_i$). The calculated value of SD_i is floored at ten business days.⁷ If the start date has occurred (eg an ongoing interest rate swap), S_i must be set to zero.

$$SD_i = \frac{\exp(-0.05 * S_i) - \exp(-0.05 * E_i)}{0.05}$$

Footnotes

⁷ Note there is a distinction between the time period of the underlying transaction and the remaining maturity of the derivative contract. For example, a European interest rate swaption with expiry of 1 year and the term of the underlying swap of 5 years has $S_i = 1$ year and $E_i = 6$ years.

52.35 For foreign exchange derivatives, the adjusted notional is defined as the notional of the foreign currency leg of the contract, converted to the domestic currency. If both legs of a foreign exchange derivative are denominated in currencies other than the domestic currency, the notional amount of each leg is converted to the domestic currency and the leg with the larger domestic currency value is the adjusted notional amount.

52.36 For equity and commodity derivatives, the adjusted notional is defined as the product of the current price of one unit of the stock or commodity (eg a share of equity or barrel of oil) and the number of units referenced by the trade.

FAQ

FAQ1 *How should the definition of adjusted notional be applied to volatility transactions such as equity volatility swaps mentioned in paragraph [CRE52.47](#)?*

For equity and commodity volatility transactions, the underlying volatility or variance referenced by the transaction should replace the unit price and contractual notional should replace the number of units.

52.37 In many cases the trade notional amount is stated clearly and fixed until maturity. When this is not the case, banks must use the following rules to determine the trade notional amount.

- (1) Where the notional is a formula of market values, the bank must enter the current market values to determine the trade notional amount.
- (2) For all interest rate and credit derivatives with variable notional amounts specified in the contract (such as amortising and accreting swaps), banks must use the average notional over the remaining life of the derivative as the trade notional amount. The average should be calculated as "time weighted". The averaging described in this paragraph does not cover transactions where the notional varies due to price changes (typically, FX, equity and commodity derivatives).
- (3) Leveraged swaps must be converted to the notional of the equivalent unleveraged swap, that is, where all rates in a swap are multiplied by a factor, the stated notional must be multiplied by the factor on the interest rates to determine the trade notional amount.
- (4) For a derivative contract with multiple exchanges of principal, the notional is multiplied by the number of exchanges of principal in the derivative contract to determine the trade notional amount.
- (5) For a derivative contract that is structured such that on specified dates any outstanding exposure is settled and the terms are reset so that the fair value of the contract is zero, the remaining maturity equals the time until the next reset date.

Supervisory delta adjustments

52.38 The supervisory delta adjustment (δ_p) parameters are also defined at the trade level and are applied to the adjusted notional amounts to reflect the direction of the transaction and its non-linearity.

52.39 The delta adjustments for all instruments that are not options and are not collateralised debt obligation (CDO) tranches are as set out in the table below:⁸

δ_i	Long in the primary risk factor	Short in the primary risk factor
Instruments that are not options or CDO tranches	+1	-1

Footnotes

⁸ *"Long in the primary risk factor" means that the market value of the instrument increases when the value of the primary risk factor increases. "Short in the primary risk factor" means that the market value of the instrument decreases when the value of the primary risk factor increases.*

52.40 The delta adjustments for options are set out in the table below, where:

- (1) The following are parameters that banks must determine appropriately:
 - (a) P_i : Underlying price (spot, forward, average, etc)
 - (b) K_i : Strike price
 - (c) T_i : Latest contractual exercise date of the option
- (2) The supervisory volatility σ_i of an option is specified on the basis of supervisory factor applicable to the trade (see Table 2 in [CRE52.72](#)).

- (3) The symbol Φ represents the standard normal cumulative distribution function.

δ_i	Bought	Sold
Call Options	$+\Phi\left(\frac{\ln(P_i / K_i) + 0.5 * \sigma_i^2 * T_i}{\sigma_i * \sqrt{T_i}}\right)$	$-\Phi\left(\frac{\ln(P_i / K_i) + 0.5 * \sigma_i^2 * T_i}{\sigma_i * \sqrt{T_i}}\right)$
Put Options	$-\Phi\left(-\frac{\ln(P_i / K_i) + 0.5 * \sigma_i^2 * T_i}{\sigma_i * \sqrt{T_i}}\right)$	$+\Phi\left(-\frac{\ln(P_i / K_i) + 0.5 * \sigma_i^2 * T_i}{\sigma_i * \sqrt{T_i}}\right)$

FAQ

FAQ1 *Why doesn't the supervisory delta adjustment calculation take the risk-free rate into account? It is identical to the Black-Scholes formula except that it's missing the risk-free rate.*

Whenever appropriate, the forward (rather than spot) value of the underlying in the supervisory delta adjustments formula should be used in order to account for the risk-free rate as well as for possible cash flows prior to the option expiry (such as dividends).

FAQ2 *How is the supervisory delta for options in [CRE52.40](#) to be calculated when the term P/K is zero or negative such that the term $\ln(P/K)$ cannot be computed (eg as may be the case in a negative interest rate environment)?*

In such cases banks must incorporate a shift in the price value and strike value by adding λ , where λ represents the presumed lowest possible extent to which interest rates in the respective currency can become negative. Therefore, the Delta δ_i for a transaction i in such cases is calculated using the formula that follows. The same parameter must be used consistently for all interest rate options in the same currency. For each jurisdiction, and for each affected currency j , the supervisor is encouraged to make a recommendation to banks for an appropriate value of λ_j with the objective to set it as low as possible. Banks are permitted to use lower values if it suits their portfolios.

Delta (δ)	Bought	Sold

Call options	$+\Phi\left(\frac{\ln\left(\left(P_i + \lambda_j\right) / \left(K_i + \lambda_j\right)\right) + 0.5 * \sigma_i^2 * T_i}{\sigma_i * \sqrt{T_i}}\right)$	$-\Phi\left(\frac{\ln\left(\left(P_i + \lambda_j\right) / \left(K_i + \lambda_j\right)\right) + 0.5 * \sigma_i^2 * T_i}{\sigma_i * \sqrt{T_i}}\right)$
Put options	$-\Phi\left(\frac{-\ln\left(\left(P_i + \lambda_j\right) / \left(K_i + \lambda_j\right)\right) - 0.5 * \sigma_i^2 * T_i}{\sigma_i * \sqrt{T_i}}\right)$	$+\Phi\left(\frac{-\ln\left(\left(P_i + \lambda_j\right) / \left(K_i + \lambda_j\right)\right) - 0.5 * \sigma_i^2 * T_i}{\sigma_i * \sqrt{T_i}}\right)$

52.41 The delta adjustments for CDO tranches⁹ are set out in the table below, where the following are parameters that banks must determine appropriately:

- (1) A_i : Attachment point of the CDO tranche
- (2) D_i : Detachment point of the CDO tranche

δ_i	Purchased (long protection)	Sold (short protection)
CDO tranches	$+\frac{15}{(1+14 * A_i) * (1+14 * D_i)}$	$-\frac{15}{(1+14 * A_i) * (1+14 * D_i)}$

Footnotes

⁹ First-to-default, second-to-default and subsequent-to-default credit derivative transactions should be treated as CDO tranches under SA-CCR. For an n th-to-default transaction on a pool of m reference names, banks must use an attachment point of $A=(n-1)/m$ and a detachment point of $D=n/m$ in order to calculate the supervisory delta formula set out [CRE52.41](#).

Effective notional for options

52.42 For single-payment options the effective notional (ie $D = d * MF * \delta$) is calculated using the following specifications:

- (1) For European, Asian, American and Bermudan put and call options, the supervisory delta must be calculated using the simplified Black-Scholes formula referenced in [CRE52.40](#). In the case of Asian options, the underlying price must be set equal to the current value of the average used in the payoff. In the case of American and Bermudan options, the latest allowed exercise date must be used as the exercise date T_i in the formula.

- (2) For Bermudan swaptions, the start date S_i must be equal to the earliest allowed exercise date, while the end date E_i must be equal to the end date of the underlying swap.
- (3) For digital options, the payoff of each digital option (bought or sold) with strike K_i must be approximated via the "collar" combination of bought and sold European options of the same type (call or put), with the strikes set equal to $0.95 \cdot K_i$ and $1.05 \cdot K_i$. The size of the position in the collar components must be such that the digital payoff is reproduced exactly outside the region between the two strikes. The effective notional is then computed for the bought and sold European components of the collar separately, using the option formulae for the supervisory delta referenced in [CRE52.40](#) (the exercise date T_i and the current value of the underlying P_i of the digital option must be used). The absolute value of the digital-option effective notional must be capped by the ratio of the digital payoff to the relevant supervisory factor.
- (4) If a trade's payoff can be represented as a combination of European option payoffs (eg collar, butterfly/calendar spread, straddle, strangle), each European option component must be treated as a separate trade.

52.43 For the purposes of effective notional calculations, multiple-payment options may be represented as a combination of single-payment options. In particular, interest rate caps/floors may be represented as the portfolio of individual caplets/floorlets, each of which is a European option on the floating interest rate over a specific coupon period. For each caplet/floorlet, S_i and T_i are the time periods starting from the current date to the start of the coupon period, while E_i is the time period starting from the current date to the end of the coupon period.

Supervisory factors: SF_i

52.44 Supervisory factors (SF_i) are used, together with aggregation formulas, to convert effective notional amounts into the add-on for each hedging set.¹⁰ The way in which supervisory factors are used within the aggregation formulas varies between asset classes. The supervisory factors are listed in Table 2 under [CRE52.72](#)

Footnotes

[10](#)

Each factor has been calibrated to result in an add-on that reflects the Effective EPE of a single at-the-money linear trade of unit notional and one-year maturity. This includes the estimate of realised volatilities assumed by supervisors for each underlying asset class.

Hedging sets

52.45 The hedging sets in the different asset classes are defined as follows, except for those described in [CRE52.46](#) and [CRE52.47](#):

- (1) Interest rate derivatives consist of a separate hedging set for each currency.
- (2) FX derivatives consist of a separate hedging set for each currency pair.
- (3) Credit derivatives consist of a single hedging set.
- (4) Equity derivatives consist of a single hedging set.
- (5) Commodity derivatives consist of four hedging sets defined for broad categories of commodity derivatives: energy, metals, agricultural and other commodities.

52.46 Derivatives that reference the basis between two risk factors and are denominated in a single currency^{[11](#)} (basis transactions) must be treated within separate hedging sets within the corresponding asset class. There is a separate hedging set^{[12](#)} for each pair of risk factors (ie for each specific basis). Examples of specific bases include three-month Libor versus six-month Libor, three-month Libor versus three-month T-Bill, one-month Libor versus overnight indexed swap rate, Brent Crude oil versus Henry Hub gas. For hedging sets consisting of basis transactions, the supervisory factor applicable to a given asset class must be multiplied by one-half.

Footnotes

[11](#)

Derivatives with two floating legs that are denominated in different currencies (such as cross-currency swaps) are not subject to this treatment; rather, they should be treated as non-basis foreign exchange contracts.

[12](#)

Within this hedging set, long and short positions are determined with respect to the basis.

52.47 Derivatives that reference the volatility of a risk factor (volatility transactions) must be treated within separate hedging sets within the corresponding asset class. Volatility hedging sets must follow the same hedging set construction outlined in [CRE52.45](#) (for example, all equity volatility transactions form a single hedging set). Examples of volatility transactions include variance and volatility swaps, options on realised or implied volatility. For hedging sets consisting of volatility transactions, the supervisory factor applicable to a given asset class must be multiplied by a factor of five.

Maturity factors

52.48 The minimum time risk horizon for an unmargined transaction is the lesser of one year and the remaining maturity of the derivative contract, floored at ten business days.¹³ Therefore, the calculation of the effective notional for an unmargined transaction includes the following maturity factor, where M_i is the remaining maturity of transaction i , floored at 10 business days:

$$MF_i^{(\text{unmargined})} = \sqrt{\frac{\min\{M_i; 1 \text{ year}\}}{1 \text{ year}}}$$

Footnotes

¹³

For example, remaining maturity for a one-month option on a 10-year Treasury bond is the one-month to expiration date of the derivative contract. However, the end date of the transaction is the 10-year remaining maturity on the Treasury bond.

52.49 The maturity parameter (M_i) is expressed in years but is subject to a floor of 10 business days. Banks should use standard market convention to convert business days into years, and vice versa. For example, 250 business days in a year, which results in a floor of 10/250 years for M_i .

52.50 For margined transactions, the maturity factor is calculated using the margin period of risk (MPOR), subject to specified floors. That is, banks must first estimate the margin period of risk (as defined in [CRE50.18](#)) for each of their netting sets. They must then use the higher of their estimated margin period of risk and the relevant floor in the calculation of the maturity factor ([CRE52.52](#)). The floors for the margin period of risk are as follows:

- (1) Ten business days for non-centrally-cleared transactions subject to daily margin agreements.

- (2) The sum of nine business days plus the re-margining period for non-centrally cleared transactions that are not subject daily margin agreements.
- (3) The relevant floors for centrally cleared transactions are prescribed in the capital requirements for bank exposures to central counterparties (see [CRE54](#)).

52.51 The following are exceptions to the floors on the minimum margin period of risk set out in [CRE52.50](#) above:

- (1) For netting sets consisting of more than 5000 transactions that are not with a central counterparty the floor on the margin period of risk is 20 business days.
- (2) For netting sets containing one or more trades involving either illiquid collateral, or an OTC derivative that cannot be easily replaced, the floor on the margin period of risk is 20 business days. For these purposes, "Illiquid collateral" and "OTC derivatives that cannot be easily replaced" must be determined in the context of stressed market conditions and will be characterised by the absence of continuously active markets where a counterparty would, within two or fewer days, obtain multiple price quotations that would not move the market or represent a price reflecting a market discount (in the case of collateral) or premium (in the case of an OTC derivative). Examples of situations where trades are deemed illiquid for this purpose include, but are not limited to, trades that are not marked daily and trades that are subject to specific accounting treatment for valuation purposes (eg OTC derivatives transactions referencing securities whose fair value is determined by models with inputs that are not observed in the market).
- (3) If a bank has experienced more than two margin call disputes on a particular netting set over the previous two quarters that have lasted longer than the applicable margin period of risk (before consideration of this provision), then the bank must reflect this history appropriately by doubling the applicable supervisory floor on the margin period of risk for that netting set for the subsequent two quarters.

FAQ

FAQ1 *In the case of non-centrally cleared derivatives that are subject to the requirements of [MGN20](#), what margin calls are to be taken into account for the purpose counting the number of disputes according to [CRE52.51\(3\)](#)?*

In the case of non-centrally cleared derivatives that are subject to the requirements of [MGN20](#), [CRE52.51\(3\)](#) applies only to variation margin call disputes.

FAQ2 *Regarding the reform of benchmark reference rates, does the extended margin period of risk in [CRE52.51\(2\)](#) (SA-CCR) and [CRE53.24\(2\)](#) (IMM) apply if the new benchmark rate experiences transitional illiquidity?*

Until one year after the discontinuation of an old benchmark rate, any transitional illiquidity of collateral and OTC derivatives that reference the relevant new benchmark rate should not trigger the extended margin period of risk in [CRE52.51\(2\)](#) for SA-CCR and [CRE53.24\(2\)](#) for the IMM.

52.52 The calculation of the effective notional for a margined transaction includes the following maturity factor, where $MPOR_i$ is the margin period of risk appropriate for the margin agreement containing the transaction i (subject to the floors set out in [CRE52.50](#) and [CRE52.51](#) above).

$$MF_i^{(\text{margined})} = \frac{3}{2} \sqrt{\frac{MPOR_i}{1 \text{ year}}}$$

52.53 The margin period of risk ($MPOR_i$) is often expressed in days, but the calculation of the maturity factor for margined netting sets references 1 year in the denominator. Banks should use standard market convention to convert business days into years, and vice versa. For example, 1 year can be converted into 250 business days in the denominator of the MF formula if MPOR is expressed in business days. Alternatively, the MPOR expressed in business days can be converted into years by dividing it by 250.

Supervisory correlation parameters

52.54 The supervisory correlation parameters (ρ_i) only apply to the PFE add-on calculation for equity, credit and commodity derivatives, and are set out in Table 2 under [CRE52.72](#). For these asset classes, the supervisory correlation parameters are derived from a single-factor model and specify the weight between systematic and idiosyncratic components. This weight determines the degree of offset between individual trades, recognising that imperfect hedges provide some, but not perfect, offset. Supervisory correlation parameters do not apply to interest rate and foreign exchange derivatives.

Asset class level add-ons

52.55 As set out in [CRE52.25](#), the aggregate add-on for a netting set ($\text{AddOn}^{\text{aggregate}}$) is calculated as the sum of the add-ons calculated for each asset class within the netting set. The sections that follow set out the calculation of the add-on for each asset class.

Add-on for interest rate derivatives

52.56 The calculation of the add-on for the interest rate derivative asset class captures the risk of interest rate derivatives of different maturities being imperfectly correlated. It does this by allocating trades to maturity buckets, in which full offsetting of long and short positions is permitted, and by using an aggregation formula that only permits limited offsetting between maturity buckets. This allocation of derivatives to maturity buckets and the process of aggregation (steps 3 to 5 below) are only used in the interest rate derivative asset class.

52.57 The add-on for the interest rate derivative asset class (AddOn^{IR}) within a netting set is calculated using the following steps:

- (1) Step 1: Calculate the effective notional for each trade in the netting set that is in the interest rate derivative asset class. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d_i); (ii) the supervisory delta adjustment of the trade (δ_i); and (iii) the maturity factor (MF). That is, for each trade i , the effective notional D_i is calculated as $D_i = d_i * MF_i * \delta_i$, where each term is as defined in [CRE52.33](#) to [CRE52.53](#).
- (2) Step 2: Allocate the trades in the interest rate derivative asset class to hedging sets. In the interest rate derivative asset class the hedging sets consist of all the derivatives that reference the same currency.

- (3) Step 3: Within each hedging set allocate each of the trades to the following three maturity buckets: less than one year (bucket 1), between one and five years (bucket 2) and more than five years (bucket 3).
- (4) Step 4: Calculate the effective notional of each maturity bucket by adding together all the trade level effective notionals calculated in step 1 of the trades within the maturity bucket. Let D^{B1} , D^{B2} and D^{B3} be the effective notionals of buckets 1, 2 and 3 respectively.
- (5) Step 5: Calculate the effective notional of the hedging set (EN_{HS}) by using either of the following aggregation formulas (the latter is to be used if the bank chooses no offsets between long and short positions across maturity buckets):

$$\text{Offset formula : } EN_{HS} = \left[(D^{B1})^2 + (D^{B2})^2 + (D^{B3})^2 + 1.4 * D^{B1} * D^{B2} + 1.4 * D^{B2} * D^{B3} + 0.6 * D^{B1} * D^{B3} \right]^{\frac{1}{2}}$$

$$\text{No offset formula : } EN_{HS} = |D^{B1}| + |D^{B2}| + |D^{B3}|$$

- (6) Step 6: Calculate the hedging set level add-on ($AddOn_{HS}$) by multiplying the effective notional of the hedging set (EN_{HS}) by the prescribed supervisory factor (SF_{HS}). The prescribed supervisory factor in the interest rate asset class is set at 0.5%, which means that $AddOn_{HS} = EN_{HS} * 0.005$.
- (7) Step 7: Calculate the asset class level add-on ($AddOn^{IR}$) by adding together all of the hedging set level add-ons calculated in step 6:

$$AddOn^{IR} = \sum_{HS} AddOn_{HS}$$

FAQ

FAQ1 *Are banks permitted to treat inflation derivatives (which SA-CCR does not specifically assign to a particular asset class) in the same manner as they treat interest rate derivatives and subject them to the same 0.5% supervisory factor?*

Yes. Banks may treat inflation derivatives in the same manner as interest rate derivatives. Derivatives referencing inflation rates for the same currency should form a separate hedging set and should be subjected to the same 0.5% supervisory factor. AddOn amounts from inflation derivatives must be added to $AddOn^{IR}$.

Add-on for foreign exchange derivatives

52.58 The steps to calculate the add-on for the foreign exchange derivative asset class are similar to the steps for the interest rate derivative asset class, except that there is no allocation of trades to maturity buckets (which means that there is full offsetting of long and short positions within the hedging sets of the foreign exchange derivative asset class).

52.59 The add-on for the foreign exchange derivative asset class ($AddOn^{FX}$) within a netting set is calculated using the following steps:

- (1) Step 1: Calculate the effective notional for each trade in the netting set that is in the foreign exchange derivative asset class. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d_i); (ii) the supervisory delta adjustment of the trade (δ_i); and (iii) the maturity factor (MF). That is, for each trade i , the effective notional D_i is calculated as $D_i = d_i * MF_i * \delta_i$, where each term is as defined in [CRE52.33](#) to [CRE52.53](#).
- (2) Step 2: Allocate the trades in the foreign exchange derivative asset class to hedging sets. In the foreign exchange derivative asset class the hedging sets consist of all the derivatives that reference the same currency pair.
- (3) Step 3: Calculate the effective notional of each hedging set (EN_{HS}) by adding together the trade level effective notionals calculated in step 1.
- (4) Step 4: Calculate the hedging set level add-on ($AddOn_{HS}$) by multiplying the absolute value of the effective notional of the hedging set (EN_{HS}) by the prescribed supervisory factor (SF_{HS}). The prescribed supervisory factor in the foreign exchange derivative asset class is set at 4%, which means that $AddOn_{HS} = |EN_{HS}| * 0.04$.
- (5) Step 5: Calculate the asset class level add-on ($AddOn^{FX}$) by adding together all of the hedging set level add-ons calculated in step 5:

$$AddOn^{FX} = \sum_{HS} AddOn_{HS}$$

FAQ

FAQ1

In SA-CCR, the calculation of the supervisory delta for foreign exchange options depends on the convention taken with respect to the ordering of the respective currency pair. For example, a call option on EUR/USD is economically identical to a put option in USD/EUR. Nevertheless, the calculation of the supervisory delta leads to different results in the two cases. Which convention should banks select for each currency pair?

For each currency pair, the same ordering convention must be used consistently across the bank and over time. The convention is to be chosen in such a way that it corresponds best to the market practice for how derivatives in the respective currency pair are usually quoted and traded.

Add-on for credit derivatives

52.60 The calculation of the add-on for the credit derivative asset class only gives full recognition of the offsetting of long and short positions for derivatives that reference the same entity (eg the same corporate issuer of bonds). Partial offsetting is recognised between derivatives that reference different entities in step 4 below. The formula used in step 4 is explained further in [CRE52.62](#) to [CRE52.64](#).

52.61 The add-on for the credit derivative asset class ($\text{AddOn}^{\text{Credit}}$) within a netting set is calculated using the following steps:

- (1) Step 1: Calculate the effective notional for each trade in the netting set that is in the credit derivative asset class. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d); (ii) the supervisory delta adjustment of the trade (δ); and (iii) the maturity factor (MF). That is, for each trade i , the effective notional D_i is calculated as $D_i = d_i * MF_i * \delta_i$, where each term is as defined in [CRE52.33](#) to [CRE52.53](#).
- (2) Step 2: Calculate the combined effective notional for all derivatives that reference the same entity. Each separate credit index that is referenced by derivatives in the credit derivative asset class should be treated as a separate entity. The combined effective notional of the entity (EN_{entity}) is calculated by adding together the trade level effective notionals calculated in step 1 that reference that entity.

