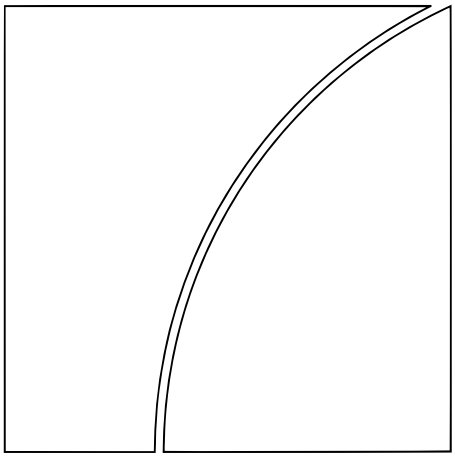
Basel Committee on Banking Supervision

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 01 January 2023

Changes due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020. Cross references to the securitisation chapters updated to include a reference to the chapter on NPL securitisations (CRE45) published on 26 November 2020. FAQs on climate related financial risks added on 8 December 2022. Updated to incorporate the FAQs published on 10 June 2025.

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, in jurisdictions that allow the use of external ratings for regulatory purposes, banks may, as a starting point, 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.
3. The credit risk mitigation techniques that are permitted to be recognised under the standardised approach are set out in chapter CRE22.

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 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 CRE45.
3. Exposures to central counterparties are addressed in CRE54.
4. Exposures arising from unsettled transactions and failed trades are addressed in CRE70.

Due diligence requirements

20.4

Consistent with the Committee's guidance on the assessment of credit risk and paragraphs SRP20.12 to SRP20.14 of the supervisory review process standard, banks must perform due diligence to ensure that they have an adequate understanding, at origination and thereafter on a regular basis (at least annually), of the risk profile and characteristics of their counterparties. In cases where ratings are used, due diligence is necessary to assess the risk of the exposure for risk management purposes and whether the risk weight applied is appropriate and prudent. The sophistication of the due diligence should be appropriate to the size and complexity of banks' activities. Banks must take reasonable and adequate steps to assess the operating and financial performance levels and trends through internal credit analysis and/or other analytics outsourced to a third party, as appropriate for each counterparty. Banks must be able to access information about their counterparties on a regular basis to complete due diligence analyses.

20.5

For exposures to entities belonging to consolidated groups, due diligence should, to the extent possible, be performed at the solo entity level to which there is a credit exposure. In evaluating the repayment capacity of the solo entity, banks are expected to take into account the support of the group and the potential for it to be adversely impacted by problems in the group.

20.6

Banks should have in place effective internal policies, processes, systems and controls to ensure that the appropriate risk weights are assigned to counterparties. Banks must be able to demonstrate to their supervisors that their due diligence analyses are appropriate. As part of their supervisory review, supervisors should ensure that banks have appropriately performed their due diligence analyses, and should take supervisory measures where these have not been done.

Exposures to sovereigns

20.7

Exposures to sovereigns and their central banks will be risk-weighted as follows:

Risk weight table for sovereigns and central banks — Table 1

External rating	AAA to AA–	A+ to A–	BBB+ to BBB–	BB+ to B–	Below B–	Unrated
Risk weight	0%	20%	50%	100%	150%	100%

20.8

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 funded in that currency. Where this discretion is exercised, other national supervisors 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.

20.9

For the purpose of risk-weighting exposures to 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 methodology agreed by the Organisation for Economic Cooperation and Development (OECD). 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". 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.

Risk weight table for sovereigns and central banks — Table 2

ECA risk scores	0 to 1	2	3	4 to 6	7

Risk weight	0%	20%	50%	100%	150%

20.10

Exposures to 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.

Exposures to non-central government public sector entities (PSEs)

20.11

Exposures to domestic PSEs will be risk-weighted at national discretion, according to either of the following two options.

Risk weight table for PSEs
Option 1: Based on external rating of sovereign Table 3

External rating of the 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%

Risk weight table for PSEs
Option 2: Based on external rating of PSE Table 4

External rating of the PSE	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%

20.12

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

Exposures to multilateral development banks (MDBs)

20.13

For the purposes of calculating capital requirements, a Multilateral Development Bank (MDB) is an institution created by a group of countries that provides financing and professional advice for economic and social development projects. MDBs have large sovereign memberships and may include both developed and/or developing countries. Each MDB has its own independent legal and operational status, but with a similar mandate and a considerable number of joint

owners.

20.14

A 0% risk weight will be applied to exposures to MDBs that fulfil to the Committee's satisfaction the eligibility criteria provided below. 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 ratings must be AAA;
2. either the shareholder structure comprises a significant proportion of sovereigns with long-term issuer external ratings of AA– or better, or the majority of the MDB's fund-raising is 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.

20.15

For exposures to all other MDBs, banks incorporated in jurisdictions that allow the use of external ratings for regulatory purposes will assign to their MDB exposures the corresponding "base" risk weights determined by the external ratings according to Table 5. Banks incorporated in jurisdictions that do not allow external ratings for regulatory purposes will risk-weight such exposures at 50%.

Risk weight table for MDB exposures Table 5

External rating of counterparty	AAA to AA–	A+ to A–	BBB+ to BBB–	BB+ to B–	Below B–	Unrated
"Base" risk weight	20%	30%	50%	100%	150%	50%

Exposures to banks

20.16

For the purposes of calculating capital requirements, a bank exposure is defined as a claim (including loans and senior debt instruments, unless considered as subordinated debt for the purposes of CRE20.60) on any financial institution that is licensed to take deposits from the public and is subject to appropriate prudential standards and level of supervision. The treatment associated with subordinated bank debt and equities is addressed in CRE20.53 to CRE20.60.

Risk weight determination

20.17

Bank exposures will be risk-weighted based on the following hierarchy:

1. External Credit Risk Assessment Approach (ECRA): This approach is for banks incorporated in jurisdictions that allow the use of external ratings for regulatory purposes. It applies to all their rated exposures to banks. Banks will apply CRE21.1 to CRE21.21 to determine which rating can be used and for which exposures.
2. Standardised Credit Risk Assessment Approach (SCRA): This approach is for all exposures of banks incorporated in jurisdictions that do not allow the use of external ratings for regulatory purposes. For exposures to banks that are unrated, this approach also applies to banks incorporated in jurisdictions that allow the use of external ratings for regulatory purposes.

External Credit Risk Assessment Approach (ECRA)

20.18

Banks incorporated in jurisdictions that allow the use of external ratings for regulatory purposes will assign to their rated bank exposures the corresponding "base" risk weights determined by the external ratings according to Table 6. Such ratings must not incorporate assumptions of implicit government support, unless the rating refers to a public bank owned by its government. Banks incorporated in jurisdictions that allow the use of external ratings for regulatory purposes must only apply SCRA for their unrated bank exposures, in accordance with CRE20.21.

Risk weight table for bank exposures
External Credit Risk Assessment Approach — Table 6

External rating of counterparty	AAA to AA–	A+ to A–	BBB+ to BBB–	BB+ to B–	Below B–
"Base" risk weight	20%	30%	50%	100%	150%
Risk weight for short-term exposures	20%	20%	20%	50%	150%

20.19

Exposures to banks with an original maturity of three months or less, as well as exposures to banks that arise from the movement of goods across national borders with an original maturity of six months or less can be assigned a risk weight that correspond to the risk weights for short term exposures in Table 6.

20.20

Banks must perform due diligence to ensure that the external ratings appropriately and conservatively reflect the creditworthiness of the bank counterparties. If the due diligence analysis reflects higher risk characteristics than that implied by the external rating bucket of the exposure (ie AAA to AA–; A+ to A– etc), the bank must assign a risk weight at least one

bucket higher than the "base" risk weight determined by the external rating. Due diligence analysis must never result in the application of a lower risk weight than that determined by the external rating.

Standardised Credit Risk Assessment Approach (SCRA)

20.21

Banks incorporated in jurisdictions that do not allow the use of external ratings for regulatory purposes will apply the SCRA to all their bank exposures. The SCRA also applies to unrated bank exposures for banks incorporated in jurisdictions that allow the use of external ratings for regulatory purposes. The SCRA requires banks to classify bank exposures into one of three risk-weight buckets (ie Grades A, B and C) and assign the corresponding risk weights in Table 7. For the purposes of the SCRA only, “published minimum regulatory requirements” in CRE20.22 to CRE20.30 excludes liquidity standards.

Risk weight table for bank exposures
Standardised Credit Risk Assessment Approach — Table 7

Credit risk assessment of counterparty	Grade A	Grade B	Grade C
“Base” risk weight	40%	75%	150%
Risk weight for short-term exposures	20%	50%	150%

SCRA: Grade A

20.22

Grade A refers to exposures to banks, where the counterparty bank has adequate capacity to meet their financial commitments (including repayments of principal and interest) in a timely manner, for the projected life of the assets or exposures and irrespective of the economic cycles and business conditions.

20.23

A counterparty bank classified into Grade A must meet or exceed the published minimum regulatory requirements and buffers established by its national supervisor as implemented in the jurisdiction where it is incorporated, except for bank-specific minimum regulatory requirements or buffers that may be imposed through supervisory actions (eg via the Supervisory Review Process, SRP) and not made public. If such minimum regulatory requirements and buffers (other than bank-specific minimum requirements or buffers) are not publicly disclosed or otherwise made available by the counterparty bank, then the counterparty bank must be assessed as Grade B or lower.

20.24

If as part of its due diligence, a bank assesses that a counterparty bank does not meet the definition of Grade A in CRE20.22 and CRE20.23, exposures to the counterparty bank must be

classified as Grade B or Grade C.

SCRA: Grade B

20.25

Grade B refers to exposures to banks, where the counterparty bank is subject to substantial credit risk, such as repayment capacities that are dependent on stable or favourable economic or business conditions.

20.26

A counterparty bank classified into Grade B must meet or exceed the published minimum regulatory requirements (excluding buffers) established by its national supervisor as implemented in the jurisdiction where it is incorporated, except for bank-specific minimum regulatory requirements that may be imposed through supervisory actions (eg via the Supervisory Review Process, SRP) and not made public. If such minimum regulatory requirements are not publicly disclosed or otherwise made available by the counterparty bank then the counterparty bank must be assessed as Grade C.

20.27

Banks will classify all exposures that do not meet the requirements outlined in CRE20.22 and CRE20.23 into Grade B, unless the exposure falls within Grade C under CRE20.28 to CRE20.30.

SCRA: Grade C

20.28

Grade C refers to higher credit risk exposures to banks, where the counterparty bank has material default risks and limited margins of safety. For these counterparties, adverse business, financial, or economic conditions are very likely to lead, or have led, to an inability to meet their financial commitments.

20.29

At a minimum, if any of the following triggers is breached, a bank must classify the exposure into Grade C:

1. The counterparty bank does not meet the criteria for being classified as Grade B with respect to its published minimum regulatory requirements, as set out in CRE20.25 and CRE20.26; or
2. Where audited financial statements are required, the external auditor has issued an adverse audit opinion or has expressed substantial doubt about the counterparty bank's ability to continue as a going concern in its financial statements or audited reports within the previous 12 months.

20.30

Even if the triggers set out in CRE20.29 are not breached, a bank may assess that the counterparty bank meets the definition in CRE20.28. In that case, the exposure to such counterparty bank must be classified into Grade C.

20.31

Exposures to banks with an original maturity of three months or less, as well as exposures to banks that arise from the movement of goods across national borders with an original maturity of six months or less, can be assigned a risk weight that correspond to the risk weights for short term exposures in Table 7.

20.32

To reflect transfer and convertibility risk under the SCRA, a risk-weight floor based on the risk weight applicable to exposures to the sovereign of the country where the bank counterparty is incorporated will be applied to the risk weight assigned to bank exposures. The sovereign floor applies when: (i) the exposure is not in the local currency of the jurisdiction of incorporation of the debtor bank; and (ii) for a borrowing booked in a branch of the debtor bank in a foreign jurisdiction, when the exposure is not in the local currency of the jurisdiction in which the branch operates. The sovereign floor will not apply to short-term (ie with a maturity below one year) self-liquidating, trade-related contingent items that arise from the movement of goods.

Exposures to covered bonds

20.33

Covered bonds are bonds issued by a bank or mortgage institution that are subject by law to special public supervision designed to protect bond holders. Proceeds deriving from the issue of these bonds must be invested in conformity with the law in assets which, during the whole period of the validity of the bonds, are capable of covering claims attached to the bonds and which, in the event of the failure of the issuer, would be used on a priority basis for the reimbursement of the principal and payment of the accrued interest.

Eligible assets

20.34

In order to be eligible for the risk weights set out in CRE20.38, the underlying assets (the cover pool) of covered bonds as defined in CRE20.33 shall meet the requirements set out in CRE20.37 and shall include any of the following:

1. claims on, or guaranteed by, sovereigns, their central banks, public sector entities or multilateral development banks;
2. claims secured by residential real estate that meet the criteria set out in CRE20.71 and with a loan-to-value ratio of 80% or lower;
3. claims secured by commercial real estate that meets the criteria set out in CRE20.71 and with a loan-to-value ratio of 60% or lower; or
4. claims on, or guaranteed by banks that qualify for a 30% or lower risk weight. However, such assets cannot exceed 15% of covered bond issuances.

20.35

The nominal value of the pool of assets assigned to the covered bond instrument(s) by its issuer should exceed its nominal outstanding value by at least 10%. The value of the pool of assets for this purpose does not need to be that required by the legislative framework. However, if the legislative framework does not stipulate a requirement of at least 10%, the

issuing bank needs to publicly disclose on a regular basis that their cover pool meets the 10% requirement in practice. In addition to the primary assets listed in this paragraph, additional collateral may include substitution assets (cash or short term liquid and secure assets held in substitution of the primary assets to top up the cover pool for management purposes) and derivatives entered into for the purposes of hedging the risks arising in the covered bond program.

20.36

The conditions set out in CRE20.34 and CRE20.35 must be satisfied at the inception of the covered bond and throughout its remaining maturity.

Disclosure requirements

20.37

Exposures in the form of covered bonds are eligible for the treatment set out in CRE20.38, provided that the bank investing in the covered bonds can demonstrate to its national supervisors that:

1. it receives portfolio information at least on:
    1. the value of the cover pool and outstanding covered bonds;
    2. the geographical distribution and type of cover assets, loan size, interest rate and currency risks;
    3. the maturity structure of cover assets and covered bonds; and
    4. the percentage of loans more than 90 days past due; and
2. the issuer makes the information referred to in point (1) available to the bank at least semi-annually.

20.38

Covered bonds that meet the criteria set out in the CRE20.34 to CRE20.37 shall be risk-weighted based on the issue-specific rating or the issuer's risk weight according to the rules outlined in CRE21.1 to CRE21.21. For covered bonds with issue-specific ratings, the risk weight shall be determined according to Table 8. For unrated covered bonds, the risk weight would be inferred from the issuer's ECRA or SCRA risk weight according to Table 9.

Risk weight table for rated covered bond exposures — Table 8

Issue-specific rating of the covered bond	AAA to AA–	A+ to A–	BBB+ to BBB–	BB+ to B–	Below B–
"Base" risk weight	10%	20%	20%	50%	100%

Risk weight table for unrated covered bond exposures — Table 9

Risk weight of the issuing bank	20%	30%	40%	50%	75%	100%	150%
"Base" risk weight	10%	15%	20%	25%	35%	50%	100%

20.39

Banks must perform due diligence to ensure that the external ratings appropriately and conservatively reflect the creditworthiness of the covered bond and the issuing bank. If the due diligence analysis reflects higher risk characteristics than that implied by the external rating bucket of the exposure (ie AAA to AA–; A+ to A– etc), the bank must assign a risk weight at least one bucket higher than the "base" risk weight determined by the external rating. Due diligence analysis must never result in the application of a lower risk weight than that determined by the external rating.

Exposures to securities firms and other financial institutions

20.40

Exposures to securities firms and other financial institutions will be treated as exposures to banks provided that these firms are subject to prudential standards and a level of supervision equivalent to those applied to banks (including capital and liquidity requirements). National supervisors should determine whether the regulatory and supervisory framework governing securities firms and other financial institutions in their own jurisdictions is equivalent to that which is applied to banks in their own jurisdictions. Where the regulatory and supervisory framework governing securities firms and other financial institutions is determined to be equivalent to that applied to banks in a jurisdiction, other national supervisors may allow their banks to risk weight such exposures to securities firms and other financial institutions as exposures to banks. Exposures to all other securities firms and financial institutions will be treated as exposures to corporates.

Exposures to corporates

20.41

For the purposes of calculating capital requirements, exposures to corporates include exposures (loans, bonds, receivables, etc) to incorporated entities, associations, partnerships, proprietorships, trusts, funds and other entities with similar characteristics, except those which qualify for one of the other exposure classes. The treatment associated with subordinated debt and equities of these counterparties is addressed in CRE20.53 to CRE20.62. The corporate exposure class includes exposures to insurance companies and other financial corporates that do not meet the definitions of exposures to banks, or securities firms and other financial institutions, as determined in CRE20.16 and CRE20.40 respectively. The corporate exposure class does not include exposures to individuals. The corporate exposure class differentiates between the following subcategories:

1. General corporate exposures;
2. Specialised lending exposures, as defined in CRE20.48.

General corporate exposures

20.42

For corporate exposures of banks incorporated in jurisdictions that allow the use of external ratings for regulatory purposes, banks will assign "base" risk weights according to Table 10.

Banks must perform due diligence to ensure that the external ratings appropriately and conservatively reflect the creditworthiness of the counterparties. Banks which have assigned risk weights to their rated bank exposures based on CRE20.18 must assign risk weights for all their corporate exposures according to Table 10. If the due diligence analysis reflects higher risk characteristics than that implied by the external rating bucket of the exposure (ie AAA to AA–; A+ to A– etc), the bank must assign a risk weight at least one bucket higher than the "base" risk weight determined by the external rating. Due diligence analysis must never result in the application of a lower risk weight than that determined by the external rating.

20.43

Unrated corporate exposures of banks incorporated in jurisdictions that allow the use of external ratings for regulatory purposes will receive a 100% risk weight, with the exception of unrated exposures to corporate small or medium-sized entities (SMEs), as described in CRE20.47.

Risk weight table for corporate exposures
Jurisdictions that use external ratings for regulatory purposes Table 10

External rating of counterparty	AAA to AA–	A+ to A–	BBB+ to BBB–	BB+ to BB–	Below BB–	Unrated
“Base” risk weight	20%	50%	75%	100%	150%	100%

20.44

For corporate exposures of banks incorporated in jurisdictions that do not allow the use of external ratings for regulatory purposes, banks will assign a 100% risk weight to all corporate exposures, with the exception of:

1. exposures to corporates identified as “investment grade” in CRE20.46; and
2. exposures to corporate SMEs in CRE20.47.

20.45

Banks must apply the treatment set out in CRE20.44 to their corporate exposures if they have assigned risk weights to their rated bank exposures based on CRE20.21.

20.46

Banks in jurisdictions that do not allow the use of external ratings for regulatory purposes may assign a 65% risk weight to exposures to "investment grade" corporates. An "investment grade" corporate is a corporate entity that has adequate capacity to meet its financial commitments in a timely manner and its ability to do so is assessed to be robust against adverse changes in the economic cycle and business conditions. When making this determination, the bank should assess the corporate entity against the investment grade definition taking into account the complexity of its business model, performance against industry and peers, and risks posed by the entity's operating environment. Moreover, the corporate entity (or its parent company) must have securities outstanding on a recognised securities exchange.

20.47

Corporate SMEs are defined as corporate exposures where the reported annual sales for the consolidated group of which the corporate counterparty is a part is less than or equal to €50 million for the most recent financial year. In some jurisdictions (eg emerging economies), national supervisors might deem it appropriate to define SMEs in a more conservative manner (ie with a lower level of sales). For unrated exposures to corporate SMEs in jurisdictions that allow the use of external ratings for regulatory purposes, and for all exposures to corporate SMEs in jurisdictions that do not allow the use of external ratings for regulatory purposes, an 85% risk weight will be applied. Exposures to SMEs that meet the criteria in CRE20.65(1) to CRE20.65(3) will be treated as regulatory retail SME exposures and risk weighted at 75%.

Specialised lending

20.48

A corporate exposure will be treated as a specialised lending exposure if such lending possesses some or all of the following characteristics, either in legal form or economic substance:

1. The exposure is not related to real estate and is within the definitions of object finance, project finance or commodities finance under CRE20.49. If the activity is related to real estate, the treatment would be determined in accordance with CRE20.69 to CRE20.91;
2. The exposure is typically to an entity (often a special purpose vehicle (SPV)) that was created specifically to finance and/or operate physical assets;
3. The borrowing entity has few 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. The primary source of repayment of the obligation is the income generated by the asset(s), rather than the independent capacity of the borrowing entity; and
4. The terms of the obligation give the lender a substantial degree of control over the asset(s) and the income that it generates.

20.49

Exposures described in CRE20.48 will be classified in one of the following three subcategories of specialised lending:

1. Project finance refers to the 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 loan. This type of financing is usually for large, complex and expensive installations such as power plants, chemical processing plants, mines, transportation infrastructure, environment, media, and telecoms. Project finance may take the form of financing the construction of a new capital installation, or refinancing of an existing installation, with or without improvements.
2. Object finance refers to the method of funding the acquisition of equipment (eg ships, aircraft, satellites, railcars, and fleets) where the repayment of the loan is dependent on the cash flows generated by the specific assets that have been financed and pledged or assigned to the lender.
3. Commodities finance refers to short-term lending to finance reserves, inventories, or receivables of exchange-traded commodities (eg crude oil, metals, or crops), where the loan will be repaid from the proceeds of the sale of the commodity and the borrower has no independent capacity to repay the loan.

20.50

Banks incorporated in jurisdictions that allow the use of external ratings for regulatory purposes will assign to their specialised lending exposures the risk weights determined by the issue-specific external ratings, if these are available, according to Table 10. Issuer ratings must not be used (ie CRE21.12 does not apply in the case of specialised lending exposures).

20.51

For specialised lending exposures for which an issue-specific external rating is not available, and for all specialised lending exposures of banks incorporated in jurisdictions that do not allow the use of external ratings for regulatory purposes, the following risk weights will apply:

1. Object and commodities finance exposures will be risk-weighted at 100%;
2. Project finance exposures will be risk-weighted at 130% during the pre-operational phase and 100% during the operational phase. Project finance exposures in the operational phase which are deemed to be high quality, as described in CRE20.52, will be risk weighted at 80%. For this purpose, operational phase is defined as the phase in which the entity that was specifically created to finance the project has
    1. a positive net cash flow that is sufficient to cover any remaining contractual obligation, and
    2. declining long-term debt.

20.52

A high quality project finance exposure refers to an exposure to a project finance entity that is able to meet its financial commitments in a timely manner and its ability to do so is assessed to be robust against adverse changes in the economic cycle and business conditions. The following conditions must also be met:

1. The project finance entity is restricted from acting to the detriment of the creditors (eg by not being able to issue additional debt without the consent of existing creditors);
2. The project finance entity has sufficient reserve funds or other financial arrangements to cover the contingency funding and working capital requirements of the project;
3. The revenues are availability-based or subject to a rate-of-return regulation or take-or-pay contract;
4. The project finance entity's revenue depends on one main counterparty and this main counterparty shall be a central government, PSE or a corporate entity with a risk weight of 80% or lower;
5. The contractual provisions governing the exposure to the project finance entity provide for a high degree of protection for creditors in case of a default of the project finance entity;
6. The main counterparty or other counterparties which similarly comply with the eligibility criteria for the main counterparty will protect the creditors from the losses resulting from a termination of the project;
7. All assets and contracts necessary to operate the project have been pledged to the creditors to the extent permitted by applicable law; and
8. Creditors may assume control of the project finance entity in case of its default.

Subordinated debt, equity and other capital instruments

20.53

The treatment described in CRE20.57 to CRE20.60 applies to subordinated debt, equity and other regulatory capital instruments issued by either corporates or banks, provided that such instruments are not deducted from regulatory capital or risk-weighted at 250% according to CAP30, or risk weighted at 1250% according to CRE20.62. It also excludes equity investments in funds treated under CRE60.

20.54

Equity exposures are defined on the basis of the economic substance of the instrument. They include both direct and indirect ownership interests, whether voting or non-voting, in the assets and income of a commercial enterprise or of a financial institution that is not consolidated or deducted. 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.

20.55

In addition to instruments classified as equity as a result of paragraph CRE20.54, the following instruments must be categorised as an equity exposure:

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

20.56

Debt obligations and other securities, partnerships, derivatives or other vehicles structured with the intent of conveying the economic substance of equity ownership are considered an equity holding. This includes liabilities from which the return is linked to that of equities. Conversely, equity investments that are structured with the intent of conveying the economic

substance of debt holdings or securitisation exposures would not be considered an equity holding.

20.57

Banks will assign a risk weight of 400% to speculative unlisted equity exposures described in CRE20.58 and a risk weight of 250% to all other equity holdings, with the exception of those equity holdings referred to in CRE20.59.

20.58

Speculative unlisted equity exposures are defined as equity investments in unlisted companies that are invested for short-term resale purposes or are considered venture capital or similar investments which are subject to price volatility and are acquired in anticipation of significant future capital gains.

20.59

National supervisors may allow banks to assign a risk weight of 100% to equity holdings made pursuant to national legislated programmes that provide significant subsidies for the investment to the bank and involve government oversight and restrictions on the equity investments. Such treatment can only be accorded to equity holdings up to an aggregate of 10% of the bank's Total capital. Examples 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.

20.60

Banks will assign a risk weight of 150% to subordinated debt and capital instruments other than equities. Any liabilities that meet the definition of "other TLAC liabilities" in CAP30.3 to CAP30.5 and that are not deducted from regulatory capital are considered to be subordinated debt for the purposes of this paragraph.

20.61

Notwithstanding the risk weights specified in CRE20.57 to CRE20.60, the risk weight for investments in significant minority- or majority-owned and –controlled commercial entities depends upon the application of 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.

20.62

Investments in significant minority- or majority-owned and –controlled commercial entities below the materiality thresholds in CRE20.61 must be risk-weighted as specified in CRE20.54 to CRE20.60. Investments in excess of the materiality thresholds must be risk-weighted at 1250%.

Retail exposure class

20.63

The retail exposure class excludes exposures within the real estate exposure class. The retail

exposure class includes the following types of exposures:

1. exposures to an individual person or persons; and
2. exposures to SMEs (as defined in CRE20.47) that meet the “regulatory retail” criteria set out in CRE20.65(1) to CRE20.65(3) below. Exposures to SMEs that do not meet these criteria will be treated as corporate SMEs exposures under CRE20.47.

20.64

Exposures within the retail exposure class will be treated according to CRE20.65 to CRE20.67 below. For the purpose of determining risk weighted assets, the retail exposure class consists of the follow three sets of exposures:

1. “Regulatory retail” exposures that do not arise from exposures to “transactors” (as defined in CRE20.66).
2. “Regulatory retail” exposures to “transactors”.
3. “Other retail” exposures.

20.65

“Regulatory retail” exposures are defined as retail exposures that meet all of the criteria listed below:

1. Product criterion: the exposure takes the form of any of the following: revolving credits and lines of credit (including credit cards, charge 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. Mortgage loans, derivatives and other securities (such as bonds and equities), whether listed or not, are specifically excluded from this category.
2. Low value of individual exposures: the maximum aggregated exposure to one counterparty cannot exceed an absolute threshold of €1 million.
3. Granularity criterion: no aggregated exposure to one counterparty can exceed 0.2% of the overall regulatory retail portfolio, unless national supervisors have determined another method to ensure satisfactory diversification of the regulatory retail portfolio. Defaulted retail exposures are to be excluded from the overall regulatory retail portfolio when assessing the granularity criterion.

20.66

“Transactors” are obligors in relation to facilities such as credit cards and charge cards where the balance has been repaid in full at each scheduled repayment date for the previous 12 months. Obligors in relation to overdraft facilities would also be considered as transactors if there has been no drawdown over the previous 12 months.

20.67

“Other retail” exposures are defined as exposures to an individual person or persons that do not meet all of the regulatory retail criteria in CRE20.65.

20.68

The risk weights that apply to exposures in the retail asset class are as follows:

1. Regulatory retail exposures that do not arise from exposures to transactors (as defined in

CRE20.66) will be risk weighted at 75%.

2. Regulatory retail exposures that arise from exposures to transactors (as defined in CRE20.66) will be risk weighted at 45%.
3. Other retail exposures will be risk weighted at 100%.

Real estate exposure class

20.69

Real estate is immovable property that is land, including agricultural land and forest, or anything treated as attached to land, in particular buildings, in contrast to being treated as movable/personal property. The real estate exposure asset class consists of:

1. Exposures secured by real estate that are classified as “regulatory real estate” exposures.
2. Exposures secured by real estate that are classified as “other real estate” exposures.
3. Exposures that are classified as “land acquisition, development and construction” (ADC) exposures.

20.70

"Regulatory real estate" exposures consist of:

1. "Regulatory residential real estate" exposures that are not "materially dependent on cash flows generated by the property".
2. "Regulatory residential real estate" exposures that are "materially dependent on cash flows generated by the property".
3. "Regulatory commercial real estate" exposures that are not "materially dependent on cash flows generated by the property".
4. "Regulatory commercial real estate" exposures that are "materially dependent on cash flows generated by the property".

Regulatory real estate exposures

20.71

For an exposure secured by real estate to be classified as a “regulatory real estate” exposure, the loan must meet the following requirements:

1. Finished property: the exposure must be secured by a fully completed immovable property. This requirement does not apply to forest and agricultural land. Subject to national discretion, supervisors may allow this criteria to be met by loans to individuals that are secured by residential property under construction or land upon which residential property would be constructed, provided that: (i) the property is a one-to-four family residential housing unit that will be the primary residence of the borrower and the lending to the individual is not, in effect, indirectly financing land acquisition, development and construction exposures described in CRE20.90; or (ii) sovereign or PSEs involved have the legal powers and ability to ensure that the property under construction will be finished.
2. Legal enforceability: any claim on the property taken must be legally enforceable in all

relevant jurisdictions. The collateral agreement and the legal process underpinning it must be such that they provide for the bank to realise the value of the property within a reasonable time frame.

3. Claims over the property: the loan is a claim over the property where the lender bank holds a first lien over the property, or a single bank holds the first lien and any sequentially lower ranking lien(s) (ie there is no intermediate lien from another bank) over the same property. However, in jurisdictions where junior liens provide the holder with a claim for collateral that is legally enforceable and constitute an effective credit risk mitigant, junior liens held by a different bank than the one holding the senior lien may also be recognised. In order to meet the above requirements, the national frameworks governing liens should ensure the following: (i) each bank holding a lien on a property can initiate the sale of the property independently from other entities holding a lien on the property; and (ii) where the sale of the property is not carried out by means of a public auction, entities holding a senior lien take reasonable steps to obtain a fair market value or the best price that may be obtained in the circumstances when exercising any power of sale on their own (ie it is not possible for the entity holding the senior lien to sell the property on its own at a discounted value in detriment of the junior lien).
4. Ability of the borrower to repay: the borrower must meet the requirements set according to CRE20.73.
5. Prudent value of property: the property must be valued according to the criteria in CRE20.74 to CRE20.76 for determining the value in the loan-to-value ratio (LTV). Moreover, the value of the property must not depend materially on the performance of the borrower.
6. Required documentation: all the information required at loan origination and for monitoring purposes must be properly documented, including information on the ability of the borrower to repay and on the valuation of the property.

20.72

The risk weights for regulatory real estate exposures will apply to jurisdictions where structural factors result in sustainably low credit losses associated with the exposures to the real estate market. National supervisors should evaluate whether the risk weights in the corresponding risk weight tables are too low for these types of exposures in their jurisdictions based on default experience and other factors such as market price stability. Supervisors may require banks in their jurisdictions to increase these risk weights as appropriate.

20.73

National supervisors should ensure that banks put in place underwriting policies with respect to the granting of mortgage loans that include the assessment of the ability of the borrower to repay. Underwriting policies must define a metric(s) (such as the loan’s debt service coverage ratio) and specify its (their) corresponding relevant level(s) to conduct such assessment. Underwriting policies must also be appropriate when the repayment of the mortgage loan depends materially on the cash flows generated by the property, including relevant metrics (such as an occupancy rate of the property). National supervisors may provide guidance on appropriate definitions and levels for these metrics in their jurisdictions.