- (3) Step 3: Calculate the add-on for each entity ($AddOn_{entity}$) by multiplying the combined effective notional for that entity calculated in step 2 by the supervisory factor that is specified for that entity (SF_{entity}). The supervisory factors vary according to the credit rating of the entity in the case of single name derivatives, and whether the index is considered investment grade or non-investment grade in the case of derivatives that reference an index. The supervisory factors are set out in Table 2 in [CRE52.72](#).
- (4) Step 4: Calculate the asset class level add-on ($AddOn^{Credit}$) by using the formula that follows. In the formula the summations are across all entities referenced by the derivatives, $AddOn_{entity}$ is the add-on amount calculated in step 3 for each entity referenced by the derivatives and ρ_{entity} is the supervisory prescribed correlation factor corresponding to the entity. As set out in Table 2 in [CRE52.72](#), the correlation factor is 50% for single entities and 80% for indices.

$$AddOn^{Credit} = \left[\left(\sum_{entity} \rho_{entity} * AddOn_{entity} \right)^2 + \sum_{entity} \left(1 - (\rho_{entity})^2 \right) * (AddOn_{entity})^2 \right]^{\frac{1}{2}}$$

52.62 The formula to recognise partial offsetting in [CRE52.61](#)(4) above, is a single-factor model, which divides the risk of the credit derivative asset class into a systematic component and an idiosyncratic component. The entity-level add-ons are allowed to offset each other fully in the systematic component; whereas, there is no offsetting benefit in the idiosyncratic component. These two components are weighted by a correlation factor which determines the degree of offsetting /hedging benefit within the credit derivatives asset class. The higher the correlation factor, the higher the importance of the systematic component, hence the higher the degree of offsetting benefits.

52.63 It should be noted that a higher or lower correlation does not necessarily mean a higher or lower capital requirement. For portfolios consisting of long and short credit positions, a high correlation factor would reduce the charge. For portfolios consisting exclusively of long positions (or short positions), a higher correlation factor would increase the charge. If most of the risk consists of systematic risk, then individual reference entities would be highly correlated and long and short positions should offset each other. If, however, most of the risk is idiosyncratic to a reference entity, then individual long and short positions would not be effective hedges for each other.

52.64 The use of a single hedging set for credit derivatives implies that credit derivatives from different industries and regions are equally able to offset the systematic component of an exposure, although they would not be able to offset the idiosyncratic portion. This approach recognises that meaningful distinctions between industries and/or regions are complex and difficult to analyse for global conglomerates.

Add-on for equity derivatives

52.65 The calculation of the add-on for the equity derivative asset class is very similar to the calculation of the add-on for the credit derivative asset class. It only gives full recognition of the offsetting of long and short positions for derivatives that reference the same entity (eg the same corporate issuer of shares). Partial offsetting is recognised between derivatives that reference different entities in step 4 below.

52.66 The add-on for the equity derivative asset class ($\text{AddOn}^{\text{Equity}}$) within a netting set is calculated using the following steps:

- (1) Step 1: Calculate the effective notional for each trade in the netting set that is in the equity derivative asset class. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d_i); (ii) the supervisory delta adjustment of the trade (δ_i); and (iii) the maturity factor (MF). That is, for each trade i , the effective notional D_i is calculated as $D_i = d_i * MF_i * \delta_i$, where each term is as defined in [CRE52.33](#) to [CRE52.53](#).
- (2) Step 2: Calculate the combined effective notional for all derivatives that reference the same entity. Each separate equity index that is referenced by derivatives in the equity derivative asset class should be treated as a separate entity. The combined effective notional of the entity (EN_{entity}) is calculated by adding together the trade level effective notionals calculated in step 1 that reference that entity.
- (3) Step 3: Calculate the add-on for each entity ($\text{AddOn}_{\text{entity}}$) by multiplying the combined effective notional for that entity calculated in step 2 by the supervisory factor that is specified for that entity (SF_{entity}). The supervisory factors are set out in Table 2 in [CRE52.72](#) and vary according to whether the entity is a single name ($SF_{\text{entity}} = 32\%$) or an index ($SF_{\text{entity}} = 20\%$).

- (4) Step 4: Calculate the asset class level add-on ($AddOn^{Equity}$) by using the formula that follows. In the formula the summations are across all entities referenced by the derivatives, $AddOn_{entity}$ is the add-on amount calculated in step 3 for each entity referenced by the derivatives and ρ_{entity} is the supervisory prescribed correlation factor corresponding to the entity. As set out in Table 2 in [CRE52.72](#), the correlation factor is 50% for single entities and 80% for indices.

$$AddOn^{Equity} = \left[\left(\sum_{entity} \rho_{entity} * AddOn_{entity} \right)^2 + \sum_{entity} \left(1 - (\rho_{entity})^2 \right) * (AddOn_{entity})^2 \right]^{\frac{1}{2}}$$

52.67 The supervisory factors for equity derivatives were calibrated based on estimates of the market volatility of equity indices, with the application of a conservative beta factor^{[14](#)} to translate this estimate into an estimate of individual volatilities.

Footnotes

^{[14](#)}

The beta of an individual equity measures the volatility of the stock relative to a broad market index. A value of beta greater than one means the individual equity is more volatile than the index. The greater the beta is, the more volatile the stock. The beta is calculated by running a linear regression of the stock on the broad index.

52.68 Banks are not permitted to make any modelling assumptions in the calculation of the PFE add-ons, including estimating individual volatilities or taking publicly available estimates of beta. This is a pragmatic approach to ensure a consistent implementation across jurisdictions but also to keep the add-on calculation relatively simple and prudent. Therefore, bank must only use the two values of supervisory factors that are defined for equity derivatives, one for single entities and one for indices.

Add-on for commodity derivatives

52.69 The calculation of the add-on for the commodity derivative asset class is similar to the calculation of the add-on for the credit and equity derivative asset classes. It recognises the full offsetting of long and short positions for derivatives that reference the same type of underlying commodity. It also allows partial offsetting between derivatives that reference different types of commodity, however, this partial offsetting is only permitted within each of the four hedging sets of the commodity derivative asset class, where the different commodity types are more likely to demonstrate some stable, meaningful joint dynamics. Offsetting between hedging sets is not recognised (eg a forward contract on crude oil cannot hedge a forward contract on corn).

52.70 The add-on for the commodity derivative asset class ($\text{AddOn}^{\text{Commodity}}$) within a netting set is calculated using the following steps:

- (1) Step 1: Calculate the effective notional for each trade in the netting set that is in the commodity derivative asset class. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d_i); (ii) the supervisory delta adjustment of the trade (δ_i); and (iii) the maturity factor (MF). That is, for each trade i , the effective notional D_i is calculated as $D_i = d_i * MF_i * \delta_i$, where each term is as defined in [CRE52.33](#) to [CRE52.53](#).
- (2) Step 2: Allocate the trades in commodity derivative asset class to hedging sets. In the commodity derivative asset class there are four hedging sets consisting of derivatives that reference: energy, metals, agriculture and other commodities.
- (3) Step 3: Calculate the combined effective notional for all derivatives with each hedging set that reference the same commodity type (eg all derivative that reference copper within the metals hedging set). The combined effective notional of the commodity type ($\text{EN}_{\text{ComType}}$) is calculated by adding together the trade level effective notionals calculated in step 1 that reference that commodity type.
- (4) Step 4: Calculate the add-on for each commodity type ($\text{AddOn}_{\text{ComType}}$) within each hedging set by multiplying the combined effective notional for that commodity calculated in step 3 by the supervisory factor that is specified for that commodity type ($\text{SF}_{\text{ComType}}$). The supervisory factors are set out in Table 2 in [CRE52.72](#) and are set at 40% for electricity derivatives and 18% for derivatives that reference all other types of commodities.

- (5) Step 5: Calculate the add-on for each of the four commodity hedging sets (AddOn_{HS}) by using the formula that follows. In the formula the summations are across all commodity types within the hedging set, AddOn_{ComType} is the add-on amount calculated in step 4 for each commodity type and $\rho_{ComType}$ is the supervisory prescribed correlation factor corresponding to the commodity type. As set out in Table 2 in [CRE52.72](#), the correlation factor is set at 40% for all commodity types.

$$AddOn_{HS} = \left[\left(\sum_{ComType} \rho_{ComType} * AddOn_{ComType} \right)^2 + \sum_{ComType} \left(1 - (\rho_{ComType})^2 \right) * (AddOn_{ComType})^2 \right]^{\frac{1}{2}}$$

- (6) Step 6: Calculate the asset class level add-on (AddOn^{Commodity}) by adding together all of the hedging set level add-ons calculated in step 5:

$$AddOn^{Commodity} = \sum_{HS} AddOn_{HS}$$

52.71 Regarding the calculation steps above, defining individual commodity types is operationally difficult. In fact, it is impossible to fully specify all relevant distinctions between commodity types so that all basis risk is captured. For example crude oil could be a commodity type within the energy hedging set, but in certain cases this definition could omit a substantial basis risk between different types of crude oil (West Texas Intermediate, Brent, Saudi Light, etc). Also, the four commodity type hedging sets have been defined without regard to characteristics such as location and quality. For example, the energy hedging set contains commodity types such as crude oil, electricity, natural gas and coal. National supervisors may require banks to use more refined definitions of commodities when they are significantly exposed to the basis risk of different products within those commodity types.

Supervisory specified parameters

52.72 Table 2 includes the supervisory factors, correlations and supervisory option volatility add-ons for each asset class and subclass.

Summary table of supervisory parameters

Table 2

Asset Class	Subclass	Supervisory factor	Correlation	Supervisory option volatility
Interest rate		0.50%	N/A	50%
Foreign exchange		4.0%	N/A	15%
Credit, Single Name	AAA	0.38%	50%	100%
	AA	0.38%	50%	100%
	A	0.42%	50%	100%
	BBB	0.54%	50%	100%
	BB	1.06%	50%	100%
	B	1.6%	50%	100%
	CCC	6.0%	50%	100%
Credit, Index	IG	0.38%	80%	80%
	SG	1.06%	80%	80%
Equity, Single Name		32%	50%	120%
Equity, Index		20%	80%	75%
Commodity	Electricity	40%	40%	150%
	Oil/Gas	18%	40%	70%
	Metals	18%	40%	70%
	Agricultural	18%	40%	70%
	Other	18%	40%	70%

FAQ

FAQ1 *Should a 50% supervisory option volatility on swaptions for all currencies be used?*

Yes.

FAQ2 *Are the supervisory volatilities in the table in paragraph [CRE52.72](#) recommended or required?*

They are required. They must be used for calculating the supervisory delta of options.

52.73 For a hedging set consisting of basis transactions, the supervisory factor applicable to its relevant asset class must be multiplied by one-half. For a hedging set consisting of volatility transactions, the supervisory factor applicable to its relevant asset class must be multiplied by a factor of five.

Treatment of multiple margin agreements and multiple netting sets

52.74 If multiple margin agreements apply to a single netting set, the netting set must be divided into sub-netting sets that align with their respective margin agreement. This treatment applies to both RC and PFE components.

FAQ
FAQ1

How should multiple margin agreements be treated in a single netting agreement?

The SA-CCR standard provides two distinct methods of calculating exposure at default: one for "margined transactions" and one for "unmargined transactions." A "margined transaction" should be understood as a derivative transaction covered by a margin agreement such that the bank's counterparty must post variation margin to the bank. All derivative transactions that are not "margined" in this sense should be treated as "unmargined transactions." This distinction of "margined" or "unmargined" for the purposes of SA-CCR is unrelated to initial margin requirements of the transaction.

The SA-CCR standard implicitly assumes the following generic variation margin set-up: either (i) the entire netting set consists exclusively of unmargined trades, or (ii) the entire netting set consists exclusively of margined trades covered by the same variation margin agreement. [CRE52.74](#) should be applied in either of the following cases: (i) the netting set consist of both margined and unmargined trades; (ii) the netting set consists of margined trades covered by different variation margin agreements.

Under [CRE52.74](#), the replacement cost (RC) is calculated for the entire netting set via the formula for margined trades in [CRE52.18](#). The inputs to the formula should be interpreted as follows:

- *V is the value of all derivative transactions (both margined and unmargined) in the netting set;*
- *C is the haircut value of net collateral held by the bank for all derivative transactions within the netting set;*
- *TH is the sum of the counterparty thresholds across all variation margin agreements within the netting set;*
- *MTA is the sum of the minimum transfer amounts across all variation margin agreements within the netting set;*

Under [CRE52.74](#), the potential future exposure (PFE) for the netting set is calculated as the product of the aggregate add-on and the multiplier (per [CRE52.20](#)). The multiplier of the netting set is calculated via the formula in [CRE52.23](#), with the inputs V and C interpreted as described above. The aggregate add-on for the netting set (also to be used as an input to the multiplier) is calculated as the sum of the aggregated add-ons calculated for each sub-netting set. The sub-netting sets are constructed as follows:

- *all unmargined transactions within the netting set form a single sub-netting set;*
- *all margined transactions within the netting set that share the same margin period of risk (MPOR) form a single sub-netting set.*

52.75 If a single margin agreement applies to several netting sets, special treatment is necessary because it is problematic to allocate the common collateral to individual netting sets. The replacement cost at any given time is determined by the sum of two terms. The first term is equal to the unmargined current exposure of the bank to the counterparty aggregated across all netting sets within the margin agreement reduced by the positive current net collateral (ie collateral is subtracted only when the bank is a net holder of collateral). The second term is non-zero only when the bank is a net poster of collateral: it is equal to the current net posted collateral (if there is any) reduced by the unmargined current exposure of the counterparty to the bank aggregated across all netting sets within the margin agreement. Net collateral available to the bank should include both VM and NICA. Mathematically, RC for the entire margin agreement is calculated as follows, where:

- (1) where the summation $NS \in MA$ is across the netting sets covered by the margin agreement (hence the notation)
- (2) V_{NS} is the current mark-to-market value of the netting set NS and C_{MA} is the equivalent value of all currently available collateral under the margin agreement

$$RC_{MA} = \max \left\{ \sum_{NS \in MA} \max \{V_{NS}; 0\} - \max \{C_{MA}; 0\}; 0 \right\} + \max \left\{ \sum_{NS \in MA} \min \{V_{NS}; 0\} - \min \{C_{MA}; 0\}; 0 \right\}$$

52.76 Where a single margin agreement applies to several netting sets as described in [CRE52.75](#) above, collateral will be exchanged based on mark-to-market values that are netted across all transactions covered under the margin agreement, irrespective of netting sets. That is, collateral exchanged on a net basis may not be sufficient to cover PFE. In this situation, therefore, the PFE add-on must be calculated according to the unmargined methodology. Netting set-level PFEs are then aggregated using the following formula, where $PFE_{NS}^{(unmargined)}$ is the PFE add-on for the netting set NS calculated according to the unmargined requirements:

$$PFE_{MA} = \sum_{NS \in MA} PFE_{NS}^{(unmargined)}$$

FAQ
FAQ1

How must a bank calculate the potential future exposure (PFE) in a case in which a single margin agreement applies to multiple netting sets?

According to [CRE52.76](#), the aggregate add-on for each netting set under the variation margin agreement is calculated according to the unmarginated methodology. For the calculation of the multiplier ([CRE52.23](#)) of the PFE of each of the individual netting sets covered by a single margin agreement or collateral amount, the available collateral C (which, in the case of a variation margin agreement, includes variation margin posted or received) should be allocated to the netting sets as follows:

- If the bank is a net receiver of collateral ($C > 0$), all of the individual amounts allocated to the individual netting sets must also be positive or zero. Netting sets with positive market values must first be allocated collateral up to the amount of those market values. Only after all positive market values have been compensated may surplus collateral be attributed freely among all netting sets.*
- If the bank is a net provider of collateral ($C < 0$), all of the individual amounts allocated to the individual netting sets must also be negative or zero. Netting sets with negative market values must first be allocated collateral up to the amount of their market values. If the collateral provided is larger than the sum of the negative market values, then all multipliers must be set equal to 1 and no allocation is necessary.*
- The allocated parts must add up to the total collateral available for the margin agreement.*

Apart from these limitations, banks may allocate available collateral at their discretion.

The multiplier is then calculated per netting set according to [CRE52.23](#) taking the allocated amount of collateral into account.

Treatment of collateral taken outside of netting sets

52.77 Eligible collateral which is taken outside a netting set, but is available to a bank to offset losses due to counterparty default on one netting set only, should be treated as an independent collateral amount associated with the netting set and used within the calculation of replacement cost under [CRE52.10](#) when the netting set is unmargined and under [CRE52.18](#) when the netting set is margined. Eligible collateral which is taken outside a netting set, and is available to a bank to offset losses due to counterparty default on more than one netting set, should be treated as collateral taken under a margin agreement applicable to multiple netting sets, in which case the treatment under [CRE52.75](#) and [CRE52.76](#) applies. If eligible collateral is available to offset losses on non-derivatives exposures as well as exposures determined using the SA-CCR, only that portion of the collateral assigned to the derivatives may be used to reduce the derivatives exposure.

CRE53

Internal models method for counterparty credit risk

This chapter sets out the internal models method for counterparty credit risk.

**Version effective as of
15 Dec 2019**

Updated to include the following FAQ: CRE53.24
FAQ4.

Approval to adopt an internal models method to estimate EAD

- 53.1** A bank (meaning the individual legal entity or a group) that wishes to adopt an internal models method to measure exposure or exposure at default (EAD) for regulatory capital purposes must seek approval from its supervisor. The internal models method is available both for banks that adopt the internal ratings-based approach to credit risk and for banks for which the standardised approach to credit risk applies to all of their credit risk exposures. The bank must meet all of the requirements given in [CRE53.6](#) to [CRE53.60](#) and must apply the method to all of its exposures that are subject to counterparty credit risk, except for long settlement transactions.
- 53.2** A bank may also choose to adopt an internal models method to measure counterparty credit risk (CCR) for regulatory capital purposes for its exposures or EAD to only over-the-counter (OTC) derivatives, to only securities financing transactions (SFTs), or to both, subject to the appropriate recognition of netting specified in [CRE53.61](#) to [CRE53.71](#). The bank must apply the method to all relevant exposures within that category, except for those that are immaterial in size and risk. During the initial implementation of the internal models method, a bank may use the Standardised Approach for counterparty credit risk for a portion of its business. The bank must submit a plan to its supervisor to bring all material exposures for that category of transactions under the internal models method.
- 53.3** For all OTC derivative transactions and for all long settlement transactions for which a bank has not received approval from its supervisor to use the internal models method, the bank must use the standardised approach to counterparty credit risk (SA-CCR, [CRE52](#)).
- 53.4** Exposures or EAD arising from long settlement transactions can be determined using either of the methods identified in this document regardless of the methods chosen for treating OTC derivatives and SFTs. In computing capital requirements for long settlement transactions banks that hold permission to use the internal ratings-based approach may opt to apply the risk weights under this Framework's standardised approach for credit risk on a permanent basis and irrespective to the materiality of such positions.
- 53.5** After adoption of the internal models method, the bank must comply with the above requirements on a permanent basis. Only under exceptional circumstances or for immaterial exposures can a bank revert to the standardised approach for counterparty credit risk for all or part of its exposure. The bank must demonstrate that reversion to a less sophisticated method does not lead to an arbitrage of the regulatory capital rules.

Exposure amount or EAD under the internal models method

- 53.6** CCR exposure or EAD is measured at the level of the netting set as defined in [CRE50](#) and [CRE53.61](#) to [CRE53.71](#). A qualifying internal model for measuring counterparty credit exposure must specify the forecasting distribution for changes in the market value of the netting set attributable to changes in market variables, such as interest rates, foreign exchange rates, etc. The model then computes the bank's CCR exposure for the netting set at each future date given the changes in the market variables. For margined counterparties, the model may also capture future collateral movements. Banks may include eligible financial collateral as defined in [CRE22.37](#) and [CRE55.2](#) in their forecasting distributions for changes in the market value of the netting set, if the quantitative, qualitative and data requirements for internal models method are met for the collateral.
- 53.7** As set out in [RBC20.8](#), banks that use the internal models method must calculate credit RWA as the higher of two amounts, one based on current parameter estimates and one based on stressed parameter estimates. Specifically, to determine the default risk capital requirement for counterparty credit risk, banks must use the greater of the portfolio-level capital requirement (not including the credit valuation adjustment, or CVA, charge in [MAR50](#)) based on Effective expected positive exposure (EPE) using current market data and the portfolio-level capital requirement based on Effective EPE using a stress calibration. The stress calibration should be a single consistent stress calibration for the whole portfolio of counterparties. The greater of Effective EPE using current market data and the stress calibration should not be applied on a counterparty by counterparty basis, but on a total portfolio level.
- 53.8** To the extent that a bank recognises collateral in EAD via current exposure, a bank would not be permitted to recognise the benefits in its estimates of loss-given-default (LGD). As a result, the bank would be required to use an LGD of an otherwise similar uncollateralised facility. In other words, the bank would be required to use an LGD that does not include collateral that is already included in EAD.
- 53.9** Under the internal models method, the bank need not employ a single model. Although the following text describes an internal model as a simulation model, no particular form of model is required. Analytical models are acceptable so long as they are subject to supervisory review, meet all of the requirements set forth in this section and are applied to all material exposures subject to a CCR-related capital requirement as noted above, with the exception of long settlement transactions, which are treated separately, and with the exception of those exposures that are immaterial in size and risk.

53.10

Expected exposure or peak exposure measures should be calculated based on a distribution of exposures that accounts for the possible non-normality of the distribution of exposures, including the existence of leptokurtosis ("fat tails"), where appropriate.

- 53.11** When using an internal model, exposure amount or EAD is calculated as the product of alpha times Effective EPE, as specified below (except for counterparties that have been identified as having explicit specific wrong way risk – see [CRE53.48](#)):

$$EAD = \alpha \times \text{Effective EPE} \quad (\text{equation 1})$$

- 53.12** Effective EPE is computed by estimating expected exposure (EE_t) as the average exposure at future date t , where the average is taken across possible future values of relevant market risk factors, such as interest rates, foreign exchange rates, etc. The internal model estimates EE at a series of future dates $t_1, t_2, t_3 \dots$ ¹. Specifically, "Effective EE " is computed recursively using the following formula, where the current date is denoted as t_0 and Effective EE_{t_0} equals current exposure:

$$\text{Effective } EE_{t_k} = \max(\text{Effective } EE_{t_{k-1}}, EE_{t_k}) \quad (\text{equation 2})$$

Footnotes

¹ *In theory, the expectations should be taken with respect to the actual probability distribution of future exposure and not the risk-neutral one. Supervisors recognise that practical considerations may make it more feasible to use the risk-neutral one. As a result, supervisors will not mandate which kind of forecasting distribution to employ.*

- 53.13** In this regard, "Effective EPE" is the average Effective EE during the first year of future exposure. If all contracts in the netting set mature before one year, EPE is the average of expected exposure until all contracts in the netting set mature. Effective EPE is computed as a weighted average of Effective EE , using the following formula where the weights $\Delta t_k = t_k - t_{k-1}$ allows for the case when future exposure is calculated at dates that are not equally spaced over time:

$$\text{Effective EPE} = \sum_{k=1}^{\min(1 \text{ year}, \text{maturity})} \text{Effective } EE_{t_k} \times \Delta t_k \quad (\text{equation 3})$$

53.14 Alpha (α) is set equal to 1.4.

53.15 Supervisors have the discretion to require a higher alpha based on a bank's CCR exposures. Factors that may require a higher alpha include the low granularity of counterparties; particularly high exposures to general wrong-way risk; particularly high correlation of market values across counterparties; and other institution-specific characteristics of CCR exposures.