20.74

The LTV is the amount of the loan divided by the value of the property. When calculating the LTV, the loan amount will be reduced as the loan amortises. The value of the property will be maintained at the value measured at origination, with the following exceptions:

1. The national supervisors elect to require banks to revise the property value downward. If the value has been adjusted downwards, a subsequent upwards adjustment can be made but not to a higher value than the value at origination.
2. The value must be adjusted if an extraordinary, idiosyncratic event occurs resulting in a permanent reduction of the property value.
3. Modifications made to the property that unequivocally increase its value could also be considered in the LTV.

20.75

The LTV must be prudently calculated in accordance with the following requirements:

1. Amount of the loan: includes the outstanding loan amount and any undrawn committed amount of the mortgage loan. The loan amount must be calculated gross of any provisions and other risk mitigants, except for pledged deposits accounts with the lending bank that meet all requirements for on-balance sheet netting and have been unconditionally and irrevocably pledged for the sole purposes of redemption of the mortgage loan.
2. Value of the property: the valuation must be appraised independently using prudently conservative valuation criteria. To ensure that the value of the property is appraised in a prudently conservative manner, the valuation must exclude expectations on price increases and must be adjusted to take into account the potential for the current market price to be significantly above the value that would be sustainable over the life of the loan. National supervisors should provide guidance setting out prudent valuation criteria where such guidance does not already exist under national law. If a market value can be determined, the valuation should not be higher than the market value.

20.76

A guarantee or financial collateral may be recognised as a credit risk mitigant in relation to exposures secured by real estate if it qualifies as eligible collateral under the credit risk mitigation framework. This may include mortgage insurance if it meets the operational requirements of the credit risk mitigation framework for a guarantee. Banks may recognise these risk mitigants in calculating the exposure amount; however, the LTV bucket and risk weight to be applied to the exposure amount must be determined before the application of the appropriate credit risk mitigation technique.

Definition of “regulatory residential real estate” exposures

20.77

A “regulatory residential real estate” exposure is a regulatory real estate exposure that is secured by a property that has the nature of a dwelling and satisfies all applicable laws and regulations enabling the property to be occupied for housing purposes (ie residential property).

Definition of “regulatory commercial real estate” exposures

20.78

A “regulatory commercial real estate” exposure is regulatory real estate exposure that is not a regulatory residential real estate exposure.

Definition of exposures that are “materially dependent on cash flows generated by the property”

20.79

Regulatory real estate exposures (both residential and commercial) are classified as exposures that are “materially dependent on cash flows generated by the property” when the prospects for servicing the loan materially depend on the cash flows generated by the property securing the loan rather than on the underlying capacity of the borrower to service the debt from other sources. The primary source of these cash flows would generally be lease or rental payments, or the sale of the property. The distinguishing characteristic of these exposures compared to other regulatory real estate exposures is that both the servicing of the loan and the prospects for recovery in the event of default depend materially on the cash flows generated by the property securing the exposure.

20.80

It is expected that the material dependence condition, set out in CRE20.79 above, would predominantly apply to loans to corporates, SMEs or SPVs, but is not restricted to those borrower types. As an example, a loan may be considered materially dependent if more than 50% of the income from the borrower used in the bank's assessment of its ability to service the loan is from cash flows generated by the residential property. National supervisors may provide further guidance setting out criteria on how material dependence should be assessed for specific exposure types.

20.81

As exceptions to the definition contained in CRE20.79 above, the following types of regulatory real estate exposures are not classified as exposures that are materially dependent on cash flows generated by the property:

1. An exposure secured by a property that is the borrower’s primary residence;
2. An exposure secured by an income-producing residential housing unit, to an individual who has mortgaged less than a certain number of properties or housing units, as specified by national supervisors;
3. An exposure secured by residential real estate property to associations or cooperatives of individuals that are regulated under national law and exist with the only purpose of granting its members the use of a primary residence in the property securing the loans; and
4. An exposure secured by residential real estate property to public housing companies and not-for-profit associations regulated under national law that exist to serve social purposes and to offer tenants long-term housing.

Risk weights for regulatory residential real estate exposures that are not materially dependent on cash flows generated by the property

20.82

For regulatory residential real estate exposures that are not materially dependent on cash flow generated by the property, the risk weight to be assigned to the total exposure amount will be determined based on the exposure’s LTV ratio in Table 11 below. The use of the risk weights in Table 11 is referred to as the “whole loan” approach.

Whole loan approach risk weights for regulatory residential real estate exposures that are not materially dependent on cash flows generated by the property Table 11

	LTV ≤ 50%	50% < LTV ≤ 60%	60% < LTV ≤ 80%	80% < LTV ≤ 90%	90% < LTV ≤ 100%	LTV > 100%
Risk weight	20%	25%	30%	40%	50%	70%

20.83

As an alternative to the whole loan approach for regulatory residential real estate exposures that are not materially dependent on cash flows generated by the property, jurisdictions may apply the "loan splitting" approach. Under the loan splitting approach, the risk weight of 20% is applied to the part of the exposure up to 55% of the property value and the risk weight of the counterparty (as prescribed in CRE20.89(1)) is applied to the residual exposure. Where there are liens on the property that are not held by the bank, the treatment is as follows:

1. Where a bank holds the junior lien and there are senior liens not held by the bank, to determine the part of the bank's exposure that is eligible for the 20% risk weight, the amount of 55% of the property value should be reduced by the amount of the senior liens not held by the bank. For example, for a loan of €70,000 to an individual secured on a property valued at €100,000, where there is also a senior ranking lien of €10,000 held by another institution, the bank will apply a risk weight of 20% to €45,000 (=max(€55,000 - €10,000, 0)) of the exposure and, according to CRE20.89(1), a risk weight of 75% to the residual exposure of €25,000.
2. Where liens not held by the bank rank pari passu with the bank's lien, to determine the part of the bank's exposure that is eligible for the 20% risk weight, the amount of 55% of the property value, reduced by the amount of more senior liens not held by the bank (if any), should be reduced by the product of: (i) 55% of the property value, reduced by the amount of any senior liens (if any, both held by the bank and held by other institutions); and (ii) the amount of liens not held by the bank that rank pari passu with the bank's lien divided by the sum of all pari passu liens. For example, for a loan of €70,000 to an individual secured on a property valued at €100,000, where there is also a pari passu ranking lien of €10,000 held by another institution, the bank will apply a risk weight of 20% to €48,125 (=€55,000 - €55,000 * €10,000/€80,000) of the exposure and, according to CRE20.89(1), a risk weight of 75% to the residual exposure of €21,875. If both the loan and the bank's lien is only €30,000 and there is additionally a more senior lien of €10,000 not held by the bank, the property value remaining available is €33,750 (= (€55,000 - €10,000) - ((€55,000 - €10,000) * €10,000/(€10,000+€30,000)), and the bank will apply a risk weight of 20% to €30,000.

Risk weights for regulatory residential real estate exposures that are materially dependent on cash flows generated by the property

20.84

For regulatory residential real estate exposures that are materially dependent on cash flows generated by the property, the risk weight to be assigned to the total exposure amount will be determined based on the exposure's LTV ratio in Table 12 below.

Risk weights for regulatory residential real estate exposures that are materially dependent on cash flows generated by the property						Table 12
	LTV ≤ 50%	50% < LTV ≤ 60%	60% < LTV ≤ 80%	80% < LTV ≤ 90%	90% < LTV ≤ 100%	LTV > 100%
Risk weight	30%	35%	45%	60%	75%	105%

Risk weights for regulatory commercial real estate exposures that are not materially dependent on cash flows generated by the property

20.85

For regulatory commercial real estate exposures that are not materially dependent on cash flow generated by the property, the risk weight to be assigned to the total exposure amount will be determined based on the exposure's LTV in Table 13 below (which sets out a whole loan approach). The risk weight of the counterparty for the purposes of Table 13 below and CRE20.86 below is prescribed in CRE20.89(1).

Whole loan approach risk weights for regulatory commercial real estate exposures that are not materially dependent on cash flows generated by the property		Table 13
	LTV ≤ 60%	LTV > 60%
Risk weight	Min (60%, RW of counterparty)	RW of counterparty

20.86

As an alternative to the whole loan approach for regulatory commercial real estate exposures that are not materially dependent on cash flows generated by the property, jurisdictions may apply the "loan splitting" approach. Under the loan splitting approach, the risk weight of 60% or the risk weight of the counterparty, whichever is lower, is applied to the part of the exposure up to 55% of the property value , and the risk weight of the counterparty is applied to the residual exposure.

Risk weights for regulatory commercial real estate exposures that are materially dependent on cash flows generated by the property

20.87

For regulatory commercial real estate exposures that are materially dependent on cash flows generated by the property , the risk weight to be assigned to the total exposure amount will be determined based on the exposure's LTV in Table 14 below.

Whole loan approach risk weights for regulatory commercial real estate exposures that are materially dependent on cash flows generated by the property	Table 14

	LTV ≤ 60%	60% < LTV ≤ 80%	LTV > 80%
Risk weight	70%	90%	110%

Definition of “other real estate” exposures and applicable risk weights

20.88

An “other real estate” exposure is an exposure within the real estate asset class that is not a regulatory real estate exposure (as defined in CRE20.71 above) and is not a land ADC exposure (as defined in CRE20.90 below).

20.89

Other real estate exposures are risk weighted as follows:

1. The risk weight of the counterparty is used for other real estate exposures that are not materially dependent on the cash flows generated by the property. For exposures to individuals the risk weight applied will be 75%. For exposures to SMEs, the risk weight applied will be 85%. For exposures to other counterparties, the risk weight applied is the risk weight that would be assigned to an unsecured exposure to that counterparty.
2. The risk weight of 150% is used for other real estate exposures that are materially dependent on the cash flows generated by the property.

Definition of land acquisition, development and construction exposures and applicable risk weights

20.90

Land ADC exposures refers to loans to companies or SPVs financing any of the land acquisition for development and construction purposes, or development and construction of any residential or commercial property. ADC exposures will be risk-weighted at 150%, unless they meet the criteria in CRE20.91.

20.91

ADC exposures to residential real estate may be risk weighted at 100%, provided that the following criteria are met:

1. prudential underwriting standards meet the requirements in CRE20.71 (ie the requirements that are used to classify regulatory real estate exposures) where applicable;
2. pre-sale or pre-lease contracts amount to a significant portion of total contracts or substantial equity at risk. Pre-sale or pre-lease contracts must be legally binding written contracts and the purchaser/renter must have made a substantial cash deposit which is subject to forfeiture if the contract is terminated. Equity at risk should be determined as an appropriate amount of borrower-contributed equity to the real estate’s appraised as-completed value.

Risk weight multiplier to certain exposures with currency mismatch

20.92

For unhedged retail and residential real estate exposures to individuals where the lending currency differs from the currency of the borrower’s source of income, banks will apply a 1.5 times multiplier to the applicable risk weight according to CRE20.63 to CRE20.68 and CRE20.82 to CRE20.84, subject to a maximum risk weight of 150%.

20.93

For the purposes of CRE20.92, an unhedged exposure refers to an exposure to a borrower that has no natural or financial hedge against the foreign exchange risk resulting from the currency mismatch between the currency of the borrower's income and the currency of the loan. A natural hedge exists where the borrower, in its normal operating procedures, receives foreign currency income that matches the currency of a given loan (eg remittances, rental incomes, salaries). A financial hedge generally includes a legal contract with a financial institution (eg forward contract). For the purposes of application of the multiplier, only these natural or financial hedges are considered sufficient where they cover at least 90% of the loan instalment, regardless of the number of hedges.

Off-balance sheet items

20.94

Off-balance sheet items will be converted into credit exposure equivalents through the use of credit conversion factors (CCF). In the case of commitments, the committed but undrawn amount of the exposure would be multiplied by the CCF. For these purposes, commitment means any contractual arrangement that has been offered by the bank and accepted by the client to extend credit, purchase assets or issue credit substitutes. It includes any such arrangement that can be unconditionally cancelled by the bank at any time without prior notice to the obligor. It also includes any such arrangement that can be cancelled by the bank if the obligor fails to meet conditions set out in the facility documentation, including conditions that must be met by the obligor prior to any initial or subsequent drawdown under the arrangement. Counterparty risk weightings for over-the-counter (OTC) derivative transactions will not be subject to any specific ceiling.

20.95

A 100% CCF will be applied to the following items:

1. 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).
2. Sale and repurchase agreements and asset sales with recourse where the credit risk remains with the bank.
3. 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). The risk-weighting treatment for counterparty credit risk must be applied in addition to the credit risk charge on the securities or posted collateral, where the credit risk of the securities lent or posted as collateral remains with the bank. This paragraph does not apply to posted collateral related to derivative transactions that is treated in accordance with the counterparty credit risk standards.
4. Forward asset purchases, forward forward deposits and partly paid shares and

securities, which represent commitments with certain drawdown.

5. Off-balance sheet items that are credit substitutes not explicitly included in any other category.

20.96

A 50% CCF will be applied to note issuance facilities and revolving underwriting facilities regardless of the maturity of the underlying facility.

20.97

A 50% CCF will be applied to certain transaction-related contingent items (eg performance bonds, bid bonds, warranties and standby letters of credit related to particular transactions).

20.98

A 40% CCF will be applied to commitments, regardless of the maturity of the underlying facility, unless they qualify for a lower CCF.

20.99

A 20% CCF will be applied to both the issuing and confirming banks of short-term self-liquidating trade letters of credit arising from the movement of goods (eg documentary credits collateralised by the underlying shipment). Short term in this context means with a maturity below one year.

20.100

A 10% CCF will be applied to 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. National supervisors should evaluate various factors in the jurisdiction, which may constrain banks' ability to cancel the commitment in practice, and consider applying a higher CCF to certain commitments as appropriate.

20.101

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

20.102

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.

Credit derivatives

20.103

A bank providing credit protection through a first-to-default or second-to-default credit derivative is subject to capital requirements on such instruments. For first-to-default credit

derivatives, the risk weights of the assets included in the basket must 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. For second-to-default credit derivatives, the treatment is similar; however, in aggregating the risk weights, the asset with the lowest risk-weighted amount can be excluded from the calculation. This treatment applies respectively for nth-to-default credit derivatives, for which the n-1 assets with the lowest risk-weighted amounts can be excluded from the calculation.

Defaulted exposures

20.104

For risk-weighting purposes under the standardised approach, a defaulted exposure is defined as one that is past due for more than 90 days, or is an exposure to a defaulted borrower. A defaulted borrower is a borrower in respect of whom any of the following events have occurred:

1. Any material credit obligation that is past due for more than 90 days. 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;
2. Any material credit obligation is on non-accrued status (eg the lending bank no longer recognises accrued interest as income or, if recognised, makes an equivalent amount of provisions);
3. A write-off or account-specific provision is made as a result of a significant perceived decline in credit quality subsequent to the bank taking on any credit exposure to the borrower;
4. Any credit obligation is sold at a material credit-related economic loss;
5. A distressed restructuring of any credit obligation (ie a restructuring that may result in a diminished financial obligation caused by the material forgiveness, or postponement, of principal, interest or (where relevant) fees) is agreed by the bank;
6. The borrower’s bankruptcy or a similar order in respect of any of the borrower’s credit obligations to the banking group has been filed;
7. The borrower has sought or has been placed in bankruptcy or similar protection where this would avoid or delay repayment of any of the credit obligations to the banking group; or
8. Any other situation where the bank considers that the borrower is unlikely to pay its credit obligations in full without recourse by the bank to actions such as realising security.

20.105

For retail exposures, the definition of default can be applied at the level of a particular credit obligation, rather than at the level of the borrower. 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.

20.106

With the exception of residential real estate exposures treated under CRE20.107, the unsecured or unguaranteed portion of a defaulted exposure shall be risk-weighted net of specific provisions and partial write-offs as follows:

1. 150% risk weight when specific provisions are less than 20% of the outstanding amount

of the loan; and

2. 100% risk weight when specific provisions are equal or greater than 20% of the outstanding amount of the loan.

20.107

Defaulted residential real estate exposures where repayments do not materially depend on cash flows generated by the property securing the loan shall be risk-weighted net of specific provisions and partial write-offs at 100%. Guarantees or financial collateral which are eligible according to the credit risk mitigation framework might be taken into account in the calculation of the exposure in accordance with CRE20.76.

20.108

For the purpose of defining the secured or guaranteed portion of the defaulted exposure, eligible collateral and guarantees will be the same as for credit risk mitigation purposes (see CRE22).

Other assets

20.109

CAP30.32 specifies a deduction treatment 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 if they exceed the thresholds set out in CAP30.32 and CAP30.33. A 250% risk weight applies to the amount of the three “threshold deduction” items listed in CAP30.32 that are not deducted by CAP30.32 or CAP30.33.