Own estimates for alpha

53.16 Banks may seek approval from their supervisors to compute internal estimates of alpha subject to a floor of 1.2, where alpha equals the ratio of economic capital from a full simulation of counterparty exposure across counterparties (numerator) and economic capital based on EPE (denominator), assuming they meet certain operating requirements. Eligible banks must meet all the operating requirements for internal estimates of EPE and must demonstrate that their internal estimates of alpha capture in the numerator the material sources of stochastic dependency of distributions of market values of transactions or of portfolios of transactions across counterparties (eg the correlation of defaults across counterparties and between market risk and default).

53.17 In the denominator, EPE must be used as if it were a fixed outstanding loan amount.

53.18 To this end, banks must ensure that the numerator and denominator of alpha are computed in a consistent fashion with respect to the modelling methodology, parameter specifications and portfolio composition. The approach used must be based on the bank's internal economic capital approach, be well-documented and be subject to independent validation. In addition, banks must review their estimates on at least a quarterly basis, and more frequently when the composition of the portfolio varies over time. Banks must assess the model risk and supervisors should be alert to the significant variation in estimates of alpha that arises from the possibility for mis-specification in the models used for the numerator, especially where convexity is present.

53.19 Where appropriate, volatilities and correlations of market risk factors used in the joint simulation of market and credit risk should be conditioned on the credit risk factor to reflect potential increases in volatility or correlation in an economic downturn. Internal estimates of alpha should take account of the granularity of exposures.

Maturity

53.20 If the original maturity of the longest-dated contract contained in the set is greater than one year, the formula for effective maturity (M) in [CRE32.42](#) is replaced with formula that follows, where df_k is the risk-free discount factor for future time period t_k and the remaining symbols are defined above. Similar to the treatment under corporate exposures, M has a cap of five years.²

$$M = \frac{\sum_{k=1}^{t_k \leq 1 \text{ year}} (\text{Effective}EE_k \times \Delta t_k \times df_k) + \sum_{\substack{\text{maturity} \\ t_k > 1 \text{ year}}} (EE_k \times \Delta t_k \times df_k)}{\sum_{k=1}^{t_k \leq 1 \text{ year}} (\text{Effective}EE_k \times \Delta t_k \times df_k)}$$

Footnotes

² Conceptually, M equals the effective credit duration of the counterparty exposure. A bank that uses an internal model to calculate a one-sided credit valuation adjustment (CVA) can use the effective credit duration estimated by such a model in place of the above formula with prior approval of its supervisor.

53.21 For netting sets in which all contracts have an original maturity of less than one year, the formula for effective maturity (M) in [CRE32.42](#) is unchanged and a floor of one year applies, with the exception of short-term exposures as described in [CRE32.45](#) to [CRE32.48](#).

Margin agreements

53.22 If the netting set is subject to a margin agreement and the internal model captures the effects of margining when estimating EE, the model's EE measure may be used directly in equation (2). Such models are noticeably more complicated than models of EPE for unmarginated counterparties. As such, they are subject to a higher degree of supervisory scrutiny before they are approved, as discussed below.

53.23 An EPE model must also include transaction-specific information in order to capture the effects of margining. It must take into account both the current amount of margin and margin that would be passed between counterparties in the future. Such a model must account for the nature of margin agreements (unilateral or bilateral), the frequency of margin calls, the margin period of risk, the thresholds of unmargined exposure the bank is willing to accept, and the minimum transfer amount. Such a model must either model the mark-to-market change in the value of collateral posted or apply this Framework's rules for collateral.

53.24 For transactions subject to daily re-margining and mark-to-market valuation, a supervisory floor of five business days for netting sets consisting only of repo-style transactions, and 10 business days for all other netting sets is imposed on the margin period of risk used for the purpose of modelling EAD with margin agreements. In the following cases a higher supervisory floor is imposed:

- (1) For all netting sets where the number of trades exceeds 5000 at any point during a quarter, a supervisory floor of 20 business days is imposed for the margin period of risk for the following quarter.
- (2) For netting sets containing one or more trades involving either illiquid collateral, or an OTC derivative that cannot be easily replaced, a supervisory floor of 20 business days is imposed for the margin period of risk. For these purposes, "Illiquid collateral" and "OTC derivatives that cannot be easily replaced" must be determined in the context of stressed market conditions and will be characterised by the absence of continuously active markets where a counterparty would, within two or fewer days, obtain multiple price quotations that would not move the market or represent a price reflecting a market discount (in the case of collateral) or premium (in the case of an OTC derivative). Examples of situations where trades are deemed illiquid for this purpose include, but are not limited to, trades that are not marked daily and trades that are subject to specific accounting treatment for valuation purposes (eg OTC derivatives or repo-style transactions referencing securities whose fair value is determined by models with inputs that are not observed in the market).
- (3) In addition, a bank must consider whether trades or securities it holds as collateral are concentrated in a particular counterparty and if that counterparty exited the market precipitously whether the bank would be able to replace its trades.

FAQ

FAQ1 *Is it correct that the margin period of risk is netting set dependent and not on an aggregated basis across a counterparty?*

Yes, the margin period of risk (MPOR) applies to a netting set. This extends only to a counterparty if all transactions with this counterparty are in one margined netting set.

FAQ2 *Is it correct that where there is illiquidity of transactions or collateral, the margin period of risk immediately changes, as opposed to the criteria for number of trades in a netting set or collateral dispute which has a lag effect?*

That is correct.

FAQ3 *Where the margin period of risk is increased above the minimum, for instance due to the inclusion of an illiquid trade, when the Expected Exposure is calculated should the margin period of risk be reduced to the minimum for tenors beyond the expected expiry of the event (the expected maturity of the illiquid trade, in this example)?*

The extension of the margin period of risk (MPOR) is ruled by market liquidity considerations. That means liquidation of respective positions might take more time than the standard MPOR. In very rare cases market liquidity horizons are as long as the maturity of these positions.

FAQ4 *Regarding the reform of benchmark reference rates, does the extended margin period of risk in [CRE52.51\(2\)](#) (SA-CCR) and [CRE53.24\(2\)](#) (IMM) apply if the new benchmark rate experiences transitional illiquidity?*

Until one year after the discontinuation of an old benchmark rate, any transitional illiquidity of collateral and OTC derivatives that reference the relevant new benchmark rate should not trigger the extended margin period of risk in [CRE52.51\(2\)](#) for SA-CCR and [CRE53.24\(2\)](#) for the IMM.

53.25 If a bank has experienced more than two margin call disputes on a particular netting set over the previous two quarters that have lasted longer than the applicable margin period of risk (before consideration of this provision), then the bank must reflect this history appropriately by using a margin period of risk that is at least double the supervisory floor for that netting set for the subsequent two quarters.

FAQ

FAQ1 *Are all margin disputes be counted even for those where the disputed amount was very small, or if there is any threshold amount that can be applied here?*

Every instance of a margin call being disputed must be counted, irrespective of the amount.

FAQ2 *In the case of non-centrally cleared derivatives that are subject to the requirements of [MGN20](#), what margin calls are to be taken into account for the purpose counting the number of disputes according to [CRE53.25](#)?*

In the case of non-centrally cleared derivatives that are subject to the requirements of [MGN20](#), [CRE53.25](#) applies only to variation margin call disputes.

53.26 For re-margining with a periodicity of N-days the margin period of risk should be at least equal to the supervisory floor, F, plus the N days minus one day. That is:

$$\text{Margin Period of Risk} = F + N - 1$$

53.27 Banks using the internal models method must not capture the effect of a reduction of EAD due to any clause in a collateral agreement that requires receipt of collateral when counterparty credit quality deteriorates.

Model validation

53.28 It is important that supervisory authorities are able to assure themselves that banks using models have counterparty credit risk management systems that are conceptually sound and implemented with integrity. Accordingly the supervisory authority will specify a number of qualitative criteria that banks would have to meet before they are permitted to use a models-based approach. The extent to which banks meet the qualitative criteria may influence the level at which supervisory authorities will set the multiplication factor referred to in [CRE53.14](#) (Alpha) above. Only those banks in full compliance with the qualitative criteria will be eligible for application of the minimum multiplication factor. The qualitative criteria include:

- (1) The bank must conduct a regular programme of backtesting, ie an ex-post comparison of the risk measures generated by the model against realised risk measures, as well as comparing hypothetical changes based on static positions with realised measures. "Risk measures" in this context, refers not only to Effective EPE, the risk measure used to derive regulatory capital, but also to the other risk measures used in the calculation of Effective EPE such as the exposure distribution at a series of future dates, the positive exposure distribution at a series of future dates, the market risk factors used to derive those exposures and the values of the constituent trades of a portfolio.
- (2) The bank must carry out an initial validation and an on-going periodic review of its IMM model and the risk measures generated by it. The validation and review must be independent of the model developers.
- (3) The board of directors and senior management should be actively involved in the risk control process and must regard credit and counterparty credit risk control as an essential aspect of the business to which significant resources need to be devoted. In this regard, the daily reports prepared by the independent risk control unit must be reviewed by a level of management with sufficient seniority and authority to enforce both reductions of positions taken by individual traders and reductions in the bank's overall risk exposure.
- (4) The bank's internal risk measurement exposure model must be closely integrated into the day-to-day risk management process of the bank. Its output should accordingly be an integral part of the process of planning, monitoring and controlling the bank's counterparty credit risk profile.
- (5) The risk measurement system should be used in conjunction with internal trading and exposure limits. In this regard, exposure limits should be related to the bank's risk measurement model in a manner that is consistent over time and that is well understood by traders, the credit function and senior management.
- (6) Banks should have a routine in place for ensuring compliance with a documented set of internal policies, controls and procedures concerning the operation of the risk measurement system. The bank's risk measurement system must be well documented, for example, through a risk management manual that describes the basic principles of the risk management system and that provides an explanation of the empirical techniques used to measure counterparty credit risk.

- (7) An independent review of the risk measurement system should be carried out regularly in the bank's own internal auditing process. This review should include both the activities of the business trading units and of the independent risk control unit. A review of the overall risk management process should take place at regular intervals (ideally no less than once a year) and should specifically address, at a minimum:
- (a) The adequacy of the documentation of the risk management system and process;
 - (b) The organisation of the risk control unit;
 - (c) The integration of counterparty credit risk measures into daily risk management;
 - (d) The approval process for counterparty credit risk models used in the calculation of counterparty credit risk used by front office and back office personnel;
 - (e) The validation of any significant change in the risk measurement process;
 - (f) The scope of counterparty credit risks captured by the risk measurement model;
 - (g) The integrity of the management information system;
 - (h) The accuracy and completeness of position data;
 - (i) The verification of the consistency, timeliness and reliability of data sources used to run internal models, including the independence of such data sources;
 - (j) The accuracy and appropriateness of volatility and correlation assumptions;
 - (k) The accuracy of valuation and risk transformation calculations; and
 - (l) The verification of the model's accuracy as described below in [CRE53.29](#) to [CRE53.33](#).
- (8) The on-going validation of counterparty credit risk models, including backtesting, must be reviewed periodically by a level of management with sufficient authority to decide the course of action that will be taken to address weaknesses in the models.

53.29

Banks must document the process for initial and on-going validation of their IMM model to a level of detail that would enable a third party to recreate the analysis. Banks must also document the calculation of the risk measures generated by the models to a level of detail that would allow a third party to recreate the risk measures. This documentation must set out the frequency with which backtesting analysis and any other on-going validation will be conducted, how the validation is conducted with respect to dataflows and portfolios and the analyses that are used.

53.30 Banks must define criteria with which to assess their EPE models and the models that input into the calculation of EPE and have a written policy in place that describes the process by which unacceptable performance will be determined and remedied.

53.31 Banks must define how representative counterparty portfolios are constructed for the purposes of validating an EPE model and its risk measures.

53.32 When validating EPE models and its risk measures that produce forecast distributions, validation must assess more than a single statistic of the model distribution.

53.33 As part of the initial and on-going validation of an IMM model and its risk measures, the following requirements must be met:

- (1) A bank must carry out backtesting using historical data on movements in market risk factors prior to supervisory approval. Backtesting must consider a number of distinct prediction time horizons out to at least one year, over a range of various start (initialisation) dates and covering a wide range of market conditions.
- (2) Banks must backtest the performance of their EPE model and the model's relevant risk measures as well as the market risk factor predictions that support EPE. For collateralised trades, the prediction time horizons considered must include those reflecting typical margin periods of risk applied in collateralised/margined trading, and must include long time horizons of at least 1 year.
- (3) The pricing models used to calculate counterparty credit risk exposure for a given scenario of future shocks to market risk factors must be tested as part of the initial and on-going model validation process. These pricing models may be different from those used to calculate Market Risk over a short horizon. Pricing models for options must account for the nonlinearity of option value with respect to market risk factors.

- (4) An EPE model must capture transaction specific information in order to aggregate exposures at the level of the netting set. Banks must verify that transactions are assigned to the appropriate netting set within the model.
- (5) Static, historical backtesting on representative counterparty portfolios must be a part of the validation process. At regular intervals as directed by its supervisor, a bank must conduct such backtesting on a number of representative counterparty portfolios. The representative portfolios must be chosen based on their sensitivity to the material risk factors and correlations to which the bank is exposed. In addition, IMM banks need to conduct backtesting that is designed to test the key assumptions of the EPE model and the relevant risk measures, eg the modelled relationship between tenors of the same risk factor, and the modelled relationships between risk factors.
- (6) Significant differences between realised exposures and the forecast distribution could indicate a problem with the model or the underlying data that the supervisor would require the bank to correct. Under such circumstances, supervisors may require additional capital to be held while the problem is being solved.
- (7) The performance of EPE models and its risk measures must be subject to good backtesting practice. The backtesting programme must be capable of identifying poor performance in an EPE model's risk measures.
- (8) Banks must validate their EPE models and all relevant risk measures out to time horizons commensurate with the maturity of trades for which exposure is calculated using an internal models method.
- (9) The pricing models used to calculate counterparty exposure must be regularly tested against appropriate independent benchmarks as part of the on-going model validation process.
- (10) The on-going validation of a bank's EPE model and the relevant risk measures include an assessment of recent performance.
- (11) The frequency with which the parameters of an EPE model are updated needs to be assessed as part of the validation process.
- (12) Under the IMM, a measure that is more conservative than the metric used to calculate regulatory EAD for every counterparty, may be used in place of alpha times Effective EPE with the prior approval of the supervisor. The degree of relative conservatism will be assessed upon initial supervisory approval and at the regular supervisory reviews of the EPE models. The bank must validate the conservatism regularly.

- (13) The on-going assessment of model performance needs to cover all counterparties for which the models are used.
- (14) The validation of IMM models must assess whether or not the bank level and netting set exposure calculations of EPE are appropriate.

Operational requirements for EPE models

53.34 In order to be eligible to adopt an internal model for estimating EPE arising from CCR for regulatory capital purposes, a bank must meet the following operational requirements. These include meeting the requirements related to the qualifying standards on CCR Management, a use test, stress testing, identification of wrong-way risk, and internal controls.

Qualifying standards on CCR Management

53.35 The bank must satisfy its supervisor that, in addition to meeting the operational requirements identified in [CRE53.36](#) to [CRE53.60](#) below, it adheres to sound practices for CCR management, including those specified in [SRP32.14](#) to [SRP32.27](#).

Use test

53.36 The distribution of exposures generated by the internal model used to calculate effective EPE must be closely integrated into the day-to-day CCR management process of the bank. For example, the bank could use the peak exposure from the distributions for counterparty credit limits or expected positive exposure for its internal allocation of capital. The internal model's output must accordingly play an essential role in the credit approval, counterparty credit risk management, internal capital allocations, and corporate governance of banks that seek approval to apply such models for capital adequacy purposes. Models and estimates designed and implemented exclusively to qualify for the internal models method are not acceptable.

53.37 A bank must have a credible track record in the use of internal models that generate a distribution of exposures to CCR. Thus, the bank must demonstrate that it has been using an internal model to calculate the distributions of exposures upon which the EPE calculation is based that meets broadly the minimum requirements for at least one year prior to supervisory approval.

- 53.38** Banks employing the internal models method must have an independent control unit that is responsible for the design and implementation of the bank's CCR management system, including the initial and on-going validation of the internal model. This unit must control input data integrity and produce and analyse daily reports on the output of the bank's risk measurement model, including an evaluation of the relationship between measures of CCR risk exposure and credit and trading limits. This unit must be independent from business credit and trading units; it must be adequately staffed; it must report directly to senior management of the bank. The work of this unit should be closely integrated into the day-to-day credit risk management process of the bank. Its output should accordingly be an integral part of the process of planning, monitoring and controlling the bank's credit and overall risk profile.
- 53.39** Banks applying the internal models method must have a collateral management unit that is responsible for calculating and making margin calls, managing margin call disputes and reporting levels of independent amounts, initial margins and variation margins accurately on a daily basis. This unit must control the integrity of the data used to make margin calls, and ensure that it is consistent and reconciled regularly with all relevant sources of data within the bank. This unit must also track the extent of reuse of collateral (both cash and non-cash) and the rights that the bank gives away to its respective counterparties for the collateral that it posts. These internal reports must indicate the categories of collateral assets that are reused, and the terms of such reuse including instrument, credit quality and maturity. The unit must also track concentration to individual collateral asset classes accepted by the banks. Senior management must allocate sufficient resources to this unit for its systems to have an appropriate level of operational performance, as measured by the timeliness and accuracy of outgoing calls and response time to incoming calls. Senior management must ensure that this unit is adequately staffed to process calls and disputes in a timely manner even under severe market crisis, and to enable the bank to limit its number of large disputes caused by trade volumes.
- 53.40** The bank's collateral management unit must produce and maintain appropriate collateral management information that is reported on a regular basis to senior management. Such internal reporting should include information on the type of collateral (both cash and non-cash) received and posted, as well as the size, aging and cause for margin call disputes. This internal reporting should also reflect trends in these figures.

- 53.41** A bank employing the internal models method must ensure that its cash management policies account simultaneously for the liquidity risks of potential incoming margin calls in the context of exchanges of variation margin or other margin types, such as initial or independent margin, under adverse market shocks, potential incoming calls for the return of excess collateral posted by counterparties, and calls resulting from a potential downgrade of its own public rating. The bank must ensure that the nature and horizon of collateral reuse is consistent with its liquidity needs and does not jeopardise its ability to post or return collateral in a timely manner.
- 53.42** The internal model used to generate the distribution of exposures must be part of a counterparty risk management framework that includes the identification, measurement, management, approval and internal reporting of counterparty risk.³ This Framework must include the measurement of usage of credit lines (aggregating counterparty exposures with other credit exposures) and economic capital allocation. In addition to EPE (a measure of future exposure), a bank must measure and manage current exposures. Where appropriate, the bank must measure current exposure gross and net of collateral held. The use test is satisfied if a bank uses other counterparty risk measures, such as peak exposure or potential future exposure (PFE), based on the distribution of exposures generated by the same model to compute EPE.

Footnotes

³ *This section draws heavily on the Counterparty Risk Management Policy Group's paper, Improving Counterparty Risk Management Practices (June 1999).*

- 53.43** A bank is not required to estimate or report EE daily, but to meet the use test it must have the systems capability to estimate EE daily, if necessary, unless it demonstrates to its supervisor that its exposures to CCR warrant some less frequent calculation. It must choose a time profile of forecasting horizons that adequately reflects the time structure of future cash flows and maturity of the contracts. For example, a bank may compute EE on a daily basis for the first ten days, once a week out to one month, once a month out to eighteen months, once a quarter out to five years and beyond five years in a manner that is consistent with the materiality and composition of the exposure.
- 53.44** Exposure must be measured out to the life of all contracts in the netting set (not just to the one year horizon), monitored and controlled. The bank must have procedures in place to identify and control the risks for counterparties where exposure rises beyond the one-year horizon. Moreover, the forecasted increase in exposure must be an input into the bank's internal economic capital model.

Stress testing

53.45 A bank must have in place sound stress testing processes for use in the assessment of capital adequacy. These stress measures must be compared against the measure of EPE and considered by the bank as part of its internal capital adequacy assessment process. Stress testing must also involve identifying possible events or future changes in economic conditions that could have unfavourable effects on a bank's credit exposures and assessment of the bank's ability to withstand such changes. Examples of scenarios that could be used are; (i) economic or industry downturns, (ii) market-place events, or (iii) decreased liquidity conditions.

53.46 Banks must have a comprehensive stress testing program for counterparty credit risk. The stress testing program must include the following elements:

- (1) Banks must ensure complete trade capture and exposure aggregation across all forms of counterparty credit risk (not just OTC derivatives) at the counterparty-specific level in a sufficient time frame to conduct regular stress testing.
- (2) For all counterparties, banks should produce, at least monthly, exposure stress testing of principal market risk factors (eg interest rates, FX, equities, credit spreads, and commodity prices) in order to proactively identify, and when necessary, reduce outsized concentrations to specific directional sensitivities.
- (3) Banks should apply multifactor stress testing scenarios and assess material non-directional risks (ie yield curve exposure, basis risks, etc) at least quarterly. Multiple-factor stress tests should, at a minimum, aim to address scenarios in which a) severe economic or market events have occurred; b) broad market liquidity has decreased significantly; and c) the market impact of liquidating positions of a large financial intermediary. These stress tests may be part of bank-wide stress testing.
- (4) Stressed market movements have an impact not only on counterparty exposures, but also on the credit quality of counterparties. At least quarterly, banks should conduct stress testing applying stressed conditions to the joint movement of exposures and counterparty creditworthiness.
- (5) Exposure stress testing (including single factor, multifactor and material non-directional risks) and joint stressing of exposure and creditworthiness should be performed at the counterparty-specific, counterparty group (eg industry and region), and aggregate bank-wide CCR levels.

- (6) Stress tests results should be integrated into regular reporting to senior management. The analysis should capture the largest counterparty-level impacts across the portfolio, material concentrations within segments of the portfolio (within the same industry or region), and relevant portfolio and counterparty specific trends.
- (7) The severity of factor shocks should be consistent with the purpose of the stress test. When evaluating solvency under stress, factor shocks should be severe enough to capture historical extreme market environments and/or extreme but plausible stressed market conditions. The impact of such shocks on capital resources should be evaluated, as well as the impact on capital requirements and earnings. For the purpose of day-to-day portfolio monitoring, hedging, and management of concentrations, banks should also consider scenarios of lesser severity and higher probability.
- (8) Banks should consider reverse stress tests to identify extreme, but plausible, scenarios that could result in significant adverse outcomes.
- (9) Senior management must take a lead role in the integration of stress testing into the risk management framework and risk culture of the bank and ensure that the results are meaningful and proactively used to manage counterparty credit risk. At a minimum, the results of stress testing for significant exposures should be compared to guidelines that express the bank's risk appetite and elevated for discussion and action when excessive or concentrated risks are present.

Wrong-way risk

53.47 Banks must identify exposures that give rise to a greater degree of general wrong-way risk. Stress testing and scenario analyses must be designed to identify risk factors that are positively correlated with counterparty credit worthiness. Such testing needs to address the possibility of severe shocks occurring when relationships between risk factors have changed. Banks should monitor general wrong way risk by product, by region, by industry, or by other categories that are germane to the business. Reports should be provided to senior management and the appropriate committee of the Board on a regular basis that communicate wrong way risks and the steps that are being taken to manage that risk.