20.110

The standard risk weight for all other assets will be 100%, with the exception of the following exposures:

1. A 0% risk weight will apply to:
    1. cash owned and held at the bank or in transit; and
    2. gold bullion held at the bank or held in another bank on an allocated basis, to the extent the gold bullion assets are backed by gold bullion liabilities.
2. A 20% risk weight will apply to cash items in the process of collection.

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 01 January 2023

Changes due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020.

Recognition of external ratings by national supervisors

The recognition process

21.1

In jurisdictions that allow the use of external ratings for regulatory purposes, only credit assessments from credit rating agencies recognised as external credit assessment institutions (ECAIs) will be allowed. National supervisors are responsible for determining on a continuous basis whether an ECAI meets the criteria listed in CRE21.2 and recognition should only be provided in respect of ECAI ratings for types of exposure where all criteria and conditions are met. National supervisors should also take into account the criteria and conditions provided in the International Organization of Securities Commissions' Code of Conduct Fundamentals for Credit Rating Agencies when determining ECAI eligibility. The supervisory process for recognising ECAIs should be made public to avoid unnecessary barriers to entry.

Eligibility criteria

21.2

An ECAI must satisfy each of the following eight criteria.

1. Objectivity: The methodology for assigning external ratings must be rigorous, systematic, and subject to some form of validation based on historical experience. Moreover, external ratings must be subject to ongoing review and responsive to changes in financial condition. Before being recognised by supervisors, a rating 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. In particular, an ECAI should not delay or refrain from taking a rating action based on its potential effect (economic, political or otherwise). The rating 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 credit rating agency may be seen as creating a conflict of interest. Furthermore, an ECAI should separate operationally, legally and, if practicable, physically its rating business from other businesses and analysts.
3. International access/transparency: The individual ratings, the key elements underlining the ratings assessments and whether the issuer participated in the rating process should be publicly available on a non-selective basis, unless they are private ratings, which should be at least available to both domestic and foreign institutions with legitimate interest and on equivalent terms. In addition, the ECAI’s general procedures, methodologies and assumptions for arriving at ratings 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; any conflict of interest, the ECAI's compensation arrangements, its rating 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 ratings, eg the likelihood of AA ratings becoming A over time. A rating should be disclosed as soon as practicably possible after issuance. When disclosing a rating, the information should be provided in plain language, indicating the nature and limitation of credit ratings and the risk of unduly relying on them to make investments.
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. In particular, ECAIs should assign analysts with appropriate knowledge and experience to assess the creditworthiness of the type of entity or obligation being rated. 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 ratings by independent parties (investors, insurers, trading partners) is evidence of the credibility of the ratings 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.
7. No abuse of unsolicited ratings: ECAIs must not use unsolicited ratings to put pressure on entities to obtain solicited ratings. Supervisors should consider whether to continue recognising such ECAIs as eligible for capital adequacy purposes, if such behaviour is identified.
8. Cooperation with the supervisor: ECAIs should notify the supervisor of significant changes to methodologies and provide access to external ratings and other relevant data in order to support initial and continued determination of eligibility.

21.3

Regarding the disclosure of conflicts of interest referenced in CRE21.2(4) above, at a minimum, the following situations and their influence on the ECAI's credit rating methodologies or credit rating actions shall be disclosed:

1. The ECAI is being paid to issue a credit rating by the rated entity or by the obligor, originator, underwriter, or arranger of the rated obligation;
2. The ECAI is being paid by subscribers with a financial interest that could be affected by a credit rating action of the ECAI;
3. The ECAI is being paid by rated entities, obligors, originators, underwriters, arrangers, or subscribers for services other than issuing credit ratings or providing access to the ECAI's credit ratings;
4. The ECAI is providing a preliminary indication or similar indication of credit quality to an entity, obligor, originator, underwriter, or arranger prior to being hired to determine the final credit rating for the entity, obligor, originator, underwriter, or arranger; and
5. The ECAI has a direct or indirect ownership interest in a rated entity or obligor, or a rated entity or obligor has a direct or indirect ownership interest in the ECAI.

21.4

Regarding the disclosure of an ECAI's compensation arrangements referenced in CRE21.2(4) above:

1. An ECAI should disclose the general nature of its compensation arrangements with rated entities, obligors, lead underwriters, or arrangers.
2. When the ECAI receives from a rated entity, obligor, originator, lead underwriter, or arranger compensation unrelated to its credit rating services, the ECAI should disclose such unrelated compensation as a percentage of total annual compensation received from such rated entity, obligor, lead underwriter, or arranger in the relevant credit rating report or elsewhere, as appropriate.
3. An ECAI should disclose in the relevant credit rating report or elsewhere, as appropriate,

if it receives 10% or more of its annual revenue from a single client (eg a rated entity, obligor, originator, lead underwriter, arranger, or subscriber, or any of their affiliates).

Implementation considerations in jurisdictions that allow use of external ratings for regulatory purposes

The mapping process

21.5

Supervisors will be responsible for assigning eligible ECAIs' ratings to the risk weights available under the standardised risk weighting framework, ie deciding which rating 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.

21.6

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 ratings that it assigns, and the definition of default used by the ECAI.

21.7

In order to promote a more consistent mapping of ratings 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.

21.8

Banks must use the chosen ECAIs and their ratings consistently for all types of exposure where they have been recognised by their supervisor as an eligible ECAI, for both risk-weighting and risk management purposes. Banks are not allowed to "cherry-pick" the ratings provided by different ECAIs and to arbitrarily change the use of ECAIs.

Multiple external ratings

21.9

If there is only one rating by an ECAI chosen by a bank for a particular exposure, that rating should be used to determine the risk weight of the exposure.

21.10

If there are two ratings by ECAIs chosen by a bank that map into different risk weights, the higher risk weight will be applied.

21.11

If there are three or more ratings with different risk weights, the two ratings that correspond to the lowest risk weights should be referred to. If these give rise to the same risk weight, that risk weight should be applied. If different, the higher risk weight should be applied.

Determination of whether an exposure is rated: Issue-specific and issuer ratings

21.12

Where a bank invests in a particular issue that has an issue-specific rating, the risk weight of the exposure will be based on this rating. Where the bank's exposure is not an investment in a specific rated issue, the following general principles apply.

1. In circumstances where the borrower has a specific rating for an issued debt – but the bank's exposure is not an investment in this particular debt – a high-quality credit rating (one which maps into a risk weight lower than that which applies to an unrated exposure) on that specific debt may only be applied to the bank's unrated exposure if this exposure ranks in all respects pari passu or senior to the exposure with a rating. If not, the external rating cannot be used and the unassessed exposure will receive the risk weight for unrated exposures.
2. In circumstances where the borrower has an issuer rating, this rating typically applies to senior unsecured exposures to that issuer. Consequently, only senior exposures to that issuer will benefit from a high-quality issuer rating. Other unassessed exposures of a highly rated issuer will be treated as unrated. If either the issuer or a single issue has a low-quality rating (mapping into a risk weight equal to or higher than that which applies to unrated exposures), an unassessed exposure to the same counterparty that ranks pari passu or is subordinated to either the senior unsecured issuer rating or the exposure with a low-quality rating will be assigned the same risk weight as is applicable to the low-quality rating.
3. In circumstances where the issuer has a specific high-quality rating (one which maps into a lower risk weight) that only applies to a limited class of liabilities (such as a deposit rating or a counterparty risk rating), this may only be used in respect of exposures that fall within that class.

21.13

Whether the bank intends to rely on an issuer- or an issue-specific rating, the rating 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 rating must fully take into account and reflect the credit risk associated with repayment of both principal and interest.

21.14

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 (see CRE22.5).

Domestic currency and foreign currency ratings

21.15

Where 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 exposures denominated in the domestic currency.

Short-term/long-term ratings

21.16

For risk-weighting purposes, short-term ratings are deemed to be issue-specific. They can only be used to derive risk weights for exposures arising from the rated facility. They cannot be generalised to other short-term exposures, except under the conditions of CRE21.18. In no event can a short-term rating be used to support a risk weight for an unrated long-term exposure. Short-term ratings may only be used for short-term exposures against banks and corporates. The table below provides a framework for banks' exposures to specific short-term facilities, such as a particular issuance of commercial paper:

Risk weight table for specific short-term ratings — Table 15

External rating	A-1/P-1	A-2/P-2	A-3/P-3	Others
Risk weight	20%	50%	100%	150%

21.17

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

21.18

In cases where short-term ratings are available, the following interaction with the general preferential treatment for short-term exposures to banks as described in CRE20.19 will apply:

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

21.19

When a short-term rating is to be used, the institution making the assessment needs to meet all of the eligibility criteria for recognising ECAIs, as described in CRE21.2, in terms of its short-term ratings.

Level of application of the rating

21.20

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

Use of unsolicited ratings

21.21

As a general rule, banks should use solicited ratings from eligible ECAIs. National supervisors may 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.

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 01 January 2023

Changes due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020. Also, cross references to the securitisation chapters updated to include a reference to the chapter on NPL securitisations (CRE45) published on 26 November 2020.

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.

22.2

The framework set out in this chapter is applicable to banking book exposures that are risk-weighted under the standardised approach.

General requirements

22.3

No transaction in which credit risk mitigation (CRM) techniques are used shall receive a higher capital requirement than an otherwise identical transaction where such techniques are not used.

22.4

The requirements of the disclosure standard (DIS40) must be fulfilled for banks to obtain capital relief in respect of any CRM techniques.

22.5

The effects of CRM must not be double-counted. Therefore, no additional supervisory recognition of CRM for regulatory capital purposes will be granted on exposures for which the risk weight already reflects that CRM. Consistent with CRE21.13, principal-only ratings will also not be allowed within the CRM framework.

22.6

While the use of CRM techniques reduces or transfers credit risk, it may simultaneously increase other risks (ie residual risks). Residual risks include legal, operational, liquidity and market risks. Therefore, banks must 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

In order for CRM techniques to provide protection, the credit quality of the counterparty must not have a material positive correlation with the employed CRM technique or with the resulting residual risks (as defined in CRE22.6). For example, securities issued by the counterparty (or by

any counterparty-related entity) provide little protection as collateral and are thus ineligible.

22.8

In the case where a bank has multiple CRM techniques covering a single exposure (eg a bank has both collateral and a guarantee partially covering an exposure), the bank must 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.

Legal requirements

22.9

In order for banks to obtain capital relief for any use of CRM techniques, all documentation used in collateralised transactions, on-balance sheet netting agreements, 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.

General treatment of maturity mismatches

22.10

For the purposes of calculating risk-weighted assets, a maturity mismatch occurs when the residual maturity of a credit protection arrangement (eg hedge) is less than that of the underlying exposure.

22.11

In the case of financial collateral, maturity mismatches are not allowed under the simple approach (see CRE22.33).

22.12

Under the other approaches, when there is a maturity mismatch the credit protection arrangement may only be recognised if the original maturity of the arrangement is greater than or equal to one year, and its residual maturity is greater than or equal to three months. In such cases, credit risk mitigation may be partially recognised as detailed below in CRE22.13.

22.13

When there is a maturity mismatch with recognised credit risk mitigants, the following adjustment applies, where:

1. P_a = value of the credit protection adjusted for maturity mismatch
2. P = credit protection amount (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 {five years, residual maturity of the exposure expressed in years}

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

22.14

The maturity of the underlying exposure and the maturity of the hedge must both be defined conservatively. The effective maturity of the underlying must 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 that may reduce the term of the hedge must be taken into account so that the shortest possible effective maturity is used. For example: where, in the case of a credit derivative, the protection seller has a call option, the maturity is the first call date. Likewise, if the protection buyer owns the call option and has a strong incentive to call the transaction at the first call date, for example because of a step-up in cost from this date on, the effective maturity is the remaining time to the first call date.

Currency mismatches

22.15

Currency mismatches are allowed under all approaches. Under the simple approach there is no specific treatment for currency mismatches, given that a minimum risk weight of 20% (floor) is generally applied. Under the comprehensive approach and in case of guarantees and credit derivatives, a specific adjustment for currency mismatches is prescribed in CRE22.52 and CRE22.82 to CRE22.83, respectively.

Overview of credit risk mitigation techniques

Collateralised transactions

22.16

A collateralised transaction is one in which:

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

22.17

Where banks take eligible financial collateral, they may reduce their regulatory capital requirements through the application of CRM techniques.

22.18

Banks may opt for either:

1. The simple approach, which replaces the risk weight of the counterparty with the risk weight of the collateral for the collateralised portion of the exposure (generally subject to a 20% floor); or
2. The comprehensive approach, which allows a more precise offset of collateral against exposures, by effectively reducing the exposure amount by a volatility-adjusted value

ascribed to the collateral.

22.19

Detailed operational requirements for both the simple approach and comprehensive approach are given in CRE22.32 to CRE22.65. Banks may operate under either, but not both, approaches in the banking book.

22.20

For collateralised OTC transactions, exchange traded derivatives and long settlement transactions, banks may use the standardised approach for counterparty credit risk (CRE52) or the internal models method (CRE53) to calculate the exposure amount, in accordance with CRE22.66 to CRE22.67.

On-balance sheet netting

22.21

Where banks have legally enforceable netting arrangements for loans and deposits that meet the conditions in CRE22.68 and CRE22.69 they may calculate capital requirements on the basis of net credit exposures as set out in that paragraph.

Guarantees and credit derivatives

22.22

Where guarantees or credit derivatives fulfil the minimum operational conditions set out in CRE22.70 to CRE22.72, banks may take account of the credit protection offered by such credit risk mitigation techniques in calculating capital requirements.

22.23

A range of guarantors and protection providers are recognised and a substitution approach applies for capital requirement calculations. Only guarantees issued by or protection provided by entities with a lower risk weight than the counterparty lead to reduced capital charges for the guaranteed exposure, 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.

22.24

Detailed conditions and operational requirements for guarantees and credit derivatives are given in CRE22.70 to CRE22.84.

Collateralised transactions

General requirements

22.25

Before capital relief is granted in respect of any form of collateral, the standards set out below in CRE22.26 to CRE22.31 must be met, irrespective of whether the simple or the

comprehensive approach is used. Banks that lend securities or post collateral must calculate capital requirements for both of the following: (i) the credit risk or market risk of the securities, if this remains with the bank; and (ii) the counterparty credit risk arising from the risk that the borrower of the securities may default.

22.26

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). Additionally, 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 the title transfer of the collateral.

22.27

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.

22.28

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

1. the risk to which margin agreements expose 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.

22.29

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.

22.30

A capital requirement must be applied on both sides of a 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 derivatives exposures or with any other borrowing transaction.

22.31

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 must calculate capital requirements as if it were itself the principal.

The simple approach : general requirements

22.32

Under the simple approach, the risk weight of the counterparty is replaced by the risk weight of the collateral instrument collateralising or partially collateralising the exposure.

22.33

For collateral to be recognised in the simple approach, it 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 exposures collateralised by the market value of recognised collateral receive the risk weight applicable to the collateral instrument. The risk weight on the collateralised portion is subject to a floor of 20% except under the conditions specified in CRE22.36 to CRE22.39. The remainder of the exposure must be assigned the risk weight appropriate to the counterparty. Maturity mismatches are not allowed under the simple approach (see CRE22.10 to CRE22.11).

The simple approach: eligible financial collateral

22.34

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 that is incurring the counterparty exposure.
2. Gold.
3. In jurisdictions that allow the use of external ratings for regulatory purposes:
    1. Debt securities rated by a recognised external credit assessment institution (ECAI) where these are either:
    (i)

    at least BB– when issued by sovereigns or public sector entities (PSEs) that are treated as sovereigns by the national supervisor; or

    (ii)

    at least BBB– when issued by other entities (including banks and other prudentially regulated financial institutions); or

    (iii)

    at least A-3/P-3 for short-term debt instruments.

    2. Debt securities not rated by a recognised ECAI where these are:
    (i)

    issued by a bank; and

(ii)

listed on a recognised exchange; and

(iii)

classified as senior debt; and

(iv)

all rated issues of the same seniority by the issuing bank are rated at least BBB– or A-3/P-3 by a recognised ECAI; and

(v)

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

(vi)

the supervisor is sufficiently confident that the market liquidity of the security is adequate.