53.48 A bank is exposed to “specific wrong-way risk” if future exposure to a specific counterparty is highly correlated with the counterparty’s probability of default. For example, a company writing put options on its own stock creates wrong-way exposures for the buyer that is specific to the counterparty. A bank must have procedures in place to identify, monitor and control cases of specific wrong way risk, beginning at the inception of a trade and continuing through the life of the trade. To calculate the CCR capital requirement, the instruments for which there exists a legal connection between the counterparty and the underlying issuer, and for which specific wrong way risk has been identified, are not considered to be in the same netting set as other transactions with the counterparty. Furthermore, for single-name credit default swaps where there exists a legal connection between the counterparty and the underlying issuer, and where specific wrong way risk has been identified, EAD in respect of such swap counterparty exposure equals the full expected loss in the remaining fair value of the underlying instruments assuming the underlying issuer is in liquidation. The use of the full expected loss in remaining fair value of the underlying instrument allows the bank to recognise, in respect of such swap, the market value that has been lost already and any expected recoveries. Accordingly LGD for advanced or foundation IRB banks must be set to 100% for such swap transactions.⁴ For banks using the Standardised Approach, the risk weight to use is that of an unsecured transaction. For equity derivatives, bond options, securities financing transactions etc referencing a single company where there exists a legal connection between the counterparty and the underlying company, and where specific wrong way risk has been identified, EAD equals the value of the transaction under the assumption of a jump-to-default of the underlying security. Inasmuch this makes re-use of possibly existing (market risk) calculations (for incremental risk charge) that already contain an LGD assumption, the LGD must be set to 100%.

Footnotes

⁴ *Note that the recoveries may also be possible on the underlying instrument beneath such swap. The capital requirements for such underlying exposure are to be calculated without reduction for the swap which introduces wrong way risk. Generally this means that such underlying exposure will receive the risk weight and capital treatment associated with an unsecured transaction (ie assuming such underlying exposure is an unsecured credit exposure).*

FAQ

FAQ1 *Please clarify exactly what needs to be done with respect to credit default swaps (CDSs) with specific wrong-way risk. Can you provide an example?*

Assume you hold a single name CDS with no wrong-way risk. Then, the EAD of that exposure would be equal to alpha times the effective EPE of the CDS contract, whilst the LGD assigned to the counterparty would be that of the corresponding netting set of the counterparty from whom the CDS was bought. Now assume that this single name CDS has Specific wrong-way risk. First, the CDS is taken out of its netting set. Second, the EAD should be equal to the expected loss on the underlying reference asset, conditional on default of the issuer of the underlying, ie assuming that the reference asset has a PD of 100%. If a non-zero recovery is assumed for the underlying asset, then the LGD for the netting set assigned to the single name CDS exposure in the risk-weighted asset calculation is set to 100%.

Integrity of modelling process

53.49 Other operational requirements focus on the internal controls needed to ensure the integrity of model inputs; specifically, the requirements address the transaction data, historical market data, frequency of calculation, and valuation models used in measuring EPE.

53.50 The internal model must reflect transaction terms and specifications in a timely, complete, and conservative fashion. Such terms include, but are not limited to, contract notional amounts, maturity, reference assets, collateral thresholds, margining arrangements, netting arrangements, etc. The terms and specifications must reside in a secure database that is subject to formal and periodic audit. The process for recognising netting arrangements must require signoff by legal staff to verify the legal enforceability of netting and be input into the database by an independent unit. The transmission of transaction terms and specifications data to the internal model must also be subject to internal audit and formal reconciliation processes must be in place between the internal model and source data systems to verify on an ongoing basis that transaction terms and specifications are being reflected in EPE correctly or at least conservatively.

53.51 When the Effective EPE model is calibrated using historic market data, the bank must employ current market data to compute current exposures and at least three years of historical data must be used to estimate parameters of the model. Alternatively, market implied data may be used to estimate parameters of the model. In all cases, the data must be updated quarterly or more frequently if

market conditions warrant. To calculate the Effective EPE using a stress calibration, the bank must also calibrate Effective EPE using three years of data that include a period of stress to the credit default spreads of a bank's counterparties or calibrate Effective EPE using market implied data from a suitable period of stress. The following process will be used to assess the adequacy of the stress calibration:

- (1) The bank must demonstrate, at least quarterly, that the stress period coincides with a period of increased CDS or other credit spreads – such as loan or corporate bond spreads – for a representative selection of the bank's counterparties with traded credit spreads. In situations where the bank does not have adequate credit spread data for a counterparty, the bank should map each counterparty to specific credit spread data based on region, internal rating and business types.
- (2) The exposure model for all counterparties must use data, either historic or implied, that include the data from the stressed credit period, and must use such data in a manner consistent with the method used for the calibration of the Effective EPE model to current data.
- (3) To evaluate the effectiveness of its stress calibration for Effective EPE, the bank must create several benchmark portfolios that are vulnerable to the same main risk factors to which the bank is exposed. The exposure to these benchmark portfolios shall be calculated using (a) current positions at current market prices, stressed volatilities, stressed correlations and other relevant stressed exposure model inputs from the 3-year stress period and (b) current positions at end of stress period market prices, stressed volatilities, stressed correlations and other relevant stressed exposure model inputs from the 3-year stress period. Supervisors may adjust the stress calibration if the exposures of these benchmark portfolios deviate substantially.

FAQ

FAQ1

Can the Basel Committee confirm that banks that use market implied data do not need to employ current market data to compute current exposures for either normal or stressed EPE, but can instead rely respectively on market implied and stressed market implied calibrations?

This will depend on the specifics of the modelling framework, but current exposure should be based on current market valuations. However, in any case, current exposure has to be based on current market data, be they directly observed or implied by other observable prices which also need to be as of the valuation date.

FAQ2

Can the Basel Committee confirm that the stressed three year data period will be centred on the credit spread stress point, ie there will be equal history used before and after that point? Where the stress period occurs in the current three year data set, is it correct that a separate stress data set would only be required once the stress point is more than 18 months in the past, ie before that the stress and current period will be the same?

There is no explicit requirement that the three-year data period needs to be centred on the credit spread stress period. The determination and review of the stress period should be discussed with your national supervisor.

- 53.52** For a bank to recognise in its EAD calculations for OTC derivatives the effect of collateral other than cash of the same currency as the exposure itself, if it is not able to model collateral jointly with the exposure then it must use either haircuts that meet the standards of the financial collateral comprehensive method with own haircut estimates or the standard supervisory haircuts.

FAQ

FAQ1

How is the FX haircut to be applied for mixed currency exposures?

The FX haircut should be applied to each element of collateral that is provided in a different currency to the exposure.

- 53.53** If the internal model includes the effect of collateral on changes in the market value of the netting set, the bank must model collateral other than cash of the same currency as the exposure itself jointly with the exposure in its EAD calculations for securities-financing transactions.
- 53.54** The EPE model (and modifications made to it) must be subject to an internal model validation process. The process must be clearly articulated in banks' policies and procedures. The validation process must specify the kind of testing needed to ensure model integrity and identify conditions under which assumptions are violated and may result in an understatement of EPE. The validation process must include a review of the comprehensiveness of the EPE model, for example such as whether the EPE model covers all products that have a material contribution to counterparty risk exposures.
- 53.55** The use of an internal model to estimate EPE, and hence the exposure amount or EAD, of positions subject to a CCR capital requirement will be conditional upon the explicit approval of the bank's supervisory authority. Home and host country supervisory authorities of banks that carry out material trading activities in multiple jurisdictions will work co-operatively to ensure an efficient approval process.
- 53.56** In the Basel Framework and in prior documents, the Committee has issued guidance regarding the use of internal models to estimate certain parameters of risk and determine minimum capital requirements against those risks. Supervisors will require that banks seeking to make use of internal models to estimate EPE meet similar requirements regarding, for example, the integrity of the risk management system, the skills of staff that will rely on such measures in operational areas and in control functions, the accuracy of models, and the rigour of internal controls over relevant internal processes. As an example, banks seeking to make use of an internal model to estimate EPE must demonstrate that they meet the Committee's general criteria for banks seeking to make use of internal models to assess market risk exposures, but in the context of assessing counterparty credit risk.⁵

Footnotes

⁵ See [MAR30.1](#) to [MAR30.4](#).

- 53.57** The supervisory review process ([SRP](#)) standard of this framework provides general background and specific guidance to cover counterparty credit risks that may not be fully covered by the Pillar 1 process.

53.58 No particular form of model is required to qualify to make use of an internal model. Although this text describes an internal model as a simulation model,

other forms of models, including analytic models, are acceptable subject to supervisory approval and review. Banks that seek recognition for the use of an internal model that is not based on simulations must demonstrate to their supervisors that the model meets all operational requirements.

53.59 For a bank that qualifies to net transactions, the bank must have internal procedures to verify that, prior to including a transaction in a netting set, the transaction is covered by a legally enforceable netting contract that meets the applicable requirements of the standardised approach to counterparty credit risk ([CRE52](#)), the credit risk mitigation chapter of the framework ([CRE22](#)), or the Cross-Product Netting Rules set forth [CRE53.61](#) to [CRE53.71](#) below.

53.60 For a bank that makes use of collateral to mitigate its CCR, the bank must have internal procedures to verify that, prior to recognising the effect of collateral in its calculations, the collateral meets the appropriate legal certainty standards as set out in [CRE22](#).

Cross-product netting rules

53.61 The Cross-Product Netting Rules apply specifically to netting across SFTs, or to netting across both SFTs and OTC derivatives, for purposes of regulatory capital computation under IMM.

53.62 Banks that receive approval to estimate their exposures to CCR using the internal models method may include within a netting set SFTs, or both SFTs and OTC derivatives subject to a legally valid form of bilateral netting that satisfies the following legal and operational criteria for a Cross-Product Netting Arrangement (as defined below). The bank must also have satisfied any prior approval or other procedural requirements that its national supervisor determines to implement for purposes of recognising a Cross-Product Netting Arrangement.

Legal Criteria

53.63 The bank has executed a written, bilateral netting agreement with the counterparty that creates a single legal obligation, covering all included bilateral master agreements and transactions ("Cross-Product Netting Arrangement"), such that the bank would have either a claim to receive or obligation to pay only the net sum of the positive and negative (i) close-out values of any included individual master agreements and (ii) mark-to-market values of any included

individual transactions (the "Cross-Product Net Amount"), in the event a counterparty fails to perform due to any of the following: default, bankruptcy, liquidation or similar circumstances.

53.64 The bank has written and reasoned legal opinions that conclude with a high degree of certainty that, in the event of a legal challenge, relevant courts or administrative authorities would find the bank's exposure under the Cross-Product Netting Arrangement to be the Cross-Product Net Amount under the laws of all relevant jurisdictions. In reaching this conclusion, legal opinions must address the validity and enforceability of the entire Cross-Product Netting Arrangement under its terms and the impact of the Cross-Product Netting Arrangement on the material provisions of any included bilateral master agreement.

- (1) The laws of "all relevant jurisdictions" are: (i) the law of the jurisdiction in which the counterparty is chartered and, if the foreign branch of a counterparty is involved, then also under the law of the jurisdiction in which the branch is located, (ii) the law that governs the individual transactions, and (iii) the law that governs any contract or agreement necessary to effect the netting.
- (2) A legal opinion must be generally recognised as such by the legal community in the bank's home country or a memorandum of law that addresses all relevant issues in a reasoned manner.

53.65 The bank has internal procedures to verify that, prior to including a transaction in a netting set, the transaction is covered by legal opinions that meet the above criteria.

53.66 The bank undertakes to update legal opinions as necessary to ensure continuing enforceability of the Cross-Product Netting Arrangement in light of possible changes in relevant law.

53.67 The Cross-Product Netting Arrangement does not include a walkaway clause. A walkaway clause is a provision which permits a non-defaulting counterparty to make only limited payments, or no payment at all, to the estate of the defaulter, even if the defaulter is a net creditor.

53.68 Each included bilateral master agreement and transaction included in the Cross-Product Netting Arrangement satisfies applicable legal requirements for recognition of credit risk mitigation techniques in [CRE22](#).

53.69 The bank maintains all required documentation in its files.

Operational Criteria

53.70 The supervisory authority is satisfied that the effects of a Cross-Product Netting Arrangement are factored into the bank's measurement of a counterparty's aggregate credit risk exposure and that the bank manages its counterparty credit risk on such basis.

53.71 Credit risk to each counterparty is aggregated to arrive at a single legal exposure across products covered by the Cross-Product Netting Arrangement. This aggregation must be factored into credit limit and economic capital processes.

CRE54

Capital requirements for bank exposures to central counterparties

This chapter sets out the calculation of capital requirements for bank exposures to central counterparties.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

Scope of application

54.1 This chapter applies to exposures to central counterparties arising from over-the-counter (OTC) derivatives, exchange-traded derivatives transactions, securities financing transactions (SFTs) and long settlement transactions. Exposures arising from the settlement of cash transactions (equities, fixed income, spot foreign exchange and spot commodities) are not subject to this treatment.¹ The settlement of cash transactions remains subject to the treatment described [CRE70](#)

Footnotes

¹ For contributions to prepaid default funds covering settlement-risk-only products, the applicable risk weight is 0%.

54.2 When the clearing member-to-client leg of an exchange-traded derivatives transaction is conducted under a bilateral agreement, both the client bank and the clearing member are to capitalise that transaction as an OTC derivative.² This treatment also applies to transactions between lower-level clients and higher-level clients in a multi-level client structure.

Footnotes

² For this purpose, the treatment in [CRE54.12](#) would also apply.

Central Counterparties

54.3 Regardless of whether a central counterparty (CCP) is classified as a qualifying CCP (QCCP), a bank retains the responsibility to ensure that it maintains adequate capital for its exposures. Under the supervisory review process standard ([SRP](#)), a bank should consider whether it might need to hold capital in excess of the minimum capital requirements if, for example:

- (1) its dealings with a CCP give rise to more risky exposures;
- (2) where, given the context of that bank's dealings, it is unclear that the CCP meets the definition of a QCCP; or

- (3) an external assessment such as an International Monetary Fund Financial Sector Assessment Program has found material shortcomings in the CCP or the regulation of CCPs, and the CCP and/or the CCP regulator have not since publicly addressed the issues identified.

- 54.4** Where the bank is acting as a clearing member, the bank should assess through appropriate scenario analysis and stress testing whether the level of capital held against exposures to a CCP adequately addresses the inherent risks of those transactions. This assessment will include potential future or contingent exposures resulting from future drawings on default fund commitments, and/or from secondary commitments to take over or replace offsetting transactions from clients of another clearing member in case of this clearing member defaulting or becoming insolvent.
- 54.5** A bank must monitor and report to senior management and the appropriate committee of the Board on a regular basis all of its exposures to CCPs, including exposures arising from trading through a CCP and exposures arising from CCP membership obligations such as default fund contributions.
- 54.6** Where a bank is clearing derivative, SFT and/or long settlement transactions through a QCCP as defined in [CRE50](#), then [CRE54.7](#) to [CRE54.40](#) will apply. In the case of non-qualifying CCPs, [CRE54.41](#) and [CRE54.42](#) will apply. Within three months of a CCP ceasing to qualify as a QCCP, unless a bank's national supervisor requires otherwise, the trades with a former QCCP may continue to be capitalised as though they are with a QCCP. After that time, the bank's exposures with such a central counterparty must be capitalised according to paragraphs [CRE54.41](#) and [CRE54.42](#).

Exposures to Qualifying CCPs : trade exposures

Clearing member exposures to CCPs

- 54.7** Where a bank acts as a clearing member of a CCP for its own purposes, a risk weight of 2% must be applied to the bank's trade exposure to the CCP in respect of OTC derivatives, exchange-traded derivative transactions, SFTs and long-settlement transactions. Where the clearing member offers clearing services to clients, the 2% risk weight also applies to the clearing member's trade exposure to the CCP that arises when the clearing member is obligated to reimburse the client for any losses suffered due to changes in the value of its transactions in the event that the CCP defaults. The risk weight applied to collateral posted to the CCP by the bank must be determined in accordance with paragraphs [CRE54.18](#) to [CRE54.23](#).

54.8

The exposure amount for a bank's trade exposure is to be calculated in accordance with methods set out in the counterparty credit risk chapters of the Basel framework (see paragraph [CRE51.8](#)), as consistently applied by the bank in the ordinary course of its business.³ In applying these methods:

- (1) Provided that the netting set does not contain illiquid collateral or exotic trades and provided there are no disputed trades, the 20-day floor for the margin period of risk (MPOR) established for netting sets where the number of trades exceeds 5000 does not apply. This floor is set out in [CRE52.51\(1\)](#) of the standardised approach for counterparty credit risk (SA-CCR), [CRE22.61](#) of comprehensive approach within the standardised approach to credit risk and [CRE53.24\(1\)](#) of the internal models method (IMM).
- (2) In all cases, a minimum MPOR of 10 days must be used for the calculation of trade exposures to CCPs for OTC derivatives.
- (3) Where CCPs retain variation margin against certain trades (eg where CCPs collect and hold variation margin against positions in exchange-traded or OTC forwards), and the member collateral is not protected against the insolvency of the CCP, the minimum time risk horizon applied to banks' trade exposures on those trades must be the lesser of one year and the remaining maturity of the transaction, with a floor of 10 business days.

Footnotes

³ *Where the firm's internal model permission does not specifically cover centrally cleared products, the IMM scope would have to be extended to cover these products (even where the non-centrally cleared versions are included in the permission). Usually, national supervisors have a well defined model approval/change process by which IMM firms can extend the products covered within their IMM scope. The introduction of a centrally cleared version of a product within the existing IMM scope must be considered as part of such a model change process, as opposed to a natural extension.*

54.9 The methods for calculating counterparty credit risk exposures (see [CRE51.8](#)), when applied to bilateral trading exposures (ie non-CCP counterparties), require banks to calculate exposures for each individual netting set. However, netting arrangements for CCPs are not as standardised as those for OTC netting agreements in the context of bilateral trading. As a consequence, paragraph [CRE54.10](#) below makes certain adjustments to the methods for calculating counterparty credit risk exposure to permit netting under certain conditions for exposures to CCPs.

54.10 Where settlement is legally enforceable on a net basis in an event of default and regardless of whether the counterparty is insolvent or bankrupt, the total replacement cost of all contracts relevant to the trade exposure determination can be calculated as a net replacement cost if the applicable close-out netting sets meet the requirements set out in:

- (1) Paragraphs [CRE22.69](#) and, where applicable, also [CRE22.70](#) in the case of repo-style transactions.
- (2) [CRE52.7](#) and [CRE52.8](#) of the SA-CCR in the case of derivative transactions.
- (3) [CRE53.61](#) to [CRE53.71](#) of IMM in the case of cross-product netting.

54.11 To the extent that the rules referenced in [CRE54.10](#) above include the term “master agreement” or the phrase “a netting contract with a counterparty or other agreement”, this terminology must be read as including any enforceable arrangement that provides legally enforceable rights of set-off. If the bank cannot demonstrate that netting agreements meet these requirements, each single transaction will be regarded as a netting set of its own for the calculation of trade exposure.

Clearing member exposures to clients

54.12 The clearing member will always capitalise its exposure (including potential credit valuation adjustment, or CVA, risk exposure) to clients as bilateral trades, irrespective of whether the clearing member guarantees the trade or acts as an intermediary between the client and the CCP. However, to recognise the shorter close-out period for cleared client transactions, clearing members can capitalise the exposure to their clients applying a margin period of risk of at least five days in IMM or SA-CCR. The reduced exposure at default (EAD) should also be used for the calculation of both the Advanced and Standardised CVA capital requirement.

54.13 If a clearing member collects collateral from a client for client cleared trades and this collateral is passed on to the CCP, the clearing member may recognise this collateral for both the CCP-clearing member leg and the clearing member-client

leg of the client cleared trade. Therefore, initial margin posted by clients to their clearing member mitigates the exposure the clearing member has against these clients. The same treatment applies, in an analogous fashion, to multi-level client structures (between a higher-level client and a lower-level client).

FAQ

FAQ1 *What treatment must a clearing member bank apply to collateral that is collected from a client of the clearing member and posted to a CCP, but that is not held in a bankruptcy-remote manner, where the clearing member is not obligated to reimburse the client for any losses due to changes in the value of its transactions in the event that the CCP defaults?*

If the clearing member bank is not obligated to reimburse the client for any loss of such posted collateral in the event that the CCP defaults, the clearing member bank is not subject to capital requirements for the posted collateral. If the clearing member bank is obligated to reimburse the client for any loss of posted collateral in the event the CCP defaults, the clearing member bank should compute the capital requirement for the posted collateral held by the CCP as an exposure to the CCP.

Client exposures

54.14 Subject to the two conditions set out in [CRE54.15](#) below being met, the treatment set out in [CRE54.7](#) to [CRE54.11](#) (ie the treatment of clearing member exposures to CCPs) also applies to the following:

- (1) A bank's exposure to a clearing member where:
 - (a) the bank is a client of the clearing member; and
 - (b) the transactions arise as a result of the clearing member acting as a financial intermediary (ie the clearing member completes an offsetting transaction with a CCP).

- (2) A bank's exposure to a CCP resulting from a transaction with the CCP where:
 - (a) the bank is a client of a clearing member; and
 - (b) the clearing member guarantees the performance the bank's exposure to the CCP.
- (3) Exposures of lower level clients to higher level clients in a multi-level client structure, provided that for all client levels in-between the two conditions in [CRE54.15](#) below are met.

54.15 The two conditions referenced in [CRE54.14](#) above are:

- (1) The offsetting transactions are identified by the CCP as client transactions and collateral to support them is held by the CCP and/or the clearing member, as applicable, under arrangements that prevent any losses to the client due to: (a) the default or insolvency of the clearing member; (b) the default or insolvency of the clearing member's other clients; and (c) the joint default or insolvency of the clearing member and any of its other clients. Regarding the condition set out in this paragraph:
 - (a) Upon the insolvency of the clearing member, there must be no legal impediment (other than the need to obtain a court order to which the client is entitled) to the transfer of the collateral belonging to clients of a defaulting clearing member to the CCP, to one or more other surviving clearing members or to the client or the client's nominee. National supervisors should be consulted to determine whether this is achieved based on particular facts and such supervisors should consult and communicate with other supervisors via the "frequently asked questions" process to ensure consistency.
 - (b) The client must have conducted a sufficient legal review (and undertake such further review as necessary to ensure continuing enforceability) and have a well founded basis to conclude that, in the event of legal challenge, the relevant courts and administrative authorities would find that such arrangements mentioned above would be legal, valid, binding and enforceable under the relevant laws of the relevant jurisdiction(s).

- (2) Relevant laws, regulation, rules, contractual, or administrative arrangements provide that the offsetting transactions with the defaulted or insolvent clearing member are highly likely to continue to be indirectly transacted through the CCP, or by the CCP, if the clearing member defaults or becomes insolvent. In such circumstances, the client positions and collateral with the CCP will be transferred at market value unless the client requests to close out the position at market value. Regarding the condition set out in this paragraph, if there is a clear precedent for transactions being ported at a CCP and industry intent for this practice to continue, then these factors must be considered when assessing if trades are highly likely to be ported. The fact that CCP documentation does not prohibit client trades from being ported is not sufficient to say they are highly likely to be ported.

54.16 Where a client is not protected from losses in the case that the clearing member and another client of the clearing member jointly default or become jointly insolvent, but all other conditions in the preceding paragraph are met, a risk weight of 4% will apply to the client's exposure to the clearing member, or to the higher level client, respectively.