4. In jurisdictions that do not allow the use of external ratings for regulatory purposes, the following securities will be eligible provided that the supervisor is sufficiently confident that the market liquidity of the security is adequate:
    1. Debt securities issued by sovereigns or PSEs that are treated as sovereigns by the national supervisor;
    2. Debt securities issued by banks assigned to Grade A under the standardised credit risk assessment approach;
    3. Other debt securities issued by “investment grade” entities as defined in CRE22.76, and
    4. Securitisation exposures with a risk weight of less than 100% in the Securitisation Standardised Approach set out in CRE41.
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:
    1. a price for the units is publicly quoted daily; and
    2. the UCITS/mutual fund is limited to investing in the instruments listed in this paragraph.

22.35

Resecuritisations as defined in the securitisation chapters (CRE40 to CRE45) are not eligible financial collateral.

Simple approach: exemptions to the risk-weight floor

22.36

Repo-style transactions that fulfil all of the following conditions are exempted from the risk-weight floor under the simple approach:

1. Both the exposure and the collateral are cash or a sovereign security or PSE security qualifying for a 0% risk weight under the standardised approach (CRE20);
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 liquidation 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; and
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.

22.37

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. Qualifying central counterparties.

22.38

Repo transactions that fulfil the requirement in CRE22.36 receive a 10% risk weight, as an exemption to the risk weight floor described in CRE22.33. If the counterparty to the transaction is a core market participant, banks may apply a risk weight of 0% to the transaction.

22.39

The 20% floor for the risk weight on a collateralised transaction does not apply and a 0% risk weight may be applied to the collateralised portion of the exposure where the exposure and the collateral are denominated in the same currency, and either:

1. the collateral is cash on deposit as defined in CRE22.34(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%.

The comprehensive approach : general requirements

22.40

In the comprehensive approach, when taking collateral, banks must calculate their adjusted exposure to a counterparty in order to take account of the risk mitigating effect of that collateral. Banks must use the applicable supervisory haircuts 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, as occasioned by market movements. Unless either side of the transaction is cash or a zero haircut is applied, the volatility-adjusted exposure amount is higher than the nominal exposure and the volatility-adjusted collateral value is lower than the nominal collateral value.

22.41

The size of the haircuts that banks must use depends on the prescribed holding period for the transaction. For the purposes of CRE22, 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. The supervisory prescribed minimum holding period is used as the basis for the calculation of the standard supervisory haircuts.

22.42

The holding period, and thus the size of the individual haircuts depends on the type of instrument, type of transaction, residual maturity and the frequency of marking to market and remargining as provided in CRE22.49 to CRE22.51. 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. Haircuts must be scaled up using the square root of time formula depending on the actual frequency of remargining or marking to market. This formula is included in CRE22.59.

22.43

Additionally, where the exposure and collateral are held in different currencies, banks must apply an additional haircut to the volatility-adjusted collateral amount in accordance with CRE22.52 and CRE22.82 to CRE22.83 to take account of possible future fluctuations in exchange rates.

22.44

The effect of master netting agreements covering securities financing transactions (SFTs) can be recognised for the calculation of capital requirements subject to the conditions and requirements in CRE22.62 to CRE22.65. Where SFTs 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.

The comprehensive approach: eligible financial collateral

22.45

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

1. All of the instruments listed in CRE22.34;
2. Equities and convertible bonds that are not included in a main index but which are listed on a recognised security exchange;
3. UCITS/mutual funds which include the instruments in point (2).

22.46

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

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

22.47

In the case of maturity mismatches, the value of the collateral received (collateral amount) must be adjusted in accordance with CRE22.10 to CRE22.14.

22.48

The exposure amount after risk mitigation (E*) must be multiplied by the risk weight of the counterparty to obtain the risk-weighted asset amount for the collateralised transaction.

22.49

In jurisdictions that allow the use of external ratings for regulatory purposes, the following supervisory haircuts (assuming daily mark-to-market, daily remargining and a 10-business day holding period), expressed as percentages, must be used to determine the haircuts appropriate to the collateral (H_c) and to the exposure (H_e):

Supervisory haircuts for comprehensive approach
Jurisdictions that allow the use of external ratings for regulatory purposes

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, ≤ 3 years	2	3	8
	>3 years, ≤ 5 years		4	
	>5 years, ≤ 10 years	4	6	16
	> 10 years		12	

A+ to BBB–/ A-2/A-3/P-3 and unrated bank securities CRE22.34(3)(b)	≤ 1 year	1	2	4
	>1 year, ≤ 3 years	3	4	12
	>3 years, ≤ 5 years		6	
	>5 years, ≤ 10 years	6	12	24
	> 10 years		20	
BB+ to BB–	All	15	Not eligible	Not eligible
Main index equities (including convertible bonds) and gold		20		
Other equities and convertible bonds listed on a recognised exchange		30		
UCITS/mutual funds		Highest haircut applicable to any security in which the fund can invest, unless the bank can apply the look-through approach (LTA) for equity investments in funds, in which case the bank may use a weighted average of haircuts applicable to instruments held by the fund.		
Cash in the same currency		0		

22.50

In jurisdictions that do not allow the use of external ratings for regulatory purposes, the following supervisory haircuts (assuming daily mark-to-market, daily remargining and a 10-business day holding period), expressed as percentages, must be used to determine the haircuts appropriate to the collateral (H_c) and to the exposure (H_e):

Supervisory haircuts for comprehensive approach
Jurisdictions that do not allow the use of external ratings for regulatory purposes

	Residual maturity	Issuer's risk weight (only for securities issued by sovereigns			Other investment-grade securities, consistent with paragraphs CRE22.34(4)(c)	
		0%	20% or 50%	100%	Non-securitisation exposures	Senior securitisation exposures with SA risk weight < 100%

<table>
<tr><td rowspan="5">Debt securities</td><td>≤ 1 year</td><td>0.5</td><td>1</td><td>15</td><td>2</td><td>4</td></tr>
<tr><td>> 1 year, ≤ 3 years</td><td rowspan="2">2</td><td rowspan="2">3</td><td rowspan="2">15</td><td>4</td><td rowspan="2">12</td></tr>
<tr><td>> 3 years, ≤ 5 years</td><td>6</td></tr>
<tr><td>> 5 years, ≤ 10 years</td><td rowspan="2">4</td><td rowspan="2">6</td><td rowspan="2">15</td><td>12</td><td rowspan="2">24</td></tr>
<tr><td>> 10 years</td><td>20</td></tr>
<tr><td>Main index equities (including convertible bonds) and gold</td><td colspan="6">20</td></tr>
<tr><td>Other equities and convertible bonds listed on a recognised exchange</td><td colspan="6">30</td></tr>
<tr><td>UCITS/mutual funds</td><td colspan="6">Highest haircut applicable to any security in which the fund can invest, unless the bank can apply the look-through approach (LTA) for equity investments in funds, in which case the bank may use a weighted average of haircuts applicable to instruments held by the fund.</td></tr>
<tr><td>Cash in the same currency</td><td colspan="6">0</td></tr>
<tr><td>Other exposure types</td><td colspan="6">30</td></tr>
</table>

22.51

In paragraphs CRE22.49 to CRE22.50:

1. “Sovereigns” includes: PSEs that are treated as sovereigns by the national supervisor, as well as multilateral development banks 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.
4. “Cash in the same currency” refers to eligible cash collateral specified in CRE22.34(1).

22.52

The haircut for currency risk (H_{fx}) 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).

22.53

For SFTs and secured lending transactions, a haircut adjustment may need to be applied in accordance with CRE22.56 to CRE22.59.

22.54

For SFTs in which the bank lends, or posts as collateral, non-eligible instruments, the haircut to be applied on the exposure must be 30%. For transactions in which the bank borrows non-eligible instruments, credit risk mitigation may not be applied.

22.55

Where the collateral is a basket of assets, the haircut (H) on the basket must 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
2. H_i the haircut applicable to that asset $H = \sum_i a_i H_i$

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

22.56

For some transactions, depending on the nature and frequency of the revaluation and remargining provisions, different holding periods and thus different haircuts must be applied. The framework for collateral haircuts distinguishes between repo-style transactions (ie repo/reverse repos and securities lending/borrowing), "other capital markets-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.

22.57

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

Minimum holding periods
Summary of minimum holding periods and remargining/revaluation periods

Transaction type	Minimum holding period	Minimum remargining/revaluation period
Repo-style transaction	five business days	daily remargining
Other capital market transactions	10 business days	daily remargining
Secured lending	20 business days	daily revaluation

22.58

Regarding the minimum holding periods set out in CRE22.57, 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 5,000 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.

22.59

When the frequency of remargining or revaluation is longer than the minimum, the minimum haircut numbers must be scaled up depending on the actual number of business days between remargining or revaluation. The 10-business day haircuts provided in CRE22.49 to CRE22.51 are the default haircuts and these haircuts must be scaled up or down using the formula below, where:

1. H = haircut
2. H_{10} = 10-business day haircut for instrument
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 $$H = H_{10}\sqrt{\frac{N_R + \left(T_M - 1\right)}{10}}$$

The comprehensive approach: exemptions under the comprehensive approach for qualifying repo-style transactions involving core market participants

22.60

For repo-style transactions with core market participants as defined in CRE22.37 and that satisfy the conditions in CRE22.36 supervisors may apply a haircut of zero.

22.61

Where, under the comprehensive approach, a supervisor applies a specific carve-out to repo-style transactions in securities issued by its domestic government, other supervisors may

choose to allow banks incorporated in their jurisdiction to adopt the same approach to the same transactions.

The comprehensive approach: treatment under the comprehensive approach of SFTs covered by master netting agreements

22.62

The effects of bilateral netting agreements covering SFTs may 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 set-off 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.

22.63

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

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

22.64

The formula in CRE22.65 will be used to calculate the counterparty credit risk capital requirements for SFTs with netting agreements. This formula includes the current exposure, an amount for systematic exposure of the securities based on the net exposure, an amount for the idiosyncratic exposure of the securities based on the gross exposure, and an amount for currency mismatch. All other rules regarding the calculation of haircuts under the comprehensive approach stated in CRE22.40 to CRE22.61 equivalently apply for banks using bilateral netting agreements for SFTs.

22.65

Banks using standard supervisory haircuts for SFTs conducted under a master netting agreement must use the formula that follows to calculate their exposure amount, where:

1. E* is the exposure value of the netting set after risk mitigation
2. E_i is the current value of all cash and securities lent, sold with an agreement to repurchase or otherwise posted to the counterparty under the netting agreement
3. C_j is the current value of all cash and securities borrowed, purchased with an agreement

to resell or otherwise held by the bank under the netting agreement

4. $$net\,exposure = \left|\sum_s E_s H_s\right|$$

5. $$gross\,exposure = \sum_s E_s \left|H_s\right|$$

6. E_s is the net current value of each security issuance under the netting set (always a positive value)
7. H_s is the haircut appropriate to E_s as described in tables of CRE22.49 to CRE22.51, as applicable
    1. H_s has a positive sign if the security is lent, sold with an agreement to repurchased, or transacted in manner similar to either securities lending or a repurchase agreement
    2. H_s has a negative sign if the security is borrowed, purchased with an agreement to resell, or transacted in a manner similar to either a securities borrowing or reverse repurchase agreement
8. N is the number of security issues contained in the netting set (except that issuances where the value Es is less than one tenth of the value of the largest Es in the netting set are not included the count)
9. E_{fx} is the absolute value of the net position in each currency fx different from the settlement currency
10. H_{fx} is the haircut appropriate for currency mismatch of currency fx

$$E^* = max\left\{0; \sum_i E_i - \sum_j C_j + 0.4 \cdot net\,exposure + 0.6 \cdot \frac{gross\,exposure}{\sqrt{N}} + \sum_{fx}\left(E_{fx} \cdot H_{fx}\right)\right\}$$

Collateralised OTC derivatives, exchange traded derivatives and long settlement transactions

22.66

Under the standardised approach for counterparty credit risk (SA-CCR, CRE52), the calculation of the counterparty credit risk charge for an individual contract will be calculated using the following formula, where:

1. 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 $$Exposure\ amount = alpha \cdot \left(RC + PFE\right)$$

22.67

As an alternative to the SA-CCR for the calculation of the counterparty credit risk charge, banks may also use the internal models method as set out in CRE53, subject to supervisory approval.

On-balance sheet netting

22.68

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 CRE22.46, 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,

22.69

When calculating the net exposure described in the paragraph above, assets (loans) are treated as exposure and liabilities (deposits) as collateral. The haircuts are zero except when a currency mismatch exists. A 10-business day holding period applies when daily mark-to-market is conducted. For on-balance sheet netting, the requirements in CRE22.49 and CRE22.59 and CRE22.10 to CRE22.14 must be applied.

Guarantees and credit derivatives

Operational requirements for guarantees and credit derivatives

22.70

If conditions set below are met, banks can substitute the risk weight of the counterparty with the risk weight of the guarantor.

22.71

A guarantee (counter-guarantee) or credit derivative must satisfy the following requirements:

1. it represents a direct claim on the protection provider;
2. it is explicitly referenced to specific exposures or a pool of exposures, so that the extent of the cover is clearly defined and incontrovertible;
3. other than non-payment by a protection purchaser of money due in respect of the credit protection contract it is irrevocable;
4. there is no clause in the contract that would allow the protection provider unilaterally to cancel the credit cover, change the maturity agreed ex post, or that would increase the effective cost of cover as a result of deteriorating credit quality in the hedged exposure;
5. it must 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 underlying counterparty fails to make the payment(s) due.

22.72

In the case of maturity mismatches, the amount of credit protection that is provided must be adjusted in accordance with CRE22.10 to CRE22.14.

Specific operational requirements for guarantees

22.73

In addition to the legal certainty requirements in CRE22.9, in order for a guarantee to be recognised, the following requirements 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 action 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 counterparty 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 must be treated as an unsecured amount in accordance with the rules for proportional cover described in CRE22.80.

Specific operational requirements for credit derivatives

22.74

In addition to the legal certainty requirements in CRE22.9, in order for a credit derivative contract to be recognised, the following requirements must be satisfied:

1. The credit events specified by the contracting parties must at a minimum cover:
    1. 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);
    2. 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
    3. restructuring of the underlying obligation involving forgiveness or postponement of principal, interest or fees that results in a credit loss event (ie write-off, specific provision or other similar debit to the profit and loss account).
2. If the credit derivative covers obligations that do not include the underlying obligation, 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. In the case of a maturity mismatch, the provisions of CRE22.10 to CRE22.14 must be applied.
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 from the underlying obligation, section (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:
    1. the reference obligation ranks pari passu with or is junior to the underlying obligation; and
    2. 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:
    1. the latter obligation ranks pari passu with or is junior to the underlying obligation; and
    2. 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.

22.75

When the restructuring of the underlying obligation is not covered by the credit derivative, but the other requirements in CRE22.74 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.

Range of eligible guarantors (counter-guarantors)/protection providers and credit derivatives

22.76

Credit protection given by the following entities can be recognised when they have a lower risk weight than the counterparty:

1. Sovereign entities, PSEs, multilateral development banks (MDBs), banks, securities firms and other prudentially regulated financial institutions with a lower risk weight than the counterparty;
2. In jurisdictions that allow the use of external ratings for regulatory purposes:
    1. other entities that are externally rated except when credit protection is provided to a securitisation exposure. This would include credit protection provided by a parent, subsidiary and affiliate companies when they have a lower risk weight than the obligor;
    2. 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.

3. In jurisdictions that do not allow the use of external ratings for regulatory purposes:
    1. Other entities, defined as “investment grade” meaning they have adequate capacity to meet their financial commitments (including repayments of principal and interest) in a timely manner, irrespective of the economic cycle and business conditions. When making this determination, the bank should assess the entity against the investment grade definition taking into account the complexity of its business model, performance against industry and peers, and risks posed by the entity’s operating environment. Moreover, the following conditions will have to be met:
    (i)

    For corporate entities (or the entity’s parent company), they must have securities outstanding on a recognised securities exchange;

    (ii)

    The creditworthiness of these “investment grade entities” is not positively correlated with the credit risk of the exposures for which they provided guarantees.

    2. Parent, subsidiary and affiliate companies of the obligor where their creditworthiness is not positively correlated with the credit risk of the exposures for which they provided guarantees. For an intra-group company to be recognised as eligible guarantor, the credit risk of the whole group should be taken into account.

22.77

Only credit default swaps and total return swaps that provide credit protection equivalent to guarantees are 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.