FAQ

FAQ1 *What is the applicable capital treatment for collateral posted by a bank as a client of a clearing member and held at the qualifying CCP, where conditions set out in [CRE54.15](#) and [CRE54.16](#) are not met?*

Where the collateral is posted by a bank as a client of a clearing member and held at the qualifying CCP not in a bankruptcy remote manner and where it does not meet the conditions set out in [CRE54.15](#) and [CRE54.16](#), the bank must apply the risk weight of the clearing member to those collateral exposures.

54.17 Where the bank is a client of the clearing member and the requirements in [CRE54.14](#) to [CRE54.16](#) above are not met, the bank will capitalise its exposure (including potential CVA risk exposure) to the clearing member as a bilateral trade.

Treatment of posted collateral

54.18 In all cases, any assets or collateral posted must, from the perspective of the bank posting such collateral, receive the risk weights that otherwise applies to such assets or collateral under the capital adequacy framework, regardless of the fact that such assets have been posted as collateral. That is, collateral posted must receive the banking book or trading book treatment it would receive if it had not been posted to the CCP.

54.19 In addition to the requirements of [CRE54.18](#) above, the posted assets or collateral are subject to the counterparty credit risk requirements, regardless of whether they are in the banking or trading book. This includes the increase in the counterparty credit risk exposure due to the application of haircuts. The counterparty credit risk requirements arise where assets or collateral of a clearing member or client are posted with a CCP or a clearing member and are not held in a bankruptcy-remote manner. In such cases, the bank posting such assets or collateral must recognise credit risk based upon the assets or collateral being exposed to risk of loss based on the creditworthiness of the entity holding such assets or collateral, as described further below.

54.20 Where such collateral is included in the definition of trade exposures (see [CRE50](#)) and the entity holding the collateral is the CCP, the following risk weights apply where the assets or collateral is not held on a bankruptcy-remote basis:

- (1) For banks that are clearing members a risk-weight of 2% applies.
- (2) For banks that are clients of clearing members:
 - (a) a 2% risk-weight applies if the conditions established in [CRE54.14](#) and [CRE54.15](#) are met; or
 - (b) a 4% risk-weight applies if the conditions in [CRE54.16](#) are met.

54.21 Where such collateral is included in the definition of trade exposures (see [CRE50](#)), there is no capital requirement for counterparty credit risk exposure (ie the related risk weight or EAD is equal to zero) if the collateral is: (a) held by a custodian; and (b) bankruptcy remote from the CCP. Regarding this paragraph:

- (1) All forms of collateral are included, such as: cash, securities, other pledged assets, and excess initial or variation margin, also called overcollateralisation.
- (2) The word "custodian" may include a trustee, agent, pledgee, secured creditor or any other person that holds property in a way that does not give such person a beneficial interest in such property and will not result in such property being subject to legally enforceable claims by such persons creditors, or to a court-ordered stay of the return of such property, if such person becomes insolvent or bankrupt.

54.22

The relevant risk-weight of the CCP will apply to assets or collateral posted by a bank that do not meet the definition of trade exposures (for example treating the exposure as a financial institution under standardised approach or internal ratings-based approach to credit risk).

- 54.23** Regarding the calculation of the exposure, or EAD, where banks use the SA-CCR to calculate exposures, collateral posted which is not held in a bankruptcy remote manner must be accounted for in the net independent collateral amount term in accordance with [CRE52.15](#) to [CRE52.19](#). For banks using IMM models, the alpha multiplier must be applied to the exposure on posted collateral.

Default fund exposures

- 54.24** Where a default fund is shared between products or types of business with settlement risk only (eg equities and bonds) and products or types of business which give rise to counterparty credit risk ie OTC derivatives, exchange-traded derivatives, SFTs or long settlement transactions, all of the default fund contributions will receive the risk weight determined according to the formulae and methodology set forth below, without apportioning to different classes or types of business or products. However, where the default fund contributions from clearing members are segregated by product types and only accessible for specific product types, the capital requirements for those default fund exposures determined according to the formulae and methodology set forth below must be calculated for each specific product giving rise to counterparty credit risk. In case the CCP's prefunded own resources are shared among product types, the CCP will have to allocate those funds to each of the calculations, in proportion to the respective product-specific EAD.
- 54.25** Whenever a bank is required to capitalise for exposures arising from default fund contributions to a qualifying CCP, clearing member banks will apply the following approach.
- 54.26** Clearing member banks will apply a risk weight to their default fund contributions determined according to a risk sensitive formula that considers (i) the size and quality of a qualifying CCP's financial resources, (ii) the counterparty credit risk exposures of such CCP, and (iii) the application of such financial resources via the CCP's loss bearing waterfall, in the case of one or more clearing member defaults. The clearing member bank's risk sensitive capital requirement for its default fund contribution (K_{CMi}) must be calculated using the formulae and methodology set forth below. This calculation may be performed by a CCP, bank, supervisor or other body with access to the required data, as long as the conditions in [CRE54.37](#) to [CRE54.39](#) are met.

54.27 The clearing member bank's risk sensitive capital requirement for its default fund contribution (K_{CMi}) is calculated in two steps:

- (1) Calculate the hypothetical capital requirement of the CCP due to its counterparty credit risk exposures to all of its clearing members and their clients.
- (2) Calculate the capital requirement for the clearing member bank.

Hypothetical capital requirement of the CCP

54.28 The first step in calculating the clearing member bank's capital requirement for its default fund contribution (K_{CMi}) is to calculate the hypothetical capital requirement of the CCP (K_{CCP}) due to its counterparty credit risk exposures to all of its clearing members and their clients. K_{CCP} is a hypothetical capital requirement for a CCP, calculated on a consistent basis for the sole purpose of determining the capitalisation of clearing member default fund contributions; it does not represent the actual capital requirements for a CCP which may be determined by a CCP and its supervisor.

54.29 K_{CCP} is calculated using the following formula, where:

- (1) RW is a risk weight of 20%⁴
- (2) capital ratio is 8%
- (3) CM is the clearing member
- (4) EAD_i is the exposure amount of the CCP to clearing member i , relating to the valuation at the end of the regulatory reporting date before the margin called on the final margin call of that day is exchanged. The exposure includes both:
 - (a) the clearing member's own transactions and client transactions guaranteed by the clearing member; and
 - (b) all values of collateral held by the CCP (including the clearing member's prefunded default fund contribution) against the transactions in (a).
- (5) The sum is over all clearing member accounts.

$$K_{CCP} = \sum_{CM_i} EAD_i \cdot RW \cdot \text{capital ratio}$$

Footnotes

[4](#) *The 20% risk weight is a minimum requirement. As with other parts of the capital adequacy framework, the national supervisor of a bank may increase the risk weight. An increase in such risk weight would be appropriate if, for example, the clearing members in a CCP are not highly rated. Any such increase in risk weight is to be communicated by the affected banks to the person completing this calculation.*

54.30 Where clearing members provide client clearing services, and client transactions and collateral are held in separate (individual or omnibus) sub-accounts to the clearing member's proprietary business, each such client sub-account should enter the sum in [CRE54.29](#) above separately, ie the member EAD in the formula above is then the sum of the client sub-account EADs and any house sub-account EAD. This will ensure that client collateral cannot be used to offset the CCP's exposures to clearing members' proprietary activity in the calculation of K_{CCP} . If any of these sub-accounts contains both derivatives and SFTs, the EAD of that sub-account is the sum of the derivative EAD and the SFT EAD.

54.31 In the case that collateral is held against an account containing both SFTs and derivatives, the prefunded initial margin provided by the member or client must be allocated to the SFT and derivatives exposures in proportion to the respective product specific EADs, calculated according to:

- (1) [CRE22.68](#) to [CRE22.72](#) for SFTs; and
- (2) SA-CCR (see [CRE52](#)) for derivatives, without including the effects of collateral.

54.32 If the default fund contributions of the member (DF_i) are not split with regard to client and house sub-accounts, they must be allocated per sub-account according to the respective fraction the initial margin of that sub-account has in relation to the total initial margin posted by or for the account of the clearing member.

54.33 For derivatives, EAD_i is calculated as the bilateral trade exposure the CCP has against the clearing member using the SA-CCR. In applying the SA-CCR:

- (1) A MPOR of 10 business days must be used to calculate the CCP's potential future exposure to its clearing members on derivatives transactions (the 20 day floor on the MPOR for netting sets with more than 5000 trades does not apply).

- (2) All collateral held by a CCP to which that CCP has a legal claim in the event of the default of the member or client, including default fund contributions of that member (DF_i), is used to offset the CCP's exposure to that member or client, through inclusion in the PFE multiplier in accordance with [CRE52.21](#) to [CRE52.23](#).

54.34 For SFTs, EAD_i is equal to $\max(EBRM_i - IM_i - DF_i; 0)$, where:

- (1) $EBRM_i$ denotes the exposure value to clearing member i before risk mitigation under [CRE22.69](#) to [CRE22.73](#); where, for the purposes of this calculation, variation margin that has been exchanged (before the margin called on the final margin call of that day) enters into the mark-to-market value of the transactions.
- (2) IM_i is the initial margin collateral posted by the clearing member with the CCP.
- (3) DF_i is the prefunded default fund contribution by the clearing member that will be applied upon such clearing member's default, either along with or immediately following such member's initial margin, to reduce the CCP loss.

54.35 As regards the calculation in this first step (ie [CRE54.28](#) to [CRE54.34](#)):

- (1) Any haircuts to be applied for SFTs must be the standard supervisory haircuts set out in [CRE22.44](#).
- (2) The holding periods for SFT calculations in [CRE22.61](#) to [CRE22.64](#) apply.
- (3) The netting sets that are applicable to regulated clearing members are the same as those referred to in [CRE54.10](#) and [CRE54.11](#). For all other clearing members, they need to follow the netting rules as laid out by the CCP based upon notification of each of its clearing members. The national supervisor can demand more granular netting sets than laid out by the CCP.

Capital requirement for each clearing member

54.36 The second step in calculating the clearing member bank's capital requirement for its default fund contribution (K_{CMi}) is to apply the following formula,⁵ where:

- (1) K_{CMi} is the capital requirement on the default fund contribution of clearing member bank i

- (2) DF_{CM}^{pref} is the total prefunded default fund contributions from clearing members
- (3) DF_{CCP} is the CCP's prefunded own resources (eg contributed capital, retained earnings, etc), which are contributed to the default waterfall, where these are junior or pari passu to prefunded member contributions
- (4) DF_i^{pref} is the prefunded default fund contributions provided by clearing member bank i

$$K_{CM_i} = \max \left(K_{CCP} \cdot \left(\frac{DF_i^{pref}}{DF_{CCP} + DF_{CM}^{pref}} \right); 8\% * 2\% * DF_i^{pref} \right)$$

Footnotes

[5](#)

The formula puts a floor on the default fund exposure risk weight of 2%.

FAQ

FAQ1

Is collateral posted as default fund contributions to a qualifying CCP subject to standardised supervisory haircuts in the computation of capital requirements for each clearing member (K_{CM_i})?

No. Exposures for collateral posted as default fund contributions to a qualifying CCP are not subject to haircuts in the computation of capital requirements for each clearing member (K_{CM_i}) per the formula in

[CRE54.36](#). However, haircuts apply for collateral used in the computation of EAD in the formula for K_{CCP} in [CRE54.29](#).

54.37 The CCP, bank, supervisor or other body with access to the required data, must make a calculation of K_{CCP} , DF_{CM}^{pref} , and DF_{CCP} in such a way to permit the supervisor of the CCP to oversee those calculations, and it must share sufficient information of the calculation results to permit each clearing member to calculate their capital requirement for the default fund and for the bank supervisor of such clearing member to review and confirm such calculations.

54.38 K_{CCP} must be calculated on a quarterly basis at a minimum; although national supervisors may require more frequent calculations in case of material changes (such as the CCP clearing a new product). The CCP, bank, supervisor or other body that did the calculations must make available to the home supervisor of any bank clearing member sufficient aggregate information about the composition of the CCP's exposures to clearing members and information provided to the clearing member for the purposes of the calculation of K_{CCP} , DF_{CM}^{pref} , and DF_{CCP} . Such information must be provided no less frequently than the home bank supervisor would require for monitoring the risk of the clearing member that it supervises.

54.39 K_{CCP} and K_{CMI} must be recalculated at least quarterly, and should also be recalculated when there are material changes to the number or exposure of cleared transactions or material changes to the financial resources of the CCP.

Cap with regard to QCCPs

54.40 Where the sum of a bank's capital requirements for exposures to a QCCP due to its trade exposure and default fund contribution is higher than the total capital requirement that would be applied to those same exposures if the CCP were for a non-qualifying CCP, as outlined in [CRE54.41](#) and [CRE54.42](#) below, the latter total capital requirement shall be applied.

Exposures to non-qualifying CCPs

54.41 Banks must apply the standardised approach for credit risk, according to the category of the counterparty, to their trade exposure to a non-qualifying CCP.

54.42 Banks must apply a risk weight of 1250% to their default fund contributions to a non-qualifying CCP. For the purposes of this paragraph, the default fund contributions of such banks will include both the funded and the unfunded contributions which are liable to be paid if the CCP so requires. Where there is a liability for unfunded contributions (ie unlimited binding commitments), the national supervisor should determine in its supervisory review process assessments the amount of unfunded commitments to which a 1250% risk weight applies.

CRE55

Counterparty credit risk in the trading book

This chapter describes how to calculate risk-weighted assets for counterparty credit risk exposures in the trading book, which is treated separately from the capital requirements for market risk.

Version effective as of 15 Dec 2019

First version in the format of the consolidated framework.

55.1 Banks must calculate the counterparty credit risk charge for over-the-counter (OTC) derivatives, repo-style and other transactions booked in the trading book, separate from the capital requirement for market risk.¹ The risk weights to be used in this calculation must be consistent with those used for calculating the capital requirements in the banking book. Thus, banks using the standardised approach in the banking book will use the standardised approach risk weights in the trading book and banks using the internal ratings-based (IRB) approach in the banking book will use the IRB risk weights in the trading book in a manner consistent with the IRB roll-out situation in the banking book as described in [CRE30.46](#) to [CRE30.53](#). For counterparties included in portfolios where the IRB approach is being used the IRB risk weights will have to be applied.

Footnotes

¹ *The treatment for unsettled foreign exchange and securities trades is set forth in [CRE70](#).*

55.2 In the trading book, for repo-style transactions, all instruments, which are included in the trading book, may be used as eligible collateral. Those instruments which fall outside the banking book definition of eligible collateral shall be subject to a haircut at the level applicable to non-main index equities listed on recognised exchanges (as noted in [CRE22.44](#)). However, where banks are using the own estimates approach to haircutting they may also apply it in the trading book in accordance with [CRE22.48](#) to [CRE22.49](#). Consequently, for instruments that count as eligible collateral in the trading book, but not in the banking book, the haircuts must be calculated for each individual security. Where banks are using a value-at-risk models approach to measuring exposure for securities financing transactions, they also may apply this approach in the trading book in accordance with [CRE22.74](#) to [CRE22.77](#) and [CRE51](#).

55.3 The calculation of the counterparty credit risk charge for collateralised OTC derivative transactions is the same as the rules prescribed for such transactions booked in the banking book (see [CRE51](#)).

55.4 The calculation of the counterparty charge for repo-style transactions will be conducted using the rules in [CRE51](#) spelt out for such transactions booked in the banking book. The firm-size adjustment for small or medium-sized entities as set out in [CRE31.9](#) shall also be applicable in the trading book.

CRE60

Equity investments in funds

This chapter sets out the approaches that a bank can use to calculate the risk-weighted assets for equity investments in funds.

**Version effective as of
15 Dec 2019**

First version in the format of the consolidated framework.

Introduction

60.1 Equity investments in funds that are held in the banking book must be treated in a manner consistent with one or more of the following three approaches, which vary in their risk sensitivity and conservatism: the “look-through approach” (LTA), the “mandate-based approach” (MBA), and the “fall-back approach” (FBA). The requirements set out in this chapter ([CRE60](#)) apply to banks’ equity investments in all types of funds, including off-balance sheet exposures (eg unfunded commitments to subscribe to a fund’s future capital calls). Exposures, including underlying exposures held by funds, that are required to be deducted under [CAP30](#) are excluded from the risk weighting treatment outlined in this chapter ([CRE60](#)). Illustrative examples of the requirements set out in this chapter are set out in [CRE99](#).

The look-through approach

60.2 The LTA requires a bank to risk weight the underlying exposures of a fund as if the exposures were held directly by the bank. This is the most granular and risk-sensitive approach. It must be used when:

- (1) there is sufficient and frequent information provided to the bank regarding the underlying exposures of the fund; and
- (2) such information is verified by an independent third party.

60.3 To satisfy condition (1) above, the frequency of financial reporting of the fund must be the same as, or more frequent than, that of the bank’s and the granularity of the financial information must be sufficient to calculate the corresponding risk weights. To satisfy condition (2) above, there must be verification of the underlying exposures by an independent third party, such as the depository or the custodian bank or, where applicable, the management company.^{[1](#)}

Footnotes

^{[1](#)} *An external audit is not required.*

60.4 Under the LTA banks must risk weight all underlying exposures of the fund as if those exposures were directly held. This includes, for example, any underlying exposure arising from the fund's derivatives activities for situations in which the underlying receives a risk weighting treatment under the calculation of minimum risk-based capital requirements ([RBC 20](#)) and the associated counterparty credit risk (CCR) exposure. Instead of determining a credit valuation adjustment (CVA) charge associated with the fund's derivatives exposures in accordance with the CVA framework ([MAR50](#)), banks must multiply the CCR exposure by a factor of 1.5 before applying the risk weight associated with the counterparty.² See [CRE99](#) for an example of how to calculate risk-weighted assets using the LTA.

Footnotes

² *A bank is only required to apply the 1.5 factor for transactions that are within the scope of the CVA framework (see [MAR50](#) for the scope of the CVA framework).*

60.5 Banks may rely on third-party calculations for determining the risk weights associated with their equity investments in funds (ie the underlying risk weights of the exposures of the fund) if they do not have adequate data or information to perform the calculations themselves. In such cases, the applicable risk weight shall be 1.2 times higher than the one that would be applicable if the exposure were held directly by the bank.³

Footnotes

³ *For instance, any exposure that is subject to a 20% risk weight under the standardised approach would be weighted at 24% ($1.2 * 20\%$) when the look through is performed by a third party.*

The mandate-based approach

60.6 The second approach, the MBA, provides a method for calculating regulatory capital that can be used when the conditions for applying the LTA are not met.

60.7 Under the MBA banks may use the information contained in a fund's mandate or in the national regulations governing such investment funds.⁴ To ensure that all underlying risks are taken into account (including CCR) and that the MBA renders capital requirements no less than the LTA, the risk-weighted assets for the fund's exposures are calculated as the sum of the following three items (see [CRE99](#) for an example of how to calculate risk-weighted assets using the MBA):

- (1) Balance sheet exposures (ie the funds' assets) are risk weighted assuming the underlying portfolios are invested to the maximum extent allowed under the fund's mandate in those assets attracting the highest capital requirements, and then progressively in those other assets implying lower capital requirements. If more than one risk weight can be applied to a given exposure, the maximum risk weight applicable must be used.⁵
- (2) Whenever the underlying risk of a derivative exposure or an off-balance-sheet item receives a risk weighting treatment under the risk based capital requirements standard ([RBC](#)), the notional amount of the derivative position or of the off-balance sheet exposure is risk weighted accordingly.^{6 7}
- (3) The CCR associated with the fund's derivative exposures is calculated using the standardised approach to counterparty credit risk (SA-CCR, see [CRE52](#)). SA-CCR calculates the counterparty credit risk exposure of a netting set of derivatives by multiplying (i) the sum of the replacement cost and potential future exposure; by (ii) an alpha factor set at 1.4. Whenever the replacement cost is unknown, the exposure measure for CCR will be calculated in a conservative manner by using the sum of the notional amounts of the derivatives in the netting set as a proxy for the replacement cost, and the multiplier used in the calculation of the potential future exposure will be equal to 1. Whenever potential future exposure is unknown, it will be calculated as 15% of the sum of the notional values of the derivatives in the netting set.⁸ The risk weight associated with the counterparty is applied to the counterparty credit risk exposure. Instead of determining a CVA charge associated with the fund's derivative exposures in accordance with the CVA framework ([MAR50](#)), banks must multiply the CCR exposure by a factor of 1.5 before applying the risk weight associated with the counterparty.⁹

Footnotes

- ⁴ Information used for this purpose is not strictly limited to a fund's mandate or national regulations governing like funds. It may also be drawn from other disclosures of the fund.
- ⁵ For instance, for investments in corporate bonds with no ratings restrictions, a risk weight of 150% must be applied.
- ⁶ If the underlying is unknown, the full notional amount of derivative positions must be used for the calculation.
- ⁷ If the notional amount of derivatives mentioned in [CRE60.7](#) is unknown, it will be estimated conservatively using the maximum notional amount of derivatives allowed under the mandate.
- ⁸ For instance, if both the replacement cost and add-on components are unknown, the CCR exposure will be calculated as: $1.4 * (\text{sum of notionals in netting set} + 0.15 * \text{sum of notionals in netting set})$.
- ⁹ A bank is only required to apply the 1.5 factor for transactions that are within the scope of the CVA framework.

The fall-back approach

- 60.8** Where neither the LTA nor the MBA is feasible, banks are required to apply the FBA. The FBA applies a 1250% risk weight to the bank's equity investment in the fund.

Treatment of funds that invest in other funds

- 60.9** When a bank has an investment in a fund (eg Fund A) that itself has an investment in another fund (eg Fund B), which the bank identified by using either the LTA or the MBA, the risk weight applied to the investment of the first fund (ie Fund A's investment in Fund B) can be determined by using one of the three approaches set out above. For all subsequent layers (eg Fund B's investments in Fund C and so forth), the risk weights applied to an investment in another fund (Fund C) can be determined by using the LTA under the condition that the LTA was also used for determining the risk weight for the investment in the fund at the previous layer (Fund B). Otherwise, the FBA must be applied.

Partial use of an approach

60.10 A bank may use a combination of the three approaches when determining the capital requirements for an equity investment in an individual fund, provided that the conditions set out in [CRE60.1](#) to [CRE60.12](#) are met.

Exclusions to the look-through, mandate-based and the fall-back approaches

60.11 Equity holdings in entities whose debt obligations qualify for a zero risk weight can be excluded from the LTA, MBA and FBA approaches (including those publicly sponsored entities where a zero risk weight can be applied), at the discretion of the national supervisor. If a national supervisor makes such an exclusion, this will be available to all banks.

60.12 To promote specified sectors of the economy, supervisors may exclude from the capital requirements equity holdings made under legislated programmes that provide significant subsidies or the investment to the bank and involve some form of government oversight and restrictions on the equity investments. Example of restrictions are limitations on the size and types of businesses in which the bank is investing, allowable amounts of ownership interests, geographical location and other pertinent factors that limit the potential risk of the investment to the bank. Equity holdings made under legislated programmes can only be excluded up to an aggregate of 10% of a bank's total regulatory capital.

Leverage adjustment

60.13 Leverage is defined as the ratio of total assets to total equity. National discretion may be applied to choose a more conservative leverage metric, if deemed appropriate. Leverage is taken into account in the MBA by using the maximum financial leverage permitted in the fund's mandate or in the national regulation governing the fund.

60.14 When determining the capital requirement related to its equity investment in a fund, a bank must apply a leverage adjustment to the average risk weight of the fund, as set out in [CRE60.15](#), subject to a cap of 1250%.

60.15 After calculating the total risk-weighted assets of the fund according to the LTA or the MBA, banks will calculate the average risk weight of the fund (Avg RWfund) by dividing the total risk-weighted assets by the total assets of the fund.

Using Avg RWfund and taking into account the leverage of a fund (Lvg), the risk-weighted assets for a bank's equity investment in a fund can be represented as follows:

$$RWA_{investment} = Avg\ RW_{fund} * Lvg * equity\ investment$$

60.16 The effect of the leverage adjustments depends on the underlying riskiness of the portfolio (ie the average risk weight) as obtained by applying the standardised approach or the internal ratings-based (IRB) approaches for credit risk. The formula can therefore be re-written as:

$$RWA_{investment} = RWA_{fund} * percentage\ of\ shares$$

60.17 See [CRE99](#) for an example of how to calculate the leverage adjustment.

Application of the LTA and MBA to banks using the IRB approach

60.18 Equity investments in funds that are held in the banking book must be treated in a consistent manner based on [CRE60.1](#) to [CRE60.17](#), as adjusted by [CRE60.19](#) to [CRE60.20](#) below.

60.19 Under the LTA:

- (1) Banks using an IRB approach must calculate the IRB risk components (ie probability of default of the underlying exposures and, where applicable, loss-given-default and exposure at default) associated with the fund's underlying exposures.
- (2) Banks using an IRB approach may use the standardised approach for credit risk ([CRE20](#) to [CRE22](#)) when applying risk weights to the underlying components of funds if they are permitted to do so under the provisions relating to the adoption of the IRB approach set out in [CRE30](#) in the case of directly held investments. In addition, when an IRB calculation is not feasible (eg the bank cannot assign the necessary risk components to the underlying exposures in a manner consistent with its own underwriting criteria), the methods set out in [CRE60.20](#) below must be used.

- (3) Banks may rely on third-party calculations for determining the risk weights associated with their equity investments in funds (ie the underlying risk

weights of the exposures of the fund) if they do not have adequate data or information to perform the calculations themselves. In this case, the third party must use the methods set out in [CRE60.20](#) below, with the applicable risk weight set 1.2 times higher than the one that would be applicable if the exposure were held directly by the bank.

60.20 In cases when the IRB calculation is not feasible ([CRE60.19](#)(2) above), a third party is performing the calculation of risk weights ([CRE60.19](#)(3) above) or when the bank is using the MBA the following methods must be used to determine the risk weights associated with the fund's underlying exposures:

- (1) for equity exposures, the simple risk weight method set out in [CRE31.31](#);
- (2) for securitisation exposures, the Securitisation External Ratings-Based Approach (SEC-ERBA) set out in [CRE42](#) if this method is implemented by the national regulator; the Securitisation Standardised Approach (SEC-SA) set out in [CRE41](#) if the SEC-ERBA has not been implemented by the national regulator or the bank is not able to use the SEC-ERBA; or a 1250% risk weight where the specified requirements for using the SEC-ERBA or SEC-SA are not met; and
- (3) the standardised approach ([CRE20](#) to [CRE22](#)) for all other exposures.

CRE70

Capital treatment of unsettled transactions and failed trades

This chapter sets out the capital requirements that apply to failed trades and unsettled securities, commodities, and foreign exchange transactions.

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Overarching principles

- 70.1** Banks are exposed to the risk associated with unsettled securities, commodities, and foreign exchange transactions from trade date. Irrespective of the booking or the accounting of the transaction, unsettled transactions must be taken into account for regulatory capital requirements purposes.
- 70.2** Banks are encouraged to develop, implement and improve systems for tracking and monitoring the credit risk exposure arising from unsettled transactions and failed trades as appropriate so that they can produce management information that facilitates timely action. Banks must closely monitor securities, commodities, and foreign exchange transactions that have failed, starting the first day they fail.

Delivery-versus-payment transactions

- 70.3** Transactions settled through a delivery-versus-payment system (DvP),¹ providing simultaneous exchanges of securities for cash, expose firms to a risk of loss on the difference between the transaction valued at the agreed settlement price and the transaction valued at current market price (ie positive current exposure). Banks must calculate a capital requirement for such exposures if the payments have not yet taken place five business days after the settlement date, see [CRE70.9](#) below.

Footnotes

- ¹ For the purpose of this Framework, DvP transactions include payment-versus-payment transactions.

Non-delivery-versus-payment transactions (free deliveries)

- 70.4** Transactions where cash is paid without receipt of the corresponding receivable (securities, foreign currencies, gold, or commodities) or, conversely, deliverables were delivered without receipt of the corresponding cash payment (non-DvP, or free deliveries) expose firms to a risk of loss on the full amount of cash paid or deliverables delivered. Banks that have made the first contractual payment /delivery leg must calculate a capital requirement for the exposure if the second leg has not been received by the end of the business day. The requirement increases if the second leg has not been received within five business days. See [CRE70.10](#) to [CRE70.12](#).

Scope of requirements

- 70.5** The capital treatment set out in this chapter is applicable to all transactions on securities, foreign exchange instruments, and commodities that give rise to a risk of delayed settlement or delivery. This includes transactions through recognised clearing houses and central counterparties that are subject to daily mark-to-market and payment of daily variation margins and that involve a mismatched trade. The treatment does not apply to the instruments that are subject to the counterparty credit risk requirements set out in [CRE51](#) (ie over-the-counter derivatives, exchange-traded derivatives, long settlement transactions, securities financing transactions).
- 70.6** Where they do not appear on the balance sheet (ie settlement date accounting), the unsettled exposure amount will receive a 100% credit conversion factor to determine the credit equivalent amount.
- 70.7** In cases of a system-wide failure of a settlement, clearing system or central counterparty, a national supervisor may use its discretion to waive capital requirements until the situation is rectified.
- 70.8** Failure of a counterparty to settle a trade in itself will not be deemed a default for purposes of credit risk under the Basel Framework.

Capital requirements for DvP transactions

- 70.9** For DvP transactions, if the payments have not yet taken place five business days after the settlement date, firms must calculate a capital requirement by multiplying the positive current exposure of the transaction by the appropriate factor, according to the Table 1 below.

Table 1	
Number of business days after the agreed settlement date	Corresponding risk multiplier
From 5 to 15	8%
From 16 to 30	50%
From 31 to 45	75%
46 or more	100%

Capital requirements for non-DvP transactions (free deliveries)

70.10 For non-DvP transactions (ie free deliveries), after the first contractual payment /delivery leg, the bank that has made the payment will treat its exposure as a loan if the second leg has not been received by the end of the business day.² This means that:

- (1) For counterparties to which the bank applies the standardised approach to credit risk, the bank will use the risk weight applicable to the counterparty set out in [CRE20](#).
- (2) For counterparties to which the bank applies the internal ratings-based (IRB) approach to credit risk, the bank will apply the appropriate IRB formula (set out in [CRE31](#)) applicable to the counterparty (set out in [CRE30](#)). When applying this requirement, if the bank has no other banking book exposures to the counterparty (that are subject to the IRB approach), the bank may assign a probability of default to the counterparty on the basis of its external rating. Banks using the Advanced IRB approach may use a 45% loss-given-default (LGD) in lieu of estimating LGDs so long as they apply it to all failed trade exposures. Alternatively, banks using the IRB approach may opt to apply the standardised approach risk weights applicable to the counterparty set out in [CRE20](#).

Footnotes

² *If the dates when two payment legs are made are the same according to the time zones where each payment is made, it is deemed that they are settled on the same day. For example, if a bank in Tokyo transfers Yen on day X (Japan Standard Time) and receives corresponding US Dollar via the Clearing House Interbank Payments System on day X (US Eastern Standard Time), the settlement is deemed to take place on the same value date.*

70.11 As an alternative to [CRE70.10\(1\)](#) and [CRE70.10\(2\)](#) above, when exposures are not material, banks may choose to apply a uniform 100% risk-weight to these exposures, in order to avoid the burden of a full credit assessment.

70.12 If five business days after the second contractual payment/delivery date the second leg has not yet effectively taken place, the bank that has made the first payment leg will risk weight the full amount of the value transferred plus replacement cost, if any, at 1250%. This treatment will apply until the second payment/delivery leg is effectively made.

CRE99

Application guidance

This chapter provides guidance on various aspects of the credit risk standard, including illustrative examples.

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First version in the format of the consolidated framework.

Introduction

99.1 The guidance set out in this chapter relates to the chapters of the credit risk standard ([CRE](#)). This chapter includes the following:

- (1) Illustrative risk weights calculated under the internal ratings-based (IRB) approach to credit risk ([CRE99.2](#) to [CRE99.3](#)).
- (2) Illustrative examples for recognition of dilution risk when applying the Securitisation Internal Ratings-Based Approach (SEC-IRBA) to securitisation exposures ([CRE99.4](#) to [CRE99.19](#)).
- (3) Illustrative examples of the application of the standardised approach to counterparty credit risk (SA-CCR) to sample portfolios ([CRE99.20](#) to [CRE99.97](#)).
- (4) Illustrative examples on the effect of margin agreements on the SA-CCR formulation ([CRE99.98](#) to [CRE99.115](#)).
- (5) Equity investments in funds: illustrative example of the calculation of risk-weighted assets (RWA) under the look-through approach (LTA) ([CRE99.116](#) to [CRE99.120](#)).
- (6) Equity investments in funds: illustrative example of the calculation of RWA under the mandate-based approach (MBA) ([CRE99.121](#) to [CRE99.127](#)).
- (7) Equity investments in funds: illustrative examples of the leverage adjustment ([CRE99.128](#) to [CRE99.133](#)).

Illustrative risk weights calculated under the IRB approach to credit risk

99.2 Table 1 provides illustrative risk weights calculated for four exposure types under the IRB approach to credit risk. Each set of risk weights for unexpected loss (UL) was produced using the appropriate risk-weight function of the risk-weight functions set out in [CRE31](#). The inputs used to calculate the illustrative risk weights include measures of the probability of default (PD), loss-given-default (LGD), and an assumed effective maturity (M) of 2.5 years, where applicable.

99.3 A firm-size adjustment applies to exposures made to small or medium-sized entity borrowers (defined as corporate exposures where the reported sales for the consolidated group of which the firm is a part is less than €50 million). Accordingly, the firm size adjustment was made in determining the second set of risk weights provided in column two for corporate exposures given that the turnover of the firm receiving the exposure is assumed to be €5 million.

Illustrative IRB risk weights for UL

Table 1

Asset class	Corporate Exposures		Residential Mortgages		Other Retail Exposures		Qualifying Revolving Retail Exposures	
LGD:	45%	45%	45%	25%	45%	85%	45%	85%
Turnover								
(millions of €):	50	5						
Maturity:	2.5 years	2.5 Years						
PD:								
0.03%	14.44%	11.30%	4.15%	2.30%	4.45%	8.41%	0.98%	1.85%
0.05%	19.65%	15.39%	6.23%	3.46%	6.63%	12.52%	1.51%	2.86%
0.10%	29.65%	23.30%	10.69%	5.94%	11.16%	21.08%	2.71%	5.12%
0.25%	49.47%	39.01%	21.30%	11.83%	21.15%	39.96%	5.76%	10.88%
0.40%	62.72%	49.49%	29.94%	16.64%	28.42%	53.69%	8.41%	15.88%
0.50%	69.61%	54.91%	35.08%	19.49%	32.36%	61.13%	10.04%	18.97%
0.75%	82.78%	65.14%	46.46%	25.81%	40.10%	75.74%	13.80%	26.06%
1.00%	92.32%	72.40%	56.40%	31.33%	45.77%	86.46%	17.22%	32.53%
1.30%	100.95%	78.77%	67.00%	37.22%	50.80%	95.95%	21.02%	39.70%

1.50%	105.59%	82.11%	73.45%	40.80%	53.37%	100.81%	23.40%	44.19%
2.00%	114.86%	88.55%	87.94%	48.85%	57.99%	109.53%	28.92%	54.63%
2.50%	122.16%	93.43%	100.64%	55.91%	60.90%	115.03%	33.98%	64.18%
3.00%	128.44%	97.58%	111.99%	62.22%	62.79%	118.61%	38.66%	73.03%
4.00%	139.58%	105.04%	131.63%	73.13%	65.01%	122.80%	47.16%	89.08%
5.00%	149.86%	112.27%	148.22%	82.35%	66.42%	125.45%	54.75%	103.41%
6.00%	159.61%	119.48%	162.52%	90.29%	67.73%	127.94%	61.61%	116.37%
10.00%	193.09%	146.51%	204.41%	113.56%	75.54%	142.69%	83.89%	158.47%
15.00%	221.54%	171.91%	235.72%	130.96%	88.60%	167.36%	103.89%	196.23%
20.00%	238.23%	188.42%	253.12%	140.62%	100.28%	189.41%	117.99%	222.86%

Illustrative examples for recognition of dilution risk when applying SEC-IRBA to securitisation exposures

99.4 The following examples are provided to illustrate the recognition of dilution risk according to [CRE44.12](#) and [CRE44.13](#). The first example in [CRE99.5](#) to [CRE99.8](#) assumes a common waterfall for default and dilution losses. The second example in [CRE99.9](#) to [CRE99.19](#) assumes a non-common waterfall for default and dilution losses.

99.5 Common waterfall for default and dilution losses: in the first example, it is assumed that losses resulting from either defaults or dilution within the securitised pool will be subject to a common waterfall, ie the loss-allocation process does not distinguish between different sources of losses within the pool.

99.6 The pool is characterised as follows. For the sake of simplicity, it is assumed that all exposures have the same size, same PD, same LGD and same maturity.

(1) Pool of €1,000,000 of corporate receivables

(2) $N = 100$

(3) $M = 2.5 \text{ years}^1$

(4) $PD_{\text{Dilution}} = 0.55\%$

(5) $LGD_{\text{Dilution}} = 100\%$

(6) $PD_{\text{Default}} = 0.95\%$

(7) $LGD_{\text{Default}} = 45\%$

Footnotes

¹ For the sake of simplicity, the possibility described in [CRE34.8](#) to set $M_{\text{Dilution}} = 1$ is not used in this example.

99.7 The capital structure is characterised as follows:

(1) Tranche A is a senior note of €700,000

(2) Tranche B is a second-loss guarantee of €250,000

(3) Tranche C is a purchase discount of €50,000

- (4) Final legal maturity of transaction / all tranches = 2.875 years, ie $M_T = 2.5$ years²

Footnotes

² The rounding of the maturity calculation is shown for example purposes.

99.8 RWA calculation:

- (1) Step 1: calculate $K_{IRB,Dilution}$ and $K_{IRB,Default}$ for the underlying portfolio:

(a) $K_{IRB,Dilution} = \frac{€1,000,000 \times (161.44\% \times 8\% \times 1.06 + 0.55\% \times 100\%)}{€1,000,000} = 14.24\%$

(b) $K_{IRB,Default} = \frac{(€1,000,000 - €136,900)^3 \times (90.62\% \times 8\% \times 1.06 + 0.95\% \times 45\%)}{€1,000,000} = 7\%$

- (2) Step 2: calculate $K_{IRB,Pool} = K_{IRB,Dilution} + K_{IRB,Default} = 14.24\% + 7\% = 21.24\%$

(3) Step 3: apply the SEC-IRBA to the three tranches

(a) Pool parameters:

(i) $N = 100$

(ii)
$$LGD_{Pool} = (LGD_{Default} \times K_{IRB,Default} + LGD_{Dilution} \times K_{IRB,Dilution}) / K_{IRB,Pool}$$

$$= (45\% \times 7\% + 100\% \times 14.24\%) / 21.24\% = 81.87\%$$

(b) Tranche parameters:

(i) $M_T = 2.5$ years

(ii) Attachment and detachment points shown in Table 2

Attachment and detachment points for each tranche		Table 2
	Attachment point	Detachment point
Tranche A	30%	100%
Tranche B	5%	30%
Tranche C	0%	5%

(4) Resulting risk-weighted exposure amounts shown in Table 3

Risk-weighted exposure amounts for each tranche		Table 3
	SEC-IRBA risk weight	RWA
Tranche A	28.78%	€201,460
Tranche B	1056.94%	€2,642,350
Tranche C	1250%	€625,000

Footnotes

³

As described in [CRE34.5](#), when calculating the default risk of exposures with non-immaterial dilution risk "EAD will be calculated as the outstanding amount minus the capital requirement for dilution prior to credit risk mitigation".

99.9 Non-common waterfall for default and dilution losses: in the second example, it is assumed that the securitisation transaction does not have one common waterfall for losses due to defaults and dilutions, ie for the determination of the risk of a specific tranche it is not only relevant what losses might be realised within the pool but also if those losses are resulting from default or a dilution event.

99.10 As the SEC-IRBA assumes that there is one common waterfall, it cannot be applied without adjustments. The following example illustrates one possible scenario and a possible adjustment specific to this scenario.

99.11 While this example is meant as a guideline, a bank should nevertheless consult with its national supervisor as to how the capital calculation should be performed (see [CRE44.13](#)).

99.12 The pool is characterised as in [CRE99.6](#).

99.13 The capital structure is characterised as follows:

- (1) Tranche A is a senior note of €950,000
- (2) Tranche C is a purchase discount of €50,000
- (3) Tranches A and C will cover both default and dilution losses
- (4) In addition, the structure also contains a second-loss guarantee of €250,000 (Tranche B)⁴ that covers only dilution losses exceeding a threshold of €50,000 up to maximum aggregated amount of €300,000, which leads to the following two waterfalls:
 - (a) Default waterfall
 - (i) Tranche A is a senior note of €950,000
 - (ii) Tranche C is a purchase discount of €50,000⁵
 - (b) Dilution waterfall
 - (i) Tranche A is a senior note of €700,000
 - (ii) Tranche B is a second-loss guarantee of €250,000
 - (iii) Tranche C is a purchase discount of €50,000⁶
- (5) M_T of all tranches is 2.5 years.

Footnotes

⁴ For the sake of simplicity, it is assumed that the second loss guarantee is cash-collateralised.

⁵ Subject to the condition that it is not already being used for realised dilution losses.

⁶ Subject to the condition that it is not already being used for realised default losses.

99.14 Tranche C is treated as described in [CRE99.7](#) to [CRE99.10](#).

99.15 Tranche B (second-loss guarantee) is exposed only to dilution risk, but not to default risk. Therefore, K_{IRB} for the purpose of calculating a capital requirement for Tranche B, can be limited to $K_{IRB,Dilution}$. However, as the holder of Tranche B cannot be sure that Tranche C will still be available to cover the first dilution losses when they are realised – because the credit enhancement might already be depleted due to earlier default losses – to ensure a prudent treatment, it cannot recognise the purchase discount as credit enhancement for dilution risk. In the capital calculation, the bank providing Tranche B should assume that €50,000 of the securitised assets have already been defaulted and hence Tranche C is no longer available as credit enhancement and the exposure of the underlying assets has been reduced to €950,000. When calculating K_{IRB} for Tranche B, the bank can assume that K_{IRB} is not affected by the reduced portfolio size.

99.16 RWA calculation for tranche B:

(1) Step 1: calculate $K_{IRB,Pool}$.

$$K_{IRB,Pool} = K_{IRB,Dilution} = 14.24\%$$

- (2) Step 2: apply the SEC-IRBA.
 - (a) Pool parameters:
 - (i) $N = 100$
 - (ii) $LGD_{\text{Pool}} = LGD_{\text{Dilution}} = 100\%$
 - (b) Tranche parameters:
 - (i) $M_T = 2.5$ years
 - (ii) Attachment point = 0%
 - (iii) Detachment point = $\text{€}250,000 / \text{€}950,000 = 26.32\%$
- (3) Resulting risk-weighted exposure amounts for tranche B:
 - (a) SEC-IRBA risk weight = 925.47%
 - (b) RWA = $\text{€}2,313,675$

99.17 The holder of Tranche A (senior note) will take all default losses not covered by the purchase discount and all dilution losses not covered by the purchase discount or the second-loss guarantee. A possible treatment for Tranche A would be to add $K_{\text{IRB,Default}}$ and $K_{\text{IRB,Dilution}}$ (as in [CRE99.7](#) to [CRE99.10](#)), but not to recognise the second-loss guarantee as credit enhancement at all because it is covering only dilution risk.

99.18 Although this is a simple approach, it is also fairly conservative. Therefore the following alternative for the senior tranche could be considered:

- (1) Calculate the RWA amount for Tranche A under the assumption that it is only exposed to losses resulting from defaults. This assumption implies that Tranche A is benefiting from a credit enhancement of $\text{€}50,000$.
- (2) Calculate the RWA amounts for Tranche C and (hypothetical) Tranche A* under the assumption that they are only exposed to dilution losses. Tranche A* should be assumed to absorb losses above $\text{€}300,000$ up to $\text{€}1,000,000$. With respect to dilution losses, this approach would recognise that the senior tranche investor cannot be sure if the purchase price discount will still be available to cover those losses when needed as it might have already been used for defaults. Consequently, from the perspective of the senior investor, the purchase price discount could only be recognised for the calculation of the capital requirement for default or dilution risk but not for both.⁷

- (3) Sum up the RWA amounts under [CRE99.18\(1\)](#) and [CRE99.18\(2\)](#) and apply the relevant risk weight floor in [CRE44.26](#) or [CRE44.29](#) to determine the final RWA amount for the senior note investor.

Footnotes

² *In this example, the purchase price discount was recognised in the default risk calculation, but banks could also choose to use it for the dilution risk calculation. It is also assumed that the second-loss dilution guarantee explicitly covers dilution losses above €50,000 up to €300,000. If the guarantee instead covered €250,000 dilution losses after the purchase discount has been depleted (irrespective of whether the purchase discount has been used for dilution or default losses), then the senior note holder should assume that he is exposed to dilution losses from €250,000 up to €1,000,000 (instead of €0 to €50,000 + €300,000 to €1,000,000).*

99.19 RWA calculation for tranche A:

- (1) Step 1: calculate RWA for [CRE99.18\(1\)](#).
- (a) Pool parameters:
- (i) $K_{\text{IRB,Pool}} = K_{\text{IRB,Default}} = 7\%$
 - (ii) $\text{LGD}_{\text{Pool}} = \text{LGD}_{\text{Default}} = 45\%$
- (b) Tranche parameters:
- (i) $M_T = 2.5$ years
 - (ii) Attachment point = €50,000 / €1,000,000 = 5%
 - (iii) Detachment point = €1,000,000 / €1,000,000 = 100%
- (c) Resulting risk-weighted exposure amounts:
- (i) SEC-IRBA risk weight = 56.58%
 - (ii) RWA = €537,510.

(2) Step 2: calculate RWA for [CRE99.18\(2\)](#).

(a) Pool parameters:

(i) $K_{\text{IRB,Pool}} = K_{\text{IRB,Dilution}} = 14.24\%$

(ii) $\text{LGD}_{\text{Pool}} = \text{LGD}_{\text{Dilution}} = 100\%$

(b) Tranche parameters:

(i) $M_T = 2.5 \text{ years}$

(ii) Attachment and detachment points shown in Table 4

Attachment and detachment points for each tranche		Table 4
	Attachment point	Detachment point
Tranche A*	30%	100%
Tranche C	0%	5%

(c) Resulting risk-weighted exposure amounts shown in Table 5

Risk-weighted exposure amounts for each tranche		Table 5
	SEC-IRBA risk weight	RWA
Tranche A*	13.65%	€95,550
Tranche C	1250%	€625,000

(3) Step 3: Sum up the RWA of [CRE99.19\(1\)](#) and [CRE99.19\(2\)](#)⁸

(a) Final RWA amount for investor in Tranche A = €537,510 + €95,550 + €625,000 = €1,258,060

(b) Implicit risk weight for Tranche A = max (15%, €1,258,060 / €950,000) = 132.43%

Footnotes

8

The correct application of the overall risk weight floor is such that the intermediate results (in this case the risk weight for Tranche A) are calculated without the floor and the floor is only enforced in the last step (ie Step 3(b)).*

Illustrative examples of the application of the SA-CCR to sample portfolios

99.20 This section ([CRE99.20](#) to [CRE99.97](#)) sets out the calculation of exposure at default (EAD) for five sample portfolios using SA-CCR. The calculations for the sample portfolios assume that intermediate values are not rounded (ie the actual results are carried through in sequential order). However, for ease of presentation, these intermediate values as well as the final EAD are rounded.