22.78

First-to-default and all other nth-to-default credit derivatives (ie by which a bank obtains credit protection for a basket of reference names and where the first- or nth–to-default among the reference names triggers the credit protection and terminates the contract) are not eligible as a credit risk mitigation technique and therefore cannot provide any regulatory capital relief. In transactions in which a bank provided credit protection through such instruments, it shall apply the treatment described in CRE20.103.

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

22.79

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 the protection provider is exempt from

payment in the event of loss are equivalent to retained first-loss positions. The portion of the exposure that is below a materiality threshold must be assigned a risk weight of 1250% by the bank purchasing the credit protection.

22.80

Where losses are shared pari passu on a pro rata basis between the bank and the guarantor, capital relief is afforded on a proportional basis, ie the protected portion of the exposure receives the treatment applicable to eligible guarantees/credit derivatives, with the remainder treated as unsecured.

22.81

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 the 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 the second-loss portion) or the junior tranche (eg the first-loss portion). In this case the rules as set out in the securitisation standard apply.

Currency mismatches

22.82

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

22.83

The currency mismatch haircut for a 10-business day holding period (assuming daily marking to market) is 8%. This haircut must be scaled up using the square root of time formula, depending on the frequency of revaluation of the credit protection as described in CRE22.59.

Sovereign guarantees and counter-guarantees

22.84

As specified in CRE20.8, 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 supervisors may extend this treatment to portions of exposures guaranteed by the sovereign (or central bank), where the guarantee is denominated in the domestic currency and the exposure is funded in that currency. An exposure may be covered by a guarantee that is indirectly counter-guaranteed by a sovereign. Such an exposure may be treated as covered by a sovereign guarantee provided that:

1. the sovereign counter-guarantee covers all credit risk elements of the exposure;

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 exposure; 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.

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 01 January 2023

Changes due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020.

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 are outlined that relate to a bank's adoption of the IRB approach at the asset class level and the related roll-out requirements. 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 CRE20.61, CRE20.62 and CRE20.109 of the standardised approach to the exposures referenced in those paragraphs (that is, investments that are assessed against certain materiality thresholds).

Categorisation of exposures

30.4

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. For the equity asset class the IRB approach is not permitted, as outlined further below.

30.5

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

30.6

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 (SME), as defined in CRE31.8.

30.7

In addition to general corporates, within the corporate asset class five sub-classes of specialised lending (SL) are identified. Such lending possesses all the following characteristics, in legal form or economic substance:

1. The exposure is typically to an entity (often a special purpose entity (SPE)) that 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.

30.8

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

Project finance

30.9

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.

30.10

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

30.11

OF refers to a method of funding the acquisition of physical assets (eg ships, aircraft, satellites, railcars, or 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

30.12

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.

30.13

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 lending

30.14

IPRE lending 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, or 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 lending

30.15

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.

30.16

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

30.17

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 and referred to in the first footnote of CRE20.14 of the standardised approach, and the entities referred to in CRE20.10 of the standardised approach.

Definition of bank exposures

30.18

This asset class covers exposures to banks as defined in CRE20.16 of the standardised approach for credit risk and those securities firms and other financial institutions set out in CRE20.40 of the standardised approach for credit risk that are treated as exposures to banks. Bank exposures also include covered bonds as defined in CRE20.33 as well as claims on all domestic PSEs that are not treated as exposures to sovereigns under the standardised approach, and MDBs that do not meet the criteria for a 0% risk weight under the standardised approach (ie MDBs that are not listed in the first footnote to CRE20.14 of the standardised approach). This asset class also includes exposures to the entities listed in this paragraph that are in the form of subordinated debt or regulatory capital instruments (which form their own asset class within the standardised approach), provided that such instruments: (i) do not fall within the scope of equity exposures as defined in CRE30.26; (ii) are not deducted from regulatory capital or risk-weighted at 250% according to CAP30; and (iii) are not risk weighted at 1250% according to CRE20.62.

Definition of retail exposures

30.19

An exposure is categorised as a retail exposure if it meets all of the criteria set out in CRE30.20 (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).

30.20

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, or 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, or 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. Where a loan is a residential mortgage (including first and subsequent liens, term loans and revolving home equity lines of credit) it is eligible for retail treatment regardless of exposure size so long as the credit is:
    1. an exposure to an individual; or
    2. an exposure to associations or cooperatives of individuals that are regulated under national law and exist with the only purpose of granting its members the use of a primary residence in the property securing the loan.
3. Where loans are extended to small businesses and managed as retail exposures they 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.

30.21

It is expected that supervisors provide flexibility in the practical application of the thresholds set out in CRE30.20, 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. Where a loan gives rise to a small business exposure below €1 million, it 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. residential mortgage loans, 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.
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.

30.25

The QRRE sub-class is split into exposures to transactors and revolvers. A QRRE transactor is an exposure to an obligor that meets the definition set out in CRE20.64 of the standardised approach. That is, the exposure is to an obligor in relation to a facility such as credit card or charge card where the balance has been repaid in full at each scheduled repayment date for the previous 12 months, or the exposure is in relation to an overdraft facility if there have been no drawdowns over the previous 12 months. All exposures that are not QRRE transactors are QRRE revolvers, including QRRE exposures with less than 12 months of repayment history.

Definition of equity exposures

30.26

This asset class covers exposures to equities as defined in CRE20.54 to CRE20.56 of the standardised approach for credit risk.

Definition of eligible purchased receivables

30.27

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

Retail receivables

30.28

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 chapters CRE34 and CRE36.

Corporate receivables

30.29

In general, for purchased corporate receivables, banks are expected to assess the default risk of individual obligors as specified in CRE31.3 to CRE31.12 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.

30.30

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

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

corporate exposures. Such concentration limits may refer to one or a combination of the following measures: the size of one individual exposure relative to the total pool, the size of the pool of receivables as a percentage of regulatory capital, or the maximum size of an individual exposure in the pool.

30.31

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

30.32

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.

30.33

For certain asset classes, the Committee has made available two broad approaches: a foundation and an advanced approach. Under the foundation approach (F-IRB 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 (A-IRB approach), banks provide 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.

30.34

For exposures to equities, as defined in CRE30.26 above, the IRB approaches are not permitted (see CRE30.43). In addition, the A-IRB approach cannot be used for the following:

1. Exposures to general corporates (ie exposures to corporates that are not classified as specialised lending) belonging to a group with total consolidated annual revenues greater than €500m.
2. Exposures in the bank asset class CRE30.18, and other securities firms and financial institutions (including insurance companies and any other financial institutions in the corporate asset class).

30.35

In making the assessment for the revenue threshold in CRE30.34 above, the amounts must be as reported in the audited financial statements of the corporates or, for corporates that are

part of consolidated groups, their consolidated groups (according to the accounting standard applicable to the ultimate parent of the consolidated group). The figures must be based on the average amounts calculated over the prior three years, or on the latest amounts updated every three years by the bank.

Corporate, sovereign and bank exposures

30.36

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

30.37

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

30.38

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

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

30.39

Banks that do not meet the requirements for the estimation of PD under the corporate foundation approach for their SL exposures 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 these requirements for HVCRE exposures 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 CRE31.11.

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 CRE31.11.

Retail exposures

30.42

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

Equity exposures

30.43

All equity exposures are subject to the approach set out in CRE20.57 of the standardised approach for credit risk, with the exception of equity investments in funds that are subject to the requirements set out in CRE60.

Eligible purchased receivables

30.44

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. As noted in CRE30.29, for corporate purchased receivables banks are in general expected to assess the default risk of individual obligors. The bank may use the A-IRB treatment for purchased corporate receivables CRE34.6 to CRE34.7 only for exposures to individual corporate obligors that are eligible for the A-IRB approach according to CRE30.34 and CRE30.35. Otherwise, the F-IRB treatment for purchased corporate receivables should be used. For eligible retail receivables, as with the retail asset class, only the A-IRB approach is available.

Adoption of the IRB approach for asset classes

30.45

Once a bank adopts an IRB approach for part of its holdings within an asset class, it is expected to extend it across all holdings within that asset class. In this context, the relevant assets classes are as follows:

1. Sovereigns
2. Banks
3. Corporates (excluding specialised lending and purchased receivables)
4. Specialised lending
5. Corporate purchased receivables
6. QRRE
7. Retail residential mortgages
8. Other retail (excluding purchased receivables)
9. Retail purchased receivables

30.46

The Committee recognises that, for many banks, it may not be practicable for various reasons to implement the IRB approach for an entire asset class across all 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 exposures within an asset class at the same time (for example, exposures that are in the same asset class, but are in different business units).

30.47

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

30.48

If a bank intends to adopt an IRB approach to an asset class, it must produce an implementation plan, specifying to what extent and when it intends to roll out the IRB approaches within the asset class and business units. The plan should be 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 that are immaterial in terms of size and perceived risk profile within their asset class 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

Banks adopting an IRB approach for an asset class are expected to continue to employ an IRB approach for that asset class. 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 in that asset class, and must be approved by the supervisor.

30.51

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 the other sub-classes. 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.

30.52

Irrespective of the materiality, exposures to central counterparties arising from over-the-counter derivatives, exchange traded derivatives transactions and securities financing transactions must be treated according to the dedicated treatment laid down in CRE54.

CRE31

IRB approach: risk weight functions

This chapter sets out the calculation of risk-weighted assets for corporate, sovereign, bank and retail exposures.

Version effective as of 01 January 2023

Changes due to December 2017 Basel III publication and the revised implementation date announced on 27 March 2020.

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; and (ii) retail exposures. Risk weighted assets are designed to address unexpected losses from exposures. The method of calculating expected losses, 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 exposures that are in default

31.3

The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in CRE36.83) and the bank's best estimate of expected loss (described in CRE36.86). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

Risk-weighted assets for corporate, sovereign and bank exposures that are not in default

Risk-weight functions for corporate, sovereign and bank exposures

31.4

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

31.5

For exposures not in default, the formula for calculating risk-weighted assets is as follows (illustrative risk weights are shown in CRE99):

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

$$Maturity\ adjustment = b = \left[0.11852 - 0.05478 \cdot \ln\left(PD\right)\right]^2$$

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

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

31.6

Regarding the formula set out in CRE31.5 above, M is the effective maturity, calculated according to CRE32.43 to CRE32.54, and the following term is used to refer to a specific part of the capital requirements formula:

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

31.7

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 USD100 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.

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

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

31.8

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 x (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.

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

31.9

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

31.10

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 IRB (F-IRB) 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 IRB (A-IRB) approach for the corporate asset class to derive risk weights for SL sub-classes.

31.11

Regarding the high volatility commercial real estate (HVCRE) sub-asset class of specialised lending, 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:

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

31.12

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

Risk-weighted assets for retail exposures that are not in default

31.13

There are three separate risk-weight functions for retail exposures, as defined in CRE31.14 to CRE31.16. 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, sovereigns and corporates. Illustrative risk weights are shown in CRE99.

Retail residential mortgage exposures

31.14

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

$$Correlation = R = 0.15$$

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

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

Qualifying revolving retail exposures

31.15

For qualifying revolving retail exposures as defined in CRE30.23 and CRE30.24 that are not in default, risk weights are defined based on the following formula:

$$Correlation = R = 0.04$$

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

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

Other retail exposures

31.16

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:

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

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

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

CRE32

IRB approach: risk components

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

Version effective as of 01 January 2023

Changes due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020.

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 CRE32.56, sets out the calculation of the risk components for corporate, sovereign and bank exposures. In the case of an exposure that is guaranteed by a sovereign, the floors that apply to the risk components do not apply to that part of the exposure covered by the sovereign guarantee (ie any part of the exposure that is not covered by the guarantee is subject to the relevant floors).

Probability of default (PD)

32.3

For corporate, sovereign and bank 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 CRE36.77 to CRE36.79.

32.4

With the exception of exposures in the sovereign asset class, the PD for each exposure that is used as input into the risk weight formula and the calculation of expected loss must not be less than 0.05%.

Loss given default (LGD)

32.5

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 approach and an advanced approach. As noted in CRE30.34, the advanced approach is not permitted for exposures to certain entities.

LGD under the foundation internal ratings-based (F-IRB) approach: treatment of unsecured claims and non-recognised collateral

32.6

Under the foundation approach, senior claims on sovereigns, banks, securities firms and other financial institutions (including insurance companies and any financial institutions in the

corporate asset class) that are not secured by recognised collateral will be assigned a 45% LGD. Senior claims on other corporates that are not secured by recognised collateral will be assigned a 40% LGD.

32.7

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

32.8

In addition to the eligible financial collateral recognised in the standardised approach, 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 physical collateral, where they meet the minimum requirements set out in CRE36.131 to CRE36.147. For eligible financial collateral, the requirements are identical to the operational standards as set out in the credit risk mitigation section of the standardised approach (see CRE22).

32.9

The simple approach to collateral presented in the standardised approach is not available to banks applying the IRB approach.

32.10

The LGD applicable to a collateralised transaction (LGD*) must be calculated as the exposure weighted average of the LGD applicable to the unsecured part of an exposure (LGD_U) and the LGD applicable to the collateralised part of an exposure (LGD_S). Specifically, the formula that follows must be used, where:

1. E is the current value of the exposure (ie cash lent or securities lent or posted). In the case of securities lent or posted the exposure value has to be increased by applying the appropriate haircuts (H_E) according to the comprehensive approach for financial collateral.
2. E_S is the current value of the collateral received after the application of the haircut applicable for the type of collateral (H_c) and for any currency mismatches between the exposure and the collateral, as specified in CRE32.11 to CRE32.12. E_S is capped at the value of $E \bullet (1+H_E)$.
3. $E_U = E \bullet (1+H_E) - E_s$. The terms E_U and E_S are only used to calculate LGD*. Banks must continue to calculate EAD without taking into account the presence of any collateral, unless otherwise specified.
4. LGD_U is the LGD applicable for an unsecured exposure, as set out in CRE32.6 and CRE32.7.
5. LGD_S is the LGD applicable to exposures secured by the type of collateral used in the

$$LGD^{*} = LGD_{U} \cdot \frac{E_{U}}{E \cdot \left(1 + H_{E}\right)} + LGD_{S} \cdot \frac{E_{S}}{E \cdot \left(1 + H_{E}\right)}$$

transaction, as specified in CRE32.11.

32.11

The following table specifies the LGD_S and haircuts applicable in the formula set out in CRE32.10:

Type of collateral	LGD_S	Haircut
Eligible financial collateral	0%	As determined by the haircuts that apply in the comprehensive formula of the standardised approach for credit risk (CRE22.49 for jurisdictions that allow the use of ratings for regulatory purposes and CRE22.50 for jurisdictions that do not). The haircuts have to be adjusted for different holding periods and non-daily remargining or revaluation according to CRE22.56 to CRE22.59 of the standardised approach.
Eligible receivables	20%	40%
Eligible residential real estate / commercial real estate	20%	40%
Other eligible physical collateral	25%	40%
Ineligible collateral	Not applicable	100%

32.12

When eligible collateral is denominated in a different currency to that of the exposure, the haircut for currency risk is the same haircut that applies in the comprehensive approach (CRE22.52 of the standardised approach).

32.13

Banks that lend securities or post collateral must calculate capital requirements for both of the following: (i) the credit risk or market risk of the securities, if this remains with the bank; and (ii) the counterparty credit risk arising from the risk that the borrower of the securities may default. CRE32.37 to CRE32.43 set out the calculation the EAD arising from transactions that

give rise to counterparty credit risk. For such transactions the LGD of the counterparty must be determined using the LGD specified for unsecured exposures, as set out in CRE32.6 and CRE32.7.

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

32.14

In the case where a bank has obtained multiple types of collateral it may apply the formula set out in CRE32.10 sequentially for each individual type of collateral. In doing so, after each step of recognising one individual type of collateral, the remaining value of the unsecured exposure (E_U) will be reduced by the adjusted value of the collateral (E_S) recognised in that step. In line with CRE32.10, the total of E_S across all collateral types is capped at the value of $E \bullet (1+H_E)$. This results in the formula that follows, where for each collateral type i:

1. LGD_{Si} is the LGD applicable to that form of collateral (as specified in CRE32.11).
2. E_{Si} is the current value of the collateral received after the application of the haircut applicable for the type of collateral (H_c) (as specified in CRE32.11).

$$LGD^{*} = LGD_{U} \cdot \frac{E_{U}}{E \cdot \left(1 + H_{E}\right)} + \sum_{i} LGD_{Si} \cdot \frac{E_{Si}}{E \cdot \left(1 + H_{E}\right)}$$

LGD under the advanced approach

32.15

Subject to certain additional minimum requirements specified below (and the conditions set out in CRE30.34), supervisors may permit banks to use their own internal estimates of LGD for corporate and sovereign 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.