99.21 The EAD for all netting sets in SA-CCR is given by the following formula, where alpha is assigned a value of 1.4:

$$EAD = \alpha * (RC + multiplier * AddOn^{aggregate})$$

Example 1: Interest rate derivatives (unmargined netting set)

99.22 Netting set 1 consists of three interest rates derivatives: two fixed versus floating interest rate swaps and one purchased physically-settled European swaption. The table below summarises the relevant contractual terms of the three derivatives. All notional amounts and market values in the table are given in USD thousands.

Trade #	Nature	Residual maturity	Base currency	Notional (USD thousands)	Pay Leg (*)	Receive Leg (*)	Market value (USD thousands)
1	Interest rate swap	10 years	USD	10,000	Fixed	Floating	30
2	Interest rate swap	4 years	USD	10,000	Floating	Fixed	-20
3	European swaption	1 into 10 years	EUR	5,000	Floating	Fixed	50

(*) For the swaption, the legs are those of the underlying swap

99.23 The netting set is not subject to a margin agreement and there is no exchange of collateral (independent amount/initial margin) at inception. For unmargined netting sets, the replacement cost is calculated using the following formula, where:

- (1) V is a simple algebraic sum of the derivatives' market values at the reference date
- (2) C is the haircut value of the initial margin, which is zero in this example

$$RC = \max\{V - C; 0\}$$

99.24 Thus, using the market values indicated in the table (expressed in USD thousands):

$$RC = \max\{30 - 20 + 50 - 0; 0\} = 60$$

99.25 Since $V - C$ is positive (ie USD 60,000), the value of the multiplier is 1, as explained in [CRE52.22](#).

99.26 The remaining term to be calculated in the calculation EAD is the aggregate add-on ($\text{AddOn}^{\text{aggregate}}$). All the transactions in the netting set belong to the interest rate asset class. The $\text{AddOn}^{\text{aggregate}}$ for the interest rate asset class can be calculated using the seven steps set out in [CRE52.57](#).

99.27 Step 1: Calculate the effective notional for each trade in the netting set. This is calculated as the product of the following three terms: (i) the adjusted notional of

the trade (d_i); (ii) the supervisory delta adjustment of the trade (δ_i); and (iii) the maturity factor (MF). That is, for each trade i , the effective notional D_i is calculated as $D_i = d_i * MF_i * \delta_i$.

99.28 For interest rate derivatives, the trade-level adjusted notional (d_i) is the product of the trade notional amount and the supervisory duration (SD_i), ie $d_i = \text{notional} * SD_i$. The supervisory duration is calculated using the following formula, where:

- (1) S_i and E_i are the start and end dates, respectively, of the time period referenced by the interest rate derivative (or, where such a derivative references the value of another interest rate instrument, the time period determined on the basis of the underlying instrument). If the start date has occurred (eg an ongoing interest rate swap), S_i must be set to zero.
- (2) The calculated value of SD_i is floored at 10 business days (which expressed in years, using an assumed market convention of 250 business days a year is 10/250 years).

$$SD_i = \frac{\exp(-0.05 * S_i) - \exp(-0.05 * E_i)}{0.05}$$

99.29 Using the formula for supervisory duration above, the trade-level adjusted notional amounts for each of the trades in Example 1 are as follows:

Trade #	Notional (USD thousands)	S_i	E_i	SD_i	Adjusted notional, d_i (USD thousands)
1	10,000	0	10	7.87	78,694
2	10,000	0	4	3.63	36,254
3	5,000	1	11	7.49	37,428

99.30 [CRE52.48](#) sets out the calculation of the maturity factor (MF_i) for unmargined trades. For trades that have a remaining maturity in excess of one year, which is the case for all trades in this example, the formula gives a maturity factor of 1.

99.31 As set out in [CRE52.38](#) to [CRE52.41](#), a supervisory delta is assigned to each trade. In particular:

- (1) Trade 1 is long in the primary risk factor (the reference floating rate) and is not an option so the supervisory delta is equal to 1.
- (2) Trade 2 is short in the primary risk factor and is not an option; thus, the supervisory delta is equal to -1.
- (3) Trade 3 is an option to enter into an interest rate swap that is short in the primary risk factor and therefore is treated as a bought put option. As such, the supervisory delta is determined by applying the relevant formula in [CRE52.40](#), using 50% as the supervisory option volatility and 1 (year) as the option exercise date. In particular, assuming that the underlying price (the appropriate forward swap rate) is 6% and the strike price (the swaption's fixed rate) is 5%, the supervisory delta is:

$$\delta_i = -\Phi\left(-\frac{\ln(0.06 / 0.05) + 0.5 \cdot 0.5^2 \cdot 1}{0.5 \cdot \sqrt{1}}\right) = -0.2694$$

99.32 The effective notional for each trade in the netting set (D_i) is calculated using the formula $D_i = d_i \cdot MF_i \cdot \delta_i$ and values for each term noted above. The results of applying the formula are as follows:

Trade #	Notional (USD thousands)	Adjusted notional, d_i (USD, thousands)	Maturity Factor, MF_i	Delta, δ_i	Effective notional, D_i (USD, thousands)
1	10,000	78,694	1	1	78,694
2	10,000	36,254	1	-1	-36,254
3	5,000	37,428	1	-0.2694	-10,083

99.33 Step 2: Allocate the trades to hedging sets. In the interest rate asset class the hedging sets consist of all the derivatives that reference the same currency. In this example, the netting set is comprised of two hedging sets, since the trades refer to interest rates denominated in two different currencies (USD and EUR).

99.34 Step 3: Within each hedging set allocate each of the trades to the following three maturity buckets: less than one year (bucket 1), between one and five years (bucket 2) and more than five years (bucket 3). For this example, within the hedging set "USD", trade 1 falls into the third maturity bucket (more than 5 years) and trade 2 falls into the second maturity bucket (between one and five years). Trade 3 falls into the third maturity bucket (more than 5 years) of the hedging set "EUR". The results of steps 1 to 3 are summarised in the table below:

Trade #	Effective notional, D_i (USD, thousands)	Hedging set	Maturity bucket
1	78,694	USD	3
2	-36,254	USD	2
3	-10,083	EUR	3

99.35 Step 4: Calculate the effective notional of each maturity bucket (D^{B1} , D^{B2} and D^{B3}) within each hedging set (USD and EUR) by adding together all the trade level effective notionals within each maturity bucket in the hedging set. In this example, there are no maturity buckets within a hedging set with more than one trade, and so this case the effective notional of each maturity bucket is simply equal to the effective notional of the single trade in each bucket. Specifically:

- (1) For the USD hedging set: D^{B1} is zero, D^{B2} is -36,254 (thousand USD) and D^{B3} is 78,694 (thousand USD).
- (2) For the EUR hedging set: D^{B1} and D^{B2} are zero and D^{B3} is -10,083 (thousand USD).

99.36 Step 5: Calculate the effective notional of the hedging set (EN_{HS}) by using either of the two following aggregation formulas (the latter is to be used if the bank chooses not to recognise offsets between long and short positions across maturity buckets):

$$\text{Offset formula : } EN_{hs} = \left[(D^{B1})^2 + (D^{B2})^2 + (D^{B3})^2 + 1.4 * D^{B1} * D^{B2} + 1.4 * D^{B2} * D^{B3} + 0.6 * D^{B1} * D^{B3} \right]^{\frac{1}{2}}$$

$$\text{No offset formula : } EN_{hs} = |D^{B1}| + |D^{B2}| + |D^{B3}|$$

99.37 In this example, the first of the two aggregation formulas is used. Therefore, the effective notionals for the USD hedging set (EN_{USD}) and the EUR hedging (EN_{EUR}) are, respectively (expressed in USD thousands):

$$EN_{USD} = \left[(-36,254)^2 + (78,694)^2 + 1.4 * (-36,254) * 78,694 \right]^{\frac{1}{2}} = 59,270$$

$$EN_{EUR} = \left[(-10,083)^2 \right]^{\frac{1}{2}} = 10,083$$

99.38 Step 6: Calculate the hedging set level add-on ($AddOn_{hs}$) by multiplying the effective notional of the hedging set (EN_{hs}) by the prescribed supervisory factor (SF_{hs}). The prescribed supervisory factor in the interest rate asset class is set at 0.5%. Therefore, the add-on for the USD and EUR hedging sets are, respectively (expressed in USD thousands):

$$AddOn_{USD} = 59,270 * 0.005 = 296.35$$

$$AddOn_{EUR} = 10,083 * 0.005 = 50.415$$

99.39 Step 7: Calculate the asset class level add-on ($AddOn^{IR}$) by adding together all of the hedging set level add-ons calculated in step 6. Therefore, the add-on for the interest rate asset class is (expressed in USD thousands):

$$AddOn^{IR} = 296.35 + 50.415 = 347$$

99.40 For this netting set the interest rate add-on is also the aggregate add-on because there are no derivatives belonging to other asset classes. The EAD for the netting set can now be calculated using the formula set out in [CRE99.21](#) (expressed in USD thousands):

$$EAD = \alpha * (RC + multiplier * AddOn^{aggregate}) = 1.4 * (60 + 1 * 347) = 569$$

Example 2 : Credit derivatives (unmargined netting set)

99.41 Netting set 2 consists of three credit derivatives: one long single-name credit default swap (CDS) written on Firm A (rated AA), one short single-name CDS written on Firm B (rated BBB), and one long CDS index (investment grade). The table below summarises the relevant contractual terms of the three derivatives. All notional amounts and market values in the table are in USD thousands.

Trade #	Nature	Reference entity / index name	Rating reference entity	Residual maturity	Base currency	Notional (USD thousands)	Position	Market value (USD thousands)
1	Single-name CDS	Firm A	AA	3 years	USD	10,000	Protection buyer	20
2	Single-name CDS	Firm B	BBB	6 years	EUR	10,000	Protection seller	-40
3	CDS index	CDX.IG 5y	Investment grade	5 years	USD	10,000	Protection buyer	0

99.42 As in the previous example, the netting set is not subject to a margin agreement and there is no exchange of collateral (independent amount/initial margin) at inception. For unmargined netting sets, the replacement cost is calculated using the following formula, where:

- (1) V is a simple algebraic sum of the derivatives' market values at the reference date
- (2) C is the haircut value of the initial margin, which is zero in this example

$$RC = \max\{V - C; 0\}$$

99.43 Thus, using the market values indicated in the table (expressed in USD thousands):

$$RC = \max\{20 - 40 + 0 - 0; 0\} = 0$$

99.44 Since in this example $V - C$ is negative (equal to V , ie -20,000), the multiplier will be activated (ie it will be less than 1). Before calculating its value, the aggregate add-on ($\text{AddOn}^{\text{aggregate}}$) needs to be determined.

99.45 All the transactions in the netting set belong to the credit derivatives asset class. The $\text{AddOn}^{\text{aggregate}}$ for the credit derivatives asset class can be calculated using the four steps set out in [CRE52.61](#).

99.46 Step 1: Calculate the effective notional for each trade in the netting set. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d_i); (ii) the supervisory delta adjustment of the trade (δ_i); and (iii) the maturity factor (MF). That is, for each trade i , the effective notional D_i is calculated as $D_i = d_i * MF_i * \delta_i$.

99.47 For credit derivatives, like interest rate derivatives, the trade-level adjusted notional (d_i) is the product of the trade notional amount and the supervisory duration (SD_i), ie $d_i = \text{notional} * SD_i$. The trade-level adjusted notional amounts for each of the trades in Example 2 are as follows:

Trade #	Notional (USD thousands)	S_i	E_i	SD_i	Adjusted notional, d_i (USD thousands)
1	10,000	0	3	2.79	27,858
2	10,000	0	6	5.18	51,836
3	10,000	0	5	4.42	44,240

99.48 [CRE52.48](#) sets out the calculation of the maturity factor (MF_i) for unmargined trades. For trades that have a remaining maturity in excess of one year, which is the case for all trades in this example, the formula gives a maturity factor of 1.

99.49 As set out in [CRE52.38](#) to [CRE52.41](#), a supervisory delta is assigned to each trade. In particular:

- (1) Trade 1 and Trade 3 are long in the primary risk factors (CDS spread) and are not options so the supervisory delta is equal to 1 for each trade.
- (2) Trade 2 is short in the primary risk factor and is not an option; thus, the supervisory delta is equal to -1.

99.50 The effective notional for each trade in the netting set (D_i) is calculated using the formula $D_i = d_i * MF_i * \delta_i$ and values for each term noted above. The results of applying the formula are as follows:

Trade #	Notional (USD thousands)	Adjusted notional, d_i (USD, thousands)	Maturity Factor, MF_i	Delta, δ_i	Effective notional, D_i (USD, thousands)
1	10,000	27,858	1	1	27,858
2	10,000	51,836	1	-1	-51,836
3	10,000	44,240	1	1	44,240

99.51 Step 2: Calculate the combined effective notional for all derivatives that reference the same entity. The combined effective notional of the entity (EN_{entity}) is calculated by adding together the trade level effective notionals calculated in step 1 that reference that entity. However, since all the derivatives refer to different entities (single names/indices), the effective notional of the entity is simply equal to the trade level effective notional (D_i) for each trade.

99.52 Step 3: Calculate the add-on for each entity ($AddOn_{entity}$) by multiplying the entity level effective notional in step 2 by the supervisory factor that is specified for that entity (SF_{entity}). The supervisory factors are set out in table 2 in [CRE52.72](#). A supervisory factor is assigned to each single-name entity based on the rating of the reference entity (0.38% for AA-rated firms and 0.54% for BBB-rated firms). For CDS indices, the SF is assigned according to whether the index is investment or speculative grade; in this example, its value is 0.38% since the index is investment grade. Thus, the entity level add-ons are the following (USD thousands):

Reference Entity	Effective notional, D_i (USD, thousands)	Supervisory factor, SF_{entity}	Entity-level add-on, $AddOn_{entity}$ ($= D_i * SF_{entity}$)
Firm A	27,858	0.38%	106
Firm B	-51,836	0.54%	-280
CDX.IG	44,240	0.38%	168

99.53 Step 4: Calculate the asset class level add-on ($AddOn^{Credit}$) by using the formula that follows, where:

- (1) The summations are across all entities referenced by the derivatives.
- (2) $AddOn_{entity}$ is the add-on amount calculated in step 3 for each entity referenced by the derivatives.
- (3) ρ_{entity} is the supervisory prescribed correlation factor corresponding to the entity. As set out in table 2 in [CRE52.72](#), the correlation factor is 50% for single entities (Firm A and Firm B) and 80% for indexes (CDX.IG).

$$AddOn^{Credit} = \left[\underbrace{\left(\sum_{entity} \rho_{entity} * AddOn_{entity} \right)^2}_{\text{idiosyncratic component}} + \underbrace{\sum_{entity} \left(1 - (\rho_{entity})^2 \right) * (AddOn_{entity})^2}_{\text{idiosyncratic component}} \right]^{\frac{1}{2}}$$

99.54 The following table shows a simple way to calculate of the systematic and idiosyncratic components in the formula:

Reference Entity	p_{entity}	AddOn entity	$p_{\text{entity}} * \text{AddOn}_{\text{entity}}$	$1-(p_{\text{entity}})^2$	$(\text{AddOn}_{\text{entity}})^2$	$(1-(p_{\text{entity}})^2) * (\text{AddOn}_{\text{entity}})^2$
Firm A	0.5	106	52.9	0.75	11,207	8,405
Firm B	0.5	-280	-140	0.75	78,353	58,765
CDX.IG	0.8	168	134.5	0.36	28,261	10,174
sum =			47.5			77,344
(sum)² =			2,253			

99.55 According to the calculations in the table, the systematic component is 2,253, while the idiosyncratic component is 77,344. Thus, the add-on for the credit asset class is calculated as follows:

$$\text{AddOn}^{\text{Credit}} = \left[2,253 + 77,344 \right]^{\frac{1}{2}} = 282$$

99.56 For this netting set the credit add-on ($\text{AddOn}^{\text{Credit}}$) is also the aggregate add-on ($\text{AddOn}^{\text{aggregate}}$) because there are no derivatives belonging to other asset classes.

99.57 The value of the multiplier can now be calculated as follows, using the formula set out in [CRE52.23](#):

$$\text{multiplier} = \min \left\{ 1; 0.05 + 0.95 * \exp \left(\frac{-20}{2 * 0.95 * 282} \right) \right\} = 0.965$$

99.58 Finally, aggregating the replacement cost and the potential future exposure (PFE) component and multiplying the result by the alpha factor of 1.4, the EAD is as follows (USD thousands):

$$\text{EAD} = 1.4 * (0 + 0.965 * 282) = 381$$

Example 3 : Commodity derivatives (unmargined netting set)

99.59 Netting set 3 consists of three commodity forward contracts. The table below summarises the relevant contractual terms of the three derivatives. All notional amounts and market values in the table are in USD thousands.

Trade #	Notional	Nature	Underlying	Direction	Residual maturity	Market value
1	10,000	Forward	(West Texas Intermediate, or WTI) Crude Oil	Long	9 months	-50
2	20,000	Forward	(Brent) Crude Oil	Short	2 years	-30
3	10,000	Forward	Silver	Long	5 years	100

99.60 As in the previous two examples, the netting set is not subject to a margin agreement and there is no exchange of collateral (independent amount/initial margin) at inception. Thus, the replacement cost is given by:

$$RC = \max\{V - C; 0\} = \max\{100 - 30 - 50 - 0; 0\} = 20$$

99.61 Since V-C is positive (ie USD 20,000), the value of the multiplier is 1, as explained in [CRE52.22](#).

99.62 All the transactions in the netting set belong to the commodities derivatives asset class. The AddOn^{aggregate} for the commodities derivatives asset class can be calculated using the six steps set out in [CRE52.70](#).

99.63 Step 1: Calculate the effective notional for each trade in the netting set. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d); (ii) the supervisory delta adjustment of the trade (δ); and (iii) the maturity factor (MF). That is, for each trade i, the effective notional D_i is calculated as $D_i = d_i * MF_i * \delta_i$.

99.64 For commodity derivatives, the adjusted notional is defined as the product of the current price of one unit of the commodity (eg barrel of oil) and the number of units referenced by the derivative. In this example, for the sake of simplicity, it is assumed that the adjusted notional (d_i) is equal to the notional value.

99.65 [CRE52.48](#) sets out the calculation of the maturity factor (MF_i) for unmargined trades. For trades that have a remaining maturity in excess of one year (trades 2 and 3 in this example), the formula gives a maturity factor of 1. For trade 1 the formula gives the following maturity factor:

$$MF = \sqrt{\frac{\min\{M_i; 1\text{year}\}}{1\text{year}}} = \sqrt{\frac{\min\{9/12; 1\}}{1}} = \sqrt{9/12}$$

99.66 As set out in [CRE52.38](#) to [CRE52.41](#), a supervisory delta is assigned to each trade. In particular:

- (1) Trade 1 and Trade 3 are long in the primary risk factors (WTI Crude Oil and Silver respectively) and are not options so the supervisory delta is equal to 1 for each trade.
- (2) Trade 2 is short in the primary risk factor (Brent Crude Oil) and is not an option; thus, the supervisory delta is equal to -1.

Trade #	Notional (USD thousands)	Adjusted notional, d_i (USD, thousands)	Maturity Factor, MF_i	Delta, δ_i	Effective notional, D_i (USD, thousands)
1	10,000	10,000	$(9/12)^{0.5}$	1	8,660
2	20,000	20,000	1	-1	-20,000
3	10,000	10,000	1	1	10,000

99.67 Step 2: Allocate the trades in commodities asset class to hedging sets. In the commodities asset class there are four hedging sets consisting of derivatives that reference: energy (trades 1 and 2 in this example), metals (trade 3 in this example), agriculture and other commodities.

Hedging set	Commodity type	Trades
Energy	Crude oil	1 and 2
	Natural gas	None
	Coal	None
	Electricity	None
Metals	Silver	3
	Gold	None

Agriculture

Other

Trade #	Effective notional, D_i (USD, thousands)	Hedging set	Commodity type
1	8,660	Energy	Crude oil
2	-20,000	Energy	Crude oil
3	10,000	Metals	Silver

99.68 Step 3: Calculate the combined effective notional for all derivatives with each hedging set that reference the same commodity type. The combined effective notional of the commodity type ($EN_{ComType}$) is calculated by adding together the trade level effective notionals calculated in step 1 that reference that commodity type. For purposes of this calculation, the bank can ignore the basis difference between the WTI and Brent forward contracts since they belong to the same commodity type, "Crude Oil" (unless the national supervisor requires the bank to use a more refined definition of commodity types). This step gives the following:

$$(1) \quad EN_{CrudeOil} = 8,660 + (-20,000) = -11,340$$

$$(2) \quad EN_{Silver} = 10,000$$

99.69 Step 4: Calculate the add-on for each commodity type ($AddOn_{ComType}$) within each hedging set by multiplying the combined effective notional for that commodity calculated in step 3 by the supervisory factor that is specified for that commodity type ($SF_{ComType}$). The supervisory factors are set out in table 2 in [CRE52.72](#) and are set at 40% for electricity derivatives and 18% for derivatives that reference all other types of commodities. Therefore:

$$(1) \quad AddOn_{CrudeOil} = -11,340 * 0.18 = -2,041$$

$$(2) \quad AddOn_{Silver} = 10,000 * 0.18 = 1,800$$

99.70 Step 5: Calculate the add-on for each of the four commodity hedging sets ($AddOn_{HS}$) by using the formula that follows. In the formula:

- (1) The summations are across all commodity types within the hedging set.
- (2) $AddOn_{ComType}$ is the add-on amount calculated in step 4 for each commodity type.
- (3) $\rho_{ComType}$ is the supervisory prescribed correlation factor corresponding to the commodity type. As set out in table 2 in [CRE52.72](#), the correlation factor is set 40% for all commodity types.

$$AddOn_{HS} = \left[\left(\sum_{ComType} \rho_{ComType} * AddOn_{ComType} \right)^2 + \sum_{ComType} \left(1 - (\rho_{ComType})^2 \right) * (AddOn_{ComType})^2 \right]^{\frac{1}{2}}$$

99.71 In this example, however, there is only one commodity type within the “Energy” hedging set (ie Crude Oil). All other commodity types within the energy hedging set (eg coal, natural gas etc) have a zero add-on. Therefore, the add-on for the energy hedging set is calculated as follows:

$$AddOn_{Energy} = \left[\left(\rho_{CrudeOil} * AddOn_{CrudeOil} \right)^2 + \left(1 - (\rho_{CrudeOil})^2 \right) * (AddOn_{CrudeOil})^2 \right]^{\frac{1}{2}}$$

$$AddOn_{Energy} = \left[(0.4 * (-2,041))^2 + (1 - (0.4)^2) * (-2,041)^2 \right]^{\frac{1}{2}} = 2,041$$

99.72 The calculation above shows that, when there is only one commodity type within a hedging set, the hedging-set add-on is equal (in absolute value) to the commodity-type add-on.