32.16

The LGD for each corporate exposure that is used as input into the risk weight formula and the calculation of expected loss must not be less than the parameter floors indicated in the table below (the floors do not apply to the LGD for exposures in the sovereign asset class):

LGD parameter floors for corporate exposures	
Unsecured	Secured
25%	Varying by collateral type: • 0% financial • 10% receivables • 10% commercial or residential real estate • 15% other physical

32.17

The LGD floors for secured exposures in the table above apply when the exposure is fully

secured (ie the value of collateral after the application of haircuts exceeds the value of the exposure). The LGD floor for a partially secured exposure is calculated as a weighted average of the unsecured LGD floor for the unsecured portion and the secured LGD floor for the secured portion. That is, the following formula should be used to determine the LGD floor, where:

1. $LGD_{U\ floor}$ and $LGD_{S\ floor}$ are the floor values for fully unsecured and fully secured exposures respectively, as specified in the table in CRE32.16.
2. The other terms are defined as set out in CRE32.10 and CRE32.11.

$$Floor = LGD_{U\ floor} \cdot \frac{E_U}{E \cdot \left(1 + H_E\right)} + LGD_{S\ floor} \cdot \frac{E_S}{E \cdot \left(1 + H_E\right)}$$

32.18

In cases where a bank has met the conditions to use their own internal estimates of LGD for a pool of unsecured exposures, and takes collateral against one of these exposures, it may not be able to model the effects of the collateral (ie it may not have enough data to model the effect of the collateral on recoveries). In such cases, the bank is permitted to apply the formula set out in CRE32.10 or CRE32.14, with the exception that the LGD_U term would be the bank's own internal estimate of the unsecured LGD. To adopt this treatment the collateral must be eligible under the F-IRB and the bank's estimate of LGD_U must not take account of any effects of collateral recoveries.

32.19

The minimum requirements for the derivation of LGD estimates are outlined in CRE36.83 to CRE36.88.

Treatment of certain repo-style transactions

32.20

Banks that want to recognise the effects of master netting agreements on repo-style transactions for capital purposes must apply the methodology outlined in CRE32.38 for determining E* for use as the EAD in the calculation of counterparty credit risk. For banks using the advanced approach, own LGD estimates would be permitted for the unsecured equivalent amount (E*) used to calculate counterparty credit risk. In both cases banks, in addition to counterparty credit risk, must also calculate the capital requirements relating to any credit or market risk to which they remain exposed arising from the underlying securities in the master netting agreement.

Treatment of guarantees and credit derivatives

32.21

There are two approaches for recognition of credit risk mitigation (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.

32.22

Under either approach, CRM in the form of guarantees and credit derivatives must not reflect

the effect of double default (see CRE36.102). 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

32.23

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 CRE22.70 to CRE22.84. 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 CRE22.70 to CRE22.75 of the standardised approach must be met.

32.24

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:
    1. the risk-weight function appropriate to the type of guarantor, and
    2. the PD appropriate to the guarantor's borrower grade.
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. For example, when a bank has a subordinated claim on the borrower but the guarantee represents a senior claim on the guarantor this may be reflected by using an LGD applicable for senior exposures (see CRE32.6) instead of an LGD applicable for subordinated exposures.
3. In case the bank applies the standardised approach to direct exposures to the guarantor it may only recognise the guarantee by applying the standardised approach to the covered portion of the exposure.

32.25

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

32.26

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 CRE22.80 to CRE22.81 of the standardised approach, and depends upon whether the cover is proportional or tranched.

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

32.27

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. In case the bank applies the standardised approach to direct exposures to the guarantor it may only recognise the guarantee by applying the standardised approach to the covered portion of the exposure. In case the bank applies the F-IRB approach to direct exposures to the guarantor it may only recognise the guarantee by determining the risk weight for the comparable direct exposure to the guarantor according to the F-IRB approach.

32.28

A bank relying on own-estimates of LGD has the option to adopt the treatment outlined in CRE32.23 to CRE32.26 above for banks under the F-IRB approach, 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 CRE36.104 to CRE36.105 concerning the type of guarantee must be satisfied. For credit derivatives, the requirements of CRE36.110 to CRE36.111 must be satisfied. For exposures for which a bank has permission to use its own estimates of LGD, the bank may recognise the risk mitigating effects of first-to-default credit derivatives, but may not recognise the risk mitigating effects of second-to-default or more generally nth-to-default credit derivatives.

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 CRE22.68 of the standardised approach. Where currency or maturity mismatched on-balance sheet netting exists, the treatment follows the standardised approach, as set out in CRE22.10 and CRE22.12 to CRE22.15.

Exposure measurement for off-balance sheet items (with the exception of derivatives)

32.31

For off-balance sheet items there are two approaches for the estimation of EAD: 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.

32.32

In the foundation approach, EAD is calculated as the committed but undrawn amount multiplied by a credit conversion factor (CCF). In the advanced approach, EAD for undrawn commitments may be calculated as the committed but undrawn amount multiplied by a CCF or derived from direct estimates of total facility EAD. In both the foundation approach and advanced approaches, the definition of commitments is the same as in the standardised approach, as set out in CRE20.94.

EAD under the foundation approach

32.33

The types of instruments and the CCFs applied to them under the F-IRB approach are the same as those in the standardised approach, as set out in CRE20.94 to CRE20.101.

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 of the 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

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

32.36

Banks which meet the minimum requirements for use of their own estimates of EAD (see CRE36.89 to CRE36.98) will be allowed for exposures for which A-IRB is permitted (see CRE30.33) to use their own internal estimates of EAD for undrawn revolving commitments to extend credit, purchase assets or issue credit substitutes provided the exposure is not subject to a CCF of 100% in the foundation approach (see CRE32.33). Standardised approach CCFs must be used for all other off-balance sheet items (for example, undrawn non-revolving commitments), and must be used where the minimum requirements for own estimates of EAD are not met. The EAD for each exposure that is not in the sovereign asset class that is used as input into the risk weight formula and the calculation of expected loss is subject to a floor that is the sum of: (i) the on balance sheet amount; and (ii) 50% of the off balance sheet exposure using the applicable CCF in the standardised approach.

Exposures that give rise to counterparty credit risk

32.37

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 (SFTs)), the EAD is to be calculated under the rules set forth in CRE50 to CRE54.

32.38

For SFTs, banks may recognise a reduction in the counterparty credit risk requirement arising from the effect of a master netting agreement providing that it satisfies the criteria set out in CRE22.62 and CRE22.63 of the standardised approach. The bank must calculate E*, which is the exposure to be used for the counterparty credit risk requirement taking account of the risk mitigation of collateral received, using the formula set out in CRE22.65 of the standardised approach. In calculating risk-weighted assets and expected loss (EL) amounts for the counterparty credit risk arising from the set of transactions covered by the master netting agreement, E* must be used as the EAD of the counterparty.

32.39

As an alternative to the use of standard haircuts for the calculation of the counterparty credit risk requirement for SFTs set out in CRE32.38, banks may be permitted to use a value-at-risk (VaR) models approach to reflect price volatility of the exposures and the financial collateral. This approach can take into account the correlation effects between security positions. This approach applies to single SFTs and SFTs covered by netting agreements on a counterparty-by-counterparty basis, both under the condition that the collateral is revalued on a daily basis. This holds for the underlying securities being different and unrelated to securitisations. The master netting agreement must satisfy the criteria set out in CRE22.62 and CRE22.63 of the standardised approach. 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 market risk model recognition can separately apply for supervisory recognition to use their internal VaR models for the calculation of potential price volatility for SFTs, provided the model meets the requirements of MAR30.2. Although the market risk standards have changed from a 99% VaR to a 97.5% expected shortfall, the VaR models approach to SFTs retains the use of a 99% VaR to calculate the counterparty credit risk for SFTs. The VaR model needs to capture risk sufficient to pass the backtesting and profit and loss attribution tests of MAR30.4. The default risk charge of MAR33.18 to MAR33.39 is not required in the VaR model for SFTs.

32.40

The quantitative and qualitative criteria for recognition of internal market risk models for SFTs are in principle the same as in MAR30.5 to MAR30.16 and MAR33.1 to MAR33.12. The minimum liquidity horizon or the holding period for SFTs is 5 business days for margined repo-style transactions, rather than the 10 business days in MAR33.12. 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.

32.41

The calculation of the exposure E* for banks using their internal model to calculate their counterparty credit risk requirement will be as follows, where banks will use the previous day's VaR number:

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

32.42

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

32.43

As in the standardised approach, for transactions where the conditions in CRE22.36 are met, and in addition, the counterparty is a core market participant as specified in CRE22.37, supervisors may choose not to apply the haircuts specified under the comprehensive approach, but instead to apply a zero H. A netting set that contains any transaction that does not meet the requirements in CRE22.36 of the standardised approach is not eligible for this treatment.

Effective maturity (M)

32.44

Effective maturity (M) will be 2.5 years for exposures to which the bank applies the foundation approach, except for repo-style transactions where the effective maturity is 6 months (ie M=0.5). 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.

32.45

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 allow the effective maturity to be fixed at 2.5 years (the “fixed maturity treatment”) for facilities to certain smaller domestic corporate borrowers 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 fixed maturity treatment is applied. If adopted, national supervisors must apply the fixed maturity treatment to all IRB banks using the advanced approach in that country, rather than on a bank-by-bank basis.

32.46

Except as noted in CRE32.51, the effective maturity (M) is subject to a floor of one year and a cap of 5 years.

32.47

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:

$$\textit{Effective maturity} = \mathrm{M} = \sum_t t \cdot CF_t \,/\, \sum_t CF_t$$

32.48

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.

32.49

For derivatives subject to a master netting agreement, the effective maturity is defined as the weighted average maturity of the transactions within the netting agreement. Further, the notional amount of each transaction should be used for weighting the maturity.

32.50

For revolving exposures, effective maturity must be determined using the maximum contractual termination date of the facility. Banks must not use the repayment date of the current drawing.

32.51

The one-year floor, set out in CRE32.46 above, does not apply to certain short-term exposures, comprising fully or nearly-fully collateralised 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), except for transactions subject to a master netting agreement, where the floor is determined by the minimum holding period for the transaction type, as required by CRE32.54.

32.52

The one-year floor, set out in CRE32.46 above, 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.

32.53

In addition to the transactions considered in CRE32.51 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 CRE32.51.
2. Some trade finance transactions that are not exempted by CRE32.52.
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.
6. Some short-term loans and deposits.

32.54

For transactions falling within the scope of CRE32.51 subject to a master netting agreement, the effective maturity is defined as the weighted average maturity of the transactions. A floor equal to the minimum holding period for the transaction type set out in CRE22.57 of the standardised approach 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.

32.55

Where there is no explicit definition, the effective maturity (M) assigned to all exposures is set at 2.5 years unless otherwise specified in CRE32.44.

Treatment of maturity mismatches

32.56

The treatment of maturity mismatches under IRB is identical to that in the standardised approach (see CRE22.10 to CRE22.14).

Risk components for retail exposures

32.57

This section, CRE32.57 to CRE32.67, sets out the calculation of the risk components for retail exposures. In the case of an exposure that is guaranteed by a sovereign, the floors that apply to the risk components do not apply to that part of the exposure covered by the sovereign guarantee (ie any part of the exposure that is not covered by the guarantee is subject to the relevant floors).

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

32.58

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: (i) the one-year PD associated with the internal borrower grade to which the pool of retail exposures is assigned; and (ii) 0.1% for qualifying revolving retail exposure (QRRE) revolvers (see CRE30.24 for the definition of QRRE revolvers) and 0.05% for all other exposures. The LGD for each exposure that is used as input into the risk weight formula and the calculation of expected loss must not be less than the parameter floors indicated in the table below:

LGD parameter floors for retail exposures

Type of exposure	*Unsecured*	*Secured*
Mortgages	Not applicable	5%
QRRE (transactors and revolvers)	50%	Not applicable
Other retail	30%	Varying by collateral type: • 0% financial • 10% receivables • 10% commercial or residential real estate • 15% other physical

32.59

Regarding the LGD parameter floors set out in the table above, the LGD floors for partially secured exposures in the "other retail" category should be calculated according to the formula set out in CRE32.17. The LGD floor for residential mortgages is fixed at 5%, irrespective of the level of collateral provided by the property.

Recognition of guarantees and credit derivatives

32.60

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 CRE36.100 to CRE36.111. 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 case the bank applies the standardised approach to direct exposures to the guarantor it may only recognise the guarantee by applying the standardised approach risk weight to the covered portion of the exposure.

32.61

Consistent with the requirements outlined above for corporate 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)

32.62

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 chapter CRE35.

32.63

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 CRE22.68 and CRE22.69 of the standardised approach. The definition of commitment is the same as in the standardised approach, as set out in CRE20.94. Banks must use their own estimates of EAD for undrawn revolving commitments to extend credit, purchase assets or issue credit substitutes provided the exposure is not subject to a CCF of 100% in the standardised approach (see CRE20.92) and the minimum requirements in CRE36.89 to CRE36.99 are satisfied. Foundation approach CCFs must be used for all other off-balance sheet items (for example, undrawn non-revolving commitments), and must be used where the minimum requirements for own estimates of EAD are not met.

32.64

Regarding own estimates of EAD, the EAD for each exposure that is used as input into the risk weight formula and the calculation of expected loss is subject to a floor that is the sum of: (i) the on balance sheet amount; and (ii) 50% of the off balance sheet exposure using the applicable CCF in the standardised approach.

32.65

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.

32.66

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 the securitised exposures using the IRB approach to credit risk for commitments.

32.67

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.

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 December 2019

FAQs on climate related financial risks added on 8 December 2022.

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 *debt service coverage ratio (DSCR), loan life coverage ratio, project life coverage ratio, and debt-to-equity ratio*)	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

	Strong	Good	Satisfactory	Weak
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
Financial structure				
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 with limited bullet payment	Bullet repayment or amortising 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

	Strong	Good	Satisfactory	Weak
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 even if certain non-key issues may exist	There are unresolved key issues in respect if actual enforcement of contracts, collateral and security
Transaction characteristics				
Design and technology risk	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
Construction risk				
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

	Strong	Good	Satisfactory	Weak
Completion guarantees	Substantial liquidated damages supported by financial substance and/or strong completion guarantee from sponsors with excellent financial standing	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
Track record and financial strength of contractor in constructing similar projects.	Strong	Good	Satisfactory	Weak
Operating risk				
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
Off-take risk				
(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

	Strong	Good	Satisfactory	Weak
(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 absorbed at projected prices even at lower than historic market growth rates	Project produces essential services or a commodity sold widely on a regional market that will absorb it at projected prices at historical growth rates	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 organised market
Supply risk				
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 inject additional cash if necessary	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
Security Package				
Assignment of contracts and accounts	Fully comprehensive	Comprehensive	Acceptable	Weak

	Strong	Good	Satisfactory	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

	Strong	Good	Satisfactory	Weak
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 during a period of severe financial stress (eg interest rates, economic growth)	The property can meet its financial obligations under a sustained period of financial stress (eg interest rates, economic growth). The property is likely to default only under severe economic conditions	During an economic downturn, the property would suffer a decline in revenue that would limit its ability to fund capital expenditures and significantly increase the risk of default	The property's financial condition is strained and is likely to default unless conditions improve in the near term
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 but not stabilised property	Leasing activity meets or exceeds projections. The project should achieve stabilisation in the near future	Leasing activity meets or 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 investment grade tenant or buyer, or the bank has a binding commitment for take-out financing from an investment grade lender	The property is entirely pre-leased or pre-sold to a creditworthy tenant or buyer, or the bank has a binding commitment for permanent financing from a creditworthy lender	Leasing activity is within projections but the building may not be pre-leased and there may not exist a take-out financing. The bank may be the permanent lender	The property is deteriorating due to cost overruns, market deterioration, tenant 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				

	Strong	Good	Satisfactory	Weak
Financial capacity and willingness to support the property.	The sponsor/developer 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	The sponsor/developer made 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	The sponsor/developer's contribution may be immaterial or non-cash. The sponsor/developer is average to below average in financial resources	The sponsor/developer lacks 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 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.	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.	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

	Strong	Good	Satisfactory	Weak
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				
Political risk, including transfer risk	Very low; strong mitigation instruments, if needed	Low; satisfactory mitigation instruments, if needed	Moderate; fair mitigation instruments	High; no or weak 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				

	Strong	Good	Satisfactory	Weak
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 re-market 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				

	Strong	Good	Satisfactory	Weak
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 re-market the asset
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

	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 1st 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

	Strong	Good	Satisfactory	Weak
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 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

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 01 January 2023

Changes due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020. Also, cross references to the securitisation chapters updated to include a reference to the chapter on NPL securitisations (CRE45) published on 26 November 2020.