99.73 Similarly, “Silver” is the only commodity type in the “Metals” hedging set, and so the add-on for the metals hedging set is:

$$AddOn_{Metals} = |AddOn_{Silver}| = 1,800$$

99.74 Step 6: Calculate the asset class level add-on ($AddOn^{Commodity}$) by adding together all of the hedging set level add-ons calculated in step 5:

$$AddOn^{Commodity} = \sum_{HS} AddOn_{HS} = AddOn_{Energy} + AddOn_{Metals} = 2,041 + 1,800 = 3841$$

99.75 For this netting set the commodity add-on ($AddOn^{Commodity}$) is also the aggregate add-on ($AddOn^{aggregate}$) because there are no derivatives belonging to other asset classes.

99.76 Finally, aggregating the replacement cost and the PFE component and multiplying the result by the alpha factor of 1.4, the EAD is as follows (USD thousands):

$$EAD = 1.4 * (20 + 1 * 3,841) = 5,406$$

Example 4 : Interest rate and credit derivatives (unmargined netting set)

99.77 Netting set 4 consists of the combined trades of Examples 1 and 2. There is no margin agreement and no collateral. The replacement cost of the combined netting set is:

$$RC = \max\{V - C; 0\} = \max\{30 - 20 + 50 + 20 - 40 + 0; 0\} = 40$$

99.78 The aggregate add-on for the combined netting set is the sum of add-ons for each asset class. In this case, there are two asset classes, interest rates and credit, and the add-ons for these asset classes have been copied from Examples 1 and 2:

$$AddOn^{aggregate} = AddOn^{IR} + AddOn^{Credit} = 347 + 282 = 629$$

99.79 Because V-C is positive, the multiplier is equal to 1. Finally, the EAD can be calculated as:

$$EAD = 1.4 * (40 + 1 * 629) = 936$$

Example 5 : Interest rate and commodities derivatives (margined netting set)

99.80 Netting set 5 consists of the combined trades of Examples 1 and 3. However, instead of being unmargined (as assumed in those examples), the trades are subject to a margin agreement with the following specifications:

Margin frequency	Threshold, TH	Minimum Transfer Amount, MTA (USD thousands)	Independent Amount, IA (USD thousands)	Total net collateral held by bank (USD thousands)
Weekly	0	5	150	200

99.81 The above table depicts a situation in which the bank received from the counterparty a net independent amount of 150 (taking into account the net amount of initial margin posted by the counterparty and any unsegregated initial margin posted by the bank). The total net collateral (after the application of haircuts) currently held by the bank is 200, which includes 50 for variation margin received and 150 for the net independent amount.

99.82 First, we determine the replacement cost. The net collateral currently held is 200 and the net independent collateral amount (NICA) is equal to the independent amount (that is, 150). The current market value of the trades in the netting set (V) is 80, it is calculated as the sum of the market value of the trades, ie $30 - 20 + 50 - 50 - 30 + 100 = 80$. The replacement cost for margined netting sets is calculated using the formula set out in [CRE52.18](#). Using this formula the replacement cost for the netting set in this example is:

$$RC = \max\{V - C; TH + MTA - NICA; 0\} = \max\{80 - 200; 0 + 5 - 150; 0\} = 0$$

99.83 Second, it is necessary to recalculate the interest rate and commodity add-ons, based on the value of the maturity factor for margined transactions, which depends on the margin period of risk. For daily re-margining, the margin period of risk (MPOR) would be 10 days. In accordance with [CRE52.50](#), for netting sets that are not subject daily margin agreements the MPOR is the sum of nine business days plus the re-margining period (which is five business days in this example). Thus the MPOR is 14 (= 9 + 5) in this example.

99.84 The re-scaled maturity factor for the trades in the netting set is calculated using the formula set out in [CRE52.52](#). Using the MPOR calculated above, the maturity factor for all trades in the netting set in this example it is calculated as follows (a market convention of 250 business days in the financial year is used):

$$MF_i^{(\text{margined})} = \frac{3}{2} \sqrt{\frac{MPOR_i}{1 \text{ year}}} = 1.5 * \sqrt{14/250}$$

99.85

For the interest rate add-on, the effective notional for each trade ($D_i = d_i * MF_i * \delta_i$) calculated in [CRE99.32](#) must be recalculated using the maturity factor for the margined netting set calculated above. That is:

IR Trade #	Notional (USD thousands)	Base currency (hedging set)	Maturity bucket	Adjusted notional, d_i (USD, thousands)	Maturity Factor, MF_i	Delta, δ_i	Effective notional (USD thousands)
1	10,000	USD	3	78,694	$1.5 * \sqrt{14/250}$	1	27,934
2	10,000	USD	2	36,254	$1.5 * \sqrt{14/250}$	-1	-12,869
3	5,000	EUR	3	37,428	$1.5 * \sqrt{14/250}$	-0.2694	-3,579

99.86 Next, the effective notional of each of the three maturity buckets within each hedging set must now be calculated. However, as set out in [CRE99.35](#), given that in this example there are no maturity buckets within a hedging set with more than a single trade, the effective maturity of each maturity bucket is simply equal to the effective notional of the single trade in each bucket. Specifically:

- (1) For the USD hedging set: D^{B1} is zero, D^{B2} is -12,869 (thousand USD) and D^{B3} is 27,934 (thousand USD).
- (2) For the EUR hedging set: D^{B1} and D^{B2} are zero and D^{B3} is -3,579 (thousand USD).

99.87 Next, the effective notional of each of the two hedging sets (USD and EUR) must be recalculated using formula set out in [CRE99.37](#) and the updated values of the effective notionals of each maturity bucket. The calculation is as follows:

$$EN_{USD} = \left[(-12,869)^2 + (27,934)^2 + 1.4 * (-12,869) * 27,934 \right]^{\frac{1}{2}} = 21,039$$

$$EN_{EUR} = \left[(-3,579)^2 \right]^{\frac{1}{2}} = 3,579$$

99.88 Next, the hedging set level add-ons ($AddOn_{hs}$) must be recalculated by multiplying the recalculated effective notionals of each hedging set (EN_{hs}) by the prescribed supervisory factor of the hedging set (SF_{hs}). As set out in [CRE99.35](#),

the prescribed supervisory factor in this case is 0.5%. Therefore, the add-on for the USD and EUR hedging sets are, respectively (expressed in USD thousands):

$$AddOn_{USD} = 21,039 * 0.005 = 105$$

$$AddOn_{EUR} = 3,579 * 0.005 = 18$$

99.89 Finally, the interest rate asset class level add-on ($AddOn_{IR}$) can be recalculated by adding together the USD and EUR hedging set level add-ons as follows (expressed in USD thousands):

$$AddOn^{IR} = 105 + 18 = 123$$

99.90 The add-on for the commodity asset class must also be recalculated using the maturity factor for the margined netting. The effective notional for each trade ($Di = di * MF_i * \delta_i$) is set out in the table below:

Commodity Trade #	Notional (USD thousands)	Hedging set	Commodity type	Adjusted notional, d_i (USD, thousands)	Maturity Factor, MF_i	Delta, δ_i
1	10,000	Energy	Crude Oil	10,000	$1.5 * \sqrt{14/250}$	1
2	20,000	Energy	Crude Oil	20,000	$1.5 * \sqrt{14/250}$	-1
3	10,000	Metals	Silver	10,000	$1.5 * \sqrt{14/250}$	1

99.91 The combined effective notional for all derivatives with each hedging set that reference the same commodity type ($EN_{ComType}$) must be recalculated by adding together the trade level effective notionals above for each commodity type. This gives the following:

$$(1) \quad EN_{CrudeOil} = 3,550 + (-7,100) = -3,550$$

$$(2) \quad EN_{Silver} = 3,550$$

99.92

The add-on for each commodity type ($AddOn_{CrudeOil}$ and $AddOn_{Silver}$) within each hedging set calculated in [CRE99.69](#) must now be recalculated by multiplying the recalculated combined effective notional for that commodity by the relevant supervisory factor (ie 18%). Therefore:

$$(1) \quad AddOn_{CrudeOil} = -3,550 * 0.18 = -639$$

$$(2) \quad AddOn_{Silver} = 3550 * 0.18 = 639$$

99.93 Next, recalculate the add-on for energy and metals hedging sets using the recalculated add-ons for each commodity type above. As noted in [CRE99.72](#), given that there is only one commodity type with each hedging set, the hedging set level add on is simply equal to the absolute value of the commodity type add-on. That is:

$$AddOn_{Energy} = |AddOn_{CrudeOil}| = 639$$

$$AddOn_{Metals} = |AddOn_{Silver}| = 639$$

99.94 Finally, calculate the commodity asset class level add-on ($AddOn^{Commodity}$) by adding together the hedging set level add-ons:

$$AddOn^{Commodity} = \sum_{HS} AddOn_{HS} = 639 + 639 = 1,278$$

99.95 The aggregate netting set level add-on can now be calculated. As set out in [CRE52.25](#), it is calculated as the sum of the asset class level add-ons. That is for this example:

$$AddOn^{aggregate} = \sum_{assetclass} AddOn^{(assetclass)} = AddOn^{IR} + AddOn^{Commodity} = 123 + 1,278 = 1,401$$

99.96 As can be seen from [CRE99.82](#), the value of V-C is negative (ie -120) and so the multiplier will be less than 1. The multiplier is calculated using the formula set out in [CRE52.23](#), which for this example gives:

$$multiplier = \min \left(1; 0.05 + 0.95 * \exp \left(\frac{80 - 200}{2 * 0.95 * 1,401} \right) \right) = 0.958$$

99.97 Finally, aggregating the replacement cost and the PFE component and multiplying the result by the alpha factor of 1.4, the EAD is as follows (USD thousands):

$$EAD = 1.4 * (0 + 0.958 * 1,401) = 1,879$$

Effect of standard margin agreements on the calculation of replacement cost with SA-CCR

99.98 In this section ([CRE99.98](#) to [CRE99.115](#)), five examples are used to illustrate the operation of the SA-CCR in the context of standard margin agreements. In particular, they relate to the formulation of replacement cost for margined trades, as set out in [CRE52.18](#):

$$RC = \max\{V - C; TH + MTA - NICA; 0\}$$

Example 1

99.99 The bank currently has met all past variation margin (VM) calls so that the value of trades with its counterparty (€80 million) is offset by cumulative VM in the form of cash collateral received. There is a small "Minimum Transfer Amount" (MTA) of €1 million and a €0 "Threshold" (TH). Furthermore, an "Independent Amount" of €10 million is agreed in favour of the bank and none in favour of its counterparty (ie the NICA is €10 million. This leads to a credit support amount of €90 million, which is assumed to have been fully received as of the reporting date.

99.100 In this example, the three terms in the replacement formula are:

- (1) $V - C = \text{€80 million} - \text{€90 million} = \text{negative €10 million}.$
- (2) $TH + MTA - NICA = \text{€0} + \text{€1 million} - \text{€10 million} = \text{negative €9 million}.$
- (3) The third term in the replacement cost formula is always zero, which ensures that replacement cost is not negative.

99.101 The highest of the three terms (-€10 million, -€9 million, 0) is zero, so the replacement cost is zero. This is due to the large amount of collateral posted by the bank's counterparty.

Example 2

99.102 The counterparty has met all VM calls but the bank has some residual exposure due to the MTA of €1 million in its master agreement, and has a €0 TH. The value of the bank's trades with the counterparty is €80 million and the bank holds €79.5 million in VM in the form of cash collateral. In addition, the bank holds €10 million in independent collateral (here being an initial margin independent of VM, the latter of which is driven by mark-to-market (MTM) changes) from the counterparty. The counterparty holds €10 million in independent collateral from the bank, which is held by the counterparty in a non-segregated manner. The NICA is therefore €0 (= €10 million independent collateral held less €10 million independent collateral posted).

99.103 In this example, the three terms in the replacement formula are:

- (1) $V - C = €80 \text{ million} - (€79.5 \text{ million} + €10 \text{ million} - €10 \text{ million}) = €0.5 \text{ million}.$
- (2) $TH + MTA - NICA = €0 + €1 \text{ million} - €0 = €1 \text{ million}.$
- (3) The third term is zero.

99.104 The replacement cost is the highest of the three terms (€0.5 million, €1 million, 0) which is €1 million. This represents the largest exposure before collateral must be exchanged.

Bank as a clearing member

99.105 The case of central clearing can be viewed from a number of perspectives. One example in which the replacement cost formula for margined trades can be applied is when the bank is a clearing member and is calculating replacement cost for its own trades with a central counterparty (CCP). In this case, the MTA and TH are generally zero. VM is usually exchanged at least daily and the independent collateral amount (ICA) in the form of a performance bond or initial margin is held by the CCP.

Example 3

99.106 The bank, in its capacity as clearing member of a CCP, has posted VM to the CCP in an amount equal to the value of the trades it has with the CCP. The bank has posted cash as initial margin and the CCP holds the initial margin in a bankruptcy remote fashion. Assume that the value of trades with the CCP are negative €50 million, the bank has posted €50 million in VM and €10 million in initial margin (IM) to the CCP.

99.107 Given that the IM is held by the CCP in a bankruptcy-remote fashion, [CRE52.17](#) permits this amount to be excluded in the calculation of NICA. Therefore, the

NICA is €0 because the bankruptcy IM posted to the CCP can be excluded and the bank has not received any IM from the CCP. The value of C is calculated as the value of NICA plus any VM received less any VM posted. The value of C is thus negative €50 million (= €0 million + €0 million - €50 million).

99.108 In this example, the three terms in the replacement cost formula are:

- (1) $V - C = (-€50 \text{ million}) - (-€50 \text{ million}) = €0$. That is, the negative value of the trades has been fully offset by the VM posted by the bank.
- (2) $TH + MTA - NICA = €0 + €0 - €0 = €0$.
- (3) The third term is zero.

99.109 The replacement cost is therefore €0.

Example 4

99.110 Example 4 is the same as the Example 3, except that the IM posted to the CCP is not bankruptcy-remote. As a consequence, the €10 million of IM must be included in the calculation of NICA. Thus, NICA is negative €10 million (= ICA received of €0 minus unsegregated ICA posted of €10 million). Also, the value of C is negative €60 million (= NICA + VM received - VM posted = -€10 million + €0 - €50 million).

99.111 In this example, the three terms in the replacement formula are:

- (1) $V - C = (-€50 \text{ million}) - (-€60 \text{ million}) = €10 \text{ million}$. That is, the negative value of the trades is more than fully offset by collateral posted by the bank.
- (2) $TH + MTA - NICA = €0 + €0 - (-€10 \text{ million}) = €10 \text{ million}$.
- (3) The third term is zero.

99.112 The replacement cost is therefore €10 million. This represents the IM posted to the CCP which risks being lost upon default and bankruptcy of the CCP.

Example 5 : Maintenance Margin Agreement

99.113 Some margin agreements specify that a counterparty (in this case, a bank) must maintain a level of collateral that is a fixed percentage of the MTM of the

transactions in a netting set. For this type of margining agreement, ICA is the amount of collateral that the counterparty must maintain above the net MTM of the transactions.

99.114 For example, suppose the agreement states that a counterparty must maintain a collateral balance of at least 140% of the MTM of its transactions and that the MTM of the derivatives transactions is €50 in the bank's favour. ICA in this case is €20 ($= 140\% * €50 - €50$). Further, suppose there is no TH, no MTA, the bank has posted no collateral and the counterparty has posted €80 in cash collateral. In this example, the three terms of the replacement cost formula are:

- (1) $V - C = €50 - €80 = -€30$.
- (2) $MTA + TH - NICA = €0 + €0 - €20 = -€20$.
- (3) The third term is zero.

99.115 Thus, the replacement cost is zero in this example.

Equity investments in funds: calculation of risk-weighted assets using the look-through approach

99.116 Consider a fund that replicates an equity index. Moreover, assume the following:

- (1) The bank uses the Standardised Approach for credit risk when calculating its capital requirements for credit risk and for determining counterparty credit risk exposures it uses the SA-CCR.
- (2) The bank owns 20% of the shares of the fund.
- (3) The fund holds forward contracts on listed equities that are cleared through a qualifying CCP (with a notional amount of USD 100); and

(4) The fund presents the following balance sheet:

Assets	
Cash	USD 20
Government bonds (AAA-rated)	USD 30
VM receivable (ie collateral posted by the bank to the CCP in respect of the forward contracts)	USD 50
Liabilities	
Notes payable	USD 5
Equity	
Shares, retained earnings and other reserves	USD 95

99.117 The funds exposures will be risk weighted as follows:

- (1) The RWA for the cash (RWA_{cash}) are calculated as the exposure of USD 20 multiplied by the applicable standardised approach (SA) risk weight of 0%. Thus, $RWA_{\text{cash}} = \text{USD } 0$.
- (2) The RWA for the government bonds (RWA_{bonds}) are calculated as the exposure of USD 30 multiplied by the applicable SA risk weight of 0%. Thus, $RWA_{\text{bonds}} = \text{USD } 0$.
- (3) The RWA for the exposures to the listed equities underlying the forward contracts ($RWA_{\text{underlying}}$) are calculated by multiplying the following three amounts: (1) the SA credit conversion factor of 100% that is applicable to forward purchases; (2) the exposure to the notional of USD 100; and (3) the applicable risk weight for listed equities under the SA which is 100%. Thus, $RWA_{\text{underlying}} = 100\% * \text{USD } 100 * 100\% = \text{USD } 100$.

- (4) The forward purchase equities expose the bank to counterparty credit risk in respect of the market value of the forwards and the collateral posted that is not held by the CCP on a bankruptcy remote basis. For the sake of simplicity, this example assumes the application of SA-CCR results in an exposure value of USD 56. The RWA for counterparty credit risk (RWA_{CCR}) are determined by multiplying the exposure amount by the relevant risk weight for trade exposures to CCPs, which 2% in this case (see [CRE54](#) for the capital

requirements for bank exposures to CCPs). Thus, $RWA_{CCR} = \text{USD } 56 * 2\% = \text{USD } 1.12$. (Note: There is no credit valuation adjustment, or CVA, charge assessed since the forward contracts are cleared through a CCP.)

99.118 The total RWA of the fund are therefore $\text{USD } 101.12 = (0 + 0 + 100 + 1.12)$.

99.119 The leverage of a fund under the LTA is calculated as the ratio of the fund's total assets to its total equity, which in this examples is $100/95$.

99.120 Therefore, the RWA for the bank's equity investment in the fund is calculated as the product of the average risk weight of the fund, the fund's leverage and the size of the bank's equity investment. That is:

$$RWA = \frac{RWA_{fund}}{Total Assets_{fund}} * Leverage * Equity investment = \frac{101.12}{100} * \frac{100}{95} * (95 * 20\%) = \text{USD } 20.2$$

Calculation of risk-weighted assets using the MBA

99.121 Consider a fund with assets of USD 100, where it is stated in the mandate that the fund replicates an equity index. In addition to being permitted to invest its assets in either cash or equities, the mandate allows the fund to take long positions in equity index futures up to a maximum nominal amount equivalent to the size of the fund's balance sheet (USD 100). This means that the total on balance sheet and off balance sheet exposures of the fund can reach USD 200. Consider also that a maximum financial leverage (fund assets/fund equity) of 1.1 applies according to the mandate. The bank holds 20% of the shares of the fund, which represents an investment of USD 18.18.

99.122 First, the on-balance sheet exposures of USD 100 will be risk weighted according to the risk weights applied to equity exposures (risk weight = 100%), ie $RWA_{on-BS} = \text{USD } 100 * 100\% = \text{USD } 100$.

99.123 Second, we assume that the fund has exhausted its limit on derivative positions, ie USD 100 notional amount. The RWA for the maximum notional amount of underlying the derivatives positions calculated by multiplying the following three amounts: (1) the SA credit conversion factor of 100% that is applicable to forward purchases; (2) the maximum exposure to the notional of USD 100; and (3) the applicable risk weight for equities under the SA which is 100%. Thus, $RWA_{\text{underlying}} = 100\% * USD100 * 100\% = USD 100$.

99.124 Third, we would calculate the counterparty credit risk associated with the derivative contract. As set out in [CRE60.7\(3\)](#):

- (1) If we do not know the replacement cost related to the futures contract, we would approximate it by the maximum notional amount, ie USD 100.
- (2) If we do not know the aggregate add-on for potential future exposure, we would approximate this by 15% of the maximum notional amount (ie 15% of USD 100=USD 15).
- (3) The counterparty credit risk exposure is calculated by multiplying
 - (a) the sum of the replacement cost and aggregate add-on for potential future exposure; by
 - (b) 1.4, which is the prescribed value of alpha.

99.125 The counterparty credit risk exposure in this example, assuming the replacement cost and aggregate add-on amounts are unknown, is therefore USD 161 (= 1.4 * (100+15)). Assuming the futures contract is cleared through a qualifying CCP, a risk weight of 2% applies, so that $RWA_{\text{CCR}} = USD 161 * 2\% = USD 3.2$. There is no CVA charge assessed since the futures contract is cleared through a CCP.

99.126 The RWA of the fund is hence obtained by adding $RWA_{\text{on-BS}}$, $RWA_{\text{underlying}}$ and RWA_{CCR} , ie USD 203.2 (=100 + 100 + 3.2).

99.127 The RWA (USD 203.2) will be divided by the total assets of the fund (USD 100) resulting in an average risk-weight of 203.2%. The bank's total RWA associated with its equity investment is calculated as the product of the average risk weight of the fund, the fund's maximum leverage and the size of the bank's equity investment. That is the bank's total associated RWA are $203.2\% * 1.1 * USD 18.18 = USD 40.6$.

Calculation of the leverage adjustment

99.128 Consider a fund with assets of USD 100 that invests in corporate debt. Assume that the fund is highly levered with equity of USD 5 and debt of USD 95. Such a fund would have financial leverage of $100/5=20$. Consider the two cases below.

99.129 In Case 1 the fund specialises in low-rated corporate debt, it has the following balance sheet:

Assets	
Cash	USD 10
A+ to A- bonds	USD 20
BBB+ to BB- bonds	USD 30
Below BB- bonds	USD 40
Liabilities	
Debt	USD 95
Equity	
Shares, retained earnings and other reserves	USD 5

99.130 The average risk weight of the fund is $(USD10*0\% + USD20*50\% + USD30*100\% + USD40*150\%)/USD100 = 100\%$. The financial leverage of 20 would result in an effective risk weight of 2,000% for banks' investments in this highly levered fund, however, this is capped at a conservative risk weight of 1,250%.

99.131 In Case 2 the fund specialises in high-rated corporate debt, it has the following balance sheet:

Assets	
Cash	USD 5
AAA to AA- bonds	USD 75
A+ to A- bonds	USD 20
Liabilities	
Debt	USD 95
Equity	
Shares, retained earnings and other reserves	USD 5

99.132 The average risk weight of the fund is $(USD5 \cdot 0\% + USD75 \cdot 20\% + USD20 \cdot 50\%) / USD100 = 25\%$. The financial leverage of 20 results in an effective risk weight of 500%.

99.133 The above examples illustrate that the rate at which the 1,250% cap is reached depends on the underlying riskiness of the portfolio (as judged by the average risk weight) as captured by standardised approach risk weights or the IRB approach. For example, for a "risky" portfolio (100% average risk weight), the 1,250% limit is reached fairly quickly with a leverage of 12.5x, while for a "low risk" portfolio (25% average risk weight) this limit is reached at a leverage of 50x.