Introduction

34.1

This chapter presents the method of calculating the unexpected loss 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. 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.

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:
    1. If the bank can demonstrate that the exposures are exclusively senior claims to corporate borrowers:
    (i)

    An LGD of 40% 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 40% of any undrawn purchase commitments minus $K_{Dilution}$.

    2. 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 40% 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, effective maturity (M) and the treatment of guarantees under the foundation approach as given in CRE32.6 to CRE32.14, CRE32.20 to CRE32.26 and CRE32.44.

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 CRE36.83) 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, 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 CRE36.83. 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 40% 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 CRE32.44 to CRE32.55). 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. 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:
    1. The PD must be set equal to the estimated EL.
    2. The LGD must be set at 100%.
    3. 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.

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 CRE32.62) 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 the credit risk standard CRE40 to CRE45, while the seller providing such a refundable purchase price discount must treat the refundable amount as a first-loss position under the securitisation chapters. 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 chapters of the credit risk standard (see CRE44.10). 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 CRE44.21.

Recognition of credit risk mitigants

34.12

Credit risk mitigants will be recognised generally using the same type of framework as set forth in CRE32.21 to CRE32.28. 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 tranched coverage (ie the risk weights of the uncovered risk components will be added to the risk weights of the covered risk components).

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.

Version effective as of 01 January 2023

Changes due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020.

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 exposure at default) associated with its exposures to which the IRB approach is applied (excluding the EL amount associated with securitisation exposures) to obtain a total EL amount.

35.3

Banks must calculate EL as probability of default (PD) x loss-given-default (LGD) for corporate, sovereign, bank, and retail exposures not in default. For corporate, sovereign, bank, and retail exposures that are in default, banks must use their best estimate of expected loss as defined in CRE36.86 for exposures subject to the advanced approach and for exposures subject to the foundation approach banks must use the supervisory LGD. For exposures subject to the supervisory slotting criteria EL is calculated as described in the chapter on the supervisory slotting approach (paragraphs CRE33.8 to CRE33.12). Securitisation exposures do not contribute to the EL amount, as set out in CRE40.36.

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. General and specific provisions set aside against 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 (see CRE30.45 to CRE30.50), must determine the portion of general provisions attributed to the standardised or IRB treatment of provisions according to the methods outlined in paragraphs 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 paragraph 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 paragraph CRE35.4) with the total EL amount as calculated within the IRB approach (as defined in paragraph CRE35.2). In addition, CAP10.18 outlines the treatment for that portion of a bank that is subject to the standardised approach for credit risk when the bank uses both the standardised and IRB approaches.

35.9

Where the calculated EL amount is lower than the total eligible 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.

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.

Version effective as of 01 January 2023

Changes due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020. FAQs on climate related financial risks added on 8 December 2022.

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 11 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. 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) 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 CRE36.83 to CRE36.111.

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 standard (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 exposures subject to the foundation IRB approach, 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 are exempt from this two-dimensional requirement for these exposures. Given the interdependence between borrower/transaction characteristics in exposures subject to the supervisory slotting approaches, 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 the general corporate foundation or advanced approach for the specialised lending (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 cross-collateral 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 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 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 CRE36.63), 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. 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. Rating systems should be designed in such a way that idiosyncratic or industry-specific changes are a driver of migrations from one category to another, and business cycle effects may also be a driver.

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.

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 CRE36.68 to CRE36.76.

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

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.

36.53

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

36.54

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. 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.

36.55

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.

36.56

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

36.57

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.

36.58

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

36.59

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

36.60

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.

36.61

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)

36.62

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

36.63

PD estimates must be a long-run average of one-year default rates for borrowers in the grade, with the exception of retail exposures as set out in CRE36.81 and CRE36.82. Requirements specific to PD estimation are provided in CRE36.77 to CRE36.82. Banks on the advanced approach must estimate an appropriate LGD (as defined in CRE36.83 to CRE36.88) for each of its facilities (or retail pools). For exposures subject to the advanced approach, banks must also

estimate an appropriate long-run default-weighted average EAD for each of its facilities as defined in CRE36.89 and CRE36.90. Requirements specific to EAD estimation appear in CRE36.89 to CRE36.99. 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 CRE36.128 to CRE36.145.

36.64

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.

36.65

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.

36.66

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 CRE36.83 to CRE36.99. 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.

36.67

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

36.68

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. 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.

36.69

The elements to be taken as indications of unlikeliness 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.
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.
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.

36.70

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

36.71

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.

36.72

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 CRE36.78. 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.

36.73

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

36.74

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

36.75

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

36.76

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

36.77

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.

36.78

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. For all methods listed below, banks must estimate a PD for each rating grade based on the observed historical average one-year default rate that is a simple average based on number of obligors (count weighted). Weighting approaches, such as EAD weighting, are not permitted.

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 CRE36.68 to CRE36.73. 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.

36.79

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. The data should include a representative mix of good and bad years.

Requirements specific to PD estimation: retail exposures

36.80

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.

36.81

One method for deriving long-run average estimates of PD and default-weighted average loss rates given default (as defined in CRE36.83) 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 CRE36.83.

36.82

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. The data should include a representative mix of good and bad years of the economic cycle relevant for the portfolio. The PD should be based on the observed historical average one-year default rate.

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

36.83

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 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 make reference to the 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.

36.84

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.

36.85

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 foundation IRB approach.

36.86

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 CRE31.3. 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 and sovereign exposures

36.87

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

36.88

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.

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

36.89

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). Banks using the advanced approach 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.

36.90

Under the advanced approach, banks must assign an estimate of EAD for each eligible 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. Moreover, where a bank bases its estimates on alternative measures of central tendency (such as the median or a higher percentile estimate) or only on 'downturn' data, it should explicitly confirm that the basic downturn requirement of the framework is met, ie the bank's estimates do not fall below a (conservative) estimate of the long-run default-weighted average EAD for similar facilities.

36.91

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.

36.92

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.

36.93

Banks' EAD estimates must be developed using a 12-month fixed-horizon approach; ie for each observation in the reference data set, default outcomes must be linked to relevant obligor and facility characteristics twelve months prior to default.

36.94

As set out in CRE36.66, banks' EAD estimates should be based on reference data that reflect the obligor, facility and bank management practice characteristics of the exposures to which the estimates are applied. Consistent with this principle, EAD estimates applied to particular exposures should not be based on data that comingle the effects of disparate characteristics or data from exposures that exhibit different characteristics (eg same broad product grouping but different customers that are managed differently by the bank). The estimates should be based on appropriately homogenous segments. Alternatively, the estimates should be based on an estimation approach that effectively disentangles the impact of the different characteristics

exhibited within the relevant dataset. Practices that generally do not comply with this principle include use of estimates based or partly based on:

1. SME/midmarket data being applied to large corporate obligors.
2. Data from commitments with ‘small’ unused limit availability being applied to facilities with ‘large’ unused limit availability.
3. Data from obligors already identified as problematic at reference date being applied to current obligors with no known issues (eg customers at reference date who were already delinquent, watchlisted by the bank, subject to recent bank-initiated limit reductions, blocked from further drawdowns or subject to other types of collections activity).
4. Data that has been affected by changes in obligors’ mix of borrowing and other credit-related products over the observation period unless that data has been effectively mitigated for such changes, eg by adjusting the data to remove the effects of the changes in the product mix. Supervisors should expect banks to demonstrate a detailed understanding of the impact of changes in customer product mix on EAD reference data sets (and associated EAD estimates) and that the impact is immaterial or has been effectively mitigated within each bank’s estimation process. Banks’ analyses in this regard should be actively challenged by supervisors. Effective mitigation would not include: setting floors to credit conversion factor (CCF)/EAD observations; use of obligor-level estimates that do not fully cover the relevant product transformation options or inappropriately combine products with very different characteristics (eg revolving and non-revolving products); adjusting only ‘material’ observations affected by product transformation; generally excluding observations affected by product profile transformation (thereby potentially distorting the representativeness of the remaining data).

36.95

A well-known feature of the commonly used undrawn limit factor (ULF) approach to estimating CCFs is the region of instability associated with facilities close to being fully drawn at reference date. Banks should ensure that their EAD estimates are effectively quarantined from the potential effects of this region of instability.

1. An acceptable approach could include using an estimation method other than the ULF approach that avoids the instability issue by not using potentially small undrawn limits that could approach zero in the denominator or, as appropriate, switching to a method other than the ULF as the region of instability is approached, eg a limit factor, balance factor or additional utilisation factor approach. Note that, consistent with CRE36.94, including limit utilisation as a driver in EAD models could quarantine much of the relevant portfolio from this issue but, in the absence of other actions, leaves open how to develop appropriate EAD estimates to be applied to exposures within the region of instability.
2. Common but ineffective approaches to mitigating this issue include capping and flooring reference data (eg observed CCFs at 100 per cent and zero respectively) or omitting observations that are judged to be affected.

36.96

EAD reference data must not be capped to the principal amount outstanding or facility limits. Accrued interest, other due payments and limit excesses should be included in EAD reference data.

36.97

For transactions that expose banks to counterparty credit risk, estimates of EAD must fulfil the requirements set forth in the counterparty credit risk standards.

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

36.98

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

36.99

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.

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

36.100

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.

36.101

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.

36.102

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.”

36.103

In case the bank applies the standardised approach to direct exposures to the guarantor, the guarantee may only be recognised by treating the covered portion of the exposure as a direct exposure to the guarantor under the standardised approach. Similarly, in case the bank applies the foundation IRB approach to direct exposures to the guarantor, the guarantee may only be recognised by applying the foundation IRB approach to the covered portion of the exposure. Alternatively, banks may choose to not recognise the effect of guarantees on their exposures.

36.104

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.

36.105

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. The guarantee 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. However, under the advanced IRB approach, guarantees that only cover loss remaining after the bank has first pursued the original obligor for payment and has completed the workout process may be recognised.

36.106

In case of guarantees where the bank applies the standardised approach to the covered portion of the exposure, the scope of guarantors and the minimum requirements as under the standardised approach apply.

36.107

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.

36.108

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.

36.109

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 and sovereign exposures where own estimates of LGD are used and standards for retail exposures

36.110

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.

36.111

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

36.112

The minimum requirements outlined in CRE36.100 to CRE36.111 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 CRE32.23.

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

36.113

The 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.

36.114

The 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.

36.115

A 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 CRE36.116).
2. Effectiveness of monitoring systems (see CRE36.117)
3. Effectiveness of work-out systems (see CRE36.118)
4. Effectiveness of systems for controlling collateral, credit availability, and cash (see CRE36.119)
5. Compliance with the bank's internal policies and procedures (see CRE36.120 and CRE36.121)

36.116

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.

36.117

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:
    1. assess the correlation among the quality of the receivables and the financial condition of both the seller and servicer; and
    2. 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:
    1. over-advances;
    2. history of the seller's arrears, bad debts, and bad debt allowances;
    3. payment terms; and

    4. 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:
    1. ensure compliance with the bank's eligibility criteria and advancing policies governing purchased receivables; and
    2. provide an effective means with which to monitor and confirm the seller's terms of sale (eg invoice date ageing) and dilution.

36.118

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.

36.119

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).

36.120

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:
    1. between the assessment of the seller/servicer and the assessment of the obligor; and
    2. between the assessment of the seller/servicer and the field audit of the seller/servicer.

36.121

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

36.122

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.

36.123

Banks 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.

36.124

Banks 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.

36.125

Banks 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.

36.126

Banks 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.

36.127

Where 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

36.128

Banks 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 section 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 and residential real estate as collateral

36.129

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; 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.

36.130

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.

Operational requirements for eligible commercial or residential real estate

36.131

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 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. 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. Where junior liens are recognised the bank must first take the haircut value of the collateral, then reduce it by the sum of all loans with liens that rank higher than the junior lien, the remaining value is the collateral that supports the loan with the junior lien. In cases where liens are held by third parties that rank pari passu with the lien of the bank, only the proportion of the collateral (after the application of haircuts and reductions due to the value of loans with liens that rank higher than the lien of the bank) that is attributable to the bank may be recognised.

36.132

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

36.133

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

36.134

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.

36.135

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.

36.136

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.

36.137

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

36.138

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 (eg 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.

36.139

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.

36.140

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.

36.141

The receivables pledged by a borrower should be diversified and not be unduly correlated with the borrower. Where the correlation is high, eg 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.

36.142

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

36.143

Supervisors may allow for recognition of the credit risk mitigating effect of certain other physical collateral when the following conditions are met:

1. The bank demonstrates to the satisfaction of the supervisor that there are liquid markets for disposal of collateral in an expeditious and economically efficient manner. Banks must carry out a reassessment of this condition both periodically and when information indicates material changes in the market.
2. The bank demonstrates to the satisfaction of the supervisor that there are well established, publicly available market prices for the collateral. Banks must also demonstrate that the amount they receive when collateral is realised does not deviate significantly from these market prices.

36.144

In order for a given bank to receive recognition for additional physical collateral, it must meet all the standards in CRE36.131 and CRE36.132, subject to the following modifications:

1. With the sole exception of permissible prior claims specified in the footnote to CRE36.131, 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 and the right to examine and revalue the collateral whenever this is deemed necessary by the lending bank.
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.

36.145

General Security Agreements, and other forms of floating charge, can provide the lending bank with a registered claim over a company’s assets. In cases where the registered claim includes both assets that are not eligible as collateral under the foundation IRB and assets that are eligible as collateral under the foundation IRB, the bank may recognise the latter. Recognition is conditional on the claims meeting the operational requirements set out in CRE36.128 to CRE36.144.

Section 10: requirements for recognition of leasing

36.146

Leases other than those that expose the bank to residual value risk (see CRE36.147) 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.

36.147

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: disclosure requirements

36.148

In order to be eligible for the IRB approach, banks must meet the disclosure requirements set out in the disclosure requirements standard (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 01 January 2023

The 1.06 scaling factor has been removed to reflect its removal in the December 2017 publication of Basel III. The simple, transparent and comparable criteria related to credit risk of underlying exposures has been adapted to reflect the credit risk asset classes as defined in the December 2017 Basel III standardised approach for credit risk. The revised implementation date is as announced on 27 March 2020. A reference to the treatment of exposures to securitisations of non-performing loans (CRE45) is introduced in CRE40.48.

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 tranched cover as described in CRE22.81. 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 tranched 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 retranching 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. 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.

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 euro 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. $$M_T = 1 + 80\%\left(M_L - 1\right)$$

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 opinion 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:
    1. is able to repurchase from the transferee the previously transferred exposures in order to realise their benefits; or
    2. 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
    1. 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;
    2. allow for increases in a retained first-loss position or credit enhancement provided by the originating bank after the transaction's inception; or
    3. 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.

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 CRE22.34. Eligible collateral pledged by SPEs may be recognised.
3. Eligible guarantors are defined in CRE22.76. 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:
    1. 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);

2. clauses that require the originating bank to alter the underlying exposures to improve the pool's average credit quality;
3. clauses that increase the banks' cost of credit protection in response to deterioration in the pool's quality;
4. 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
5. 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
    1. subordinate the bank's senior or pari passu interest in the underlying revolving credit facilities to the interest of other investors;
    2. subordinate the bank's subordinated interest to an even greater degree relative to the interests of other parties; or
    3. 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 expand 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

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 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:

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

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. For exposures to securitisations of non-performing loans as defined in CRE45.1, banks must apply the framework with the adjustments laid out in CRE45.

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 expected loss portion. 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) 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.

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:
    1. 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.
    2. 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):
    1. For an IRB pool, K_P equals K_{IRB} as defined in CRE44.2 to CRE44.13.
    2. For an SA pool, K_P equals K_{SA} as defined in CRE41.2 to CRE41.5.
    3. 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, CRE22.34 when the bank applies the SEC-ERBA or SEC-SA, and CRE32.8 when the bank applies the SEC-IRBA. Collateral pledged by SPEs may be recognised;
2. credit protection provided by the entities listed in CRE22.76 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 CRE22.70 to CRE22.75, 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 tranched credit protection, the original securitisation tranche will be decomposed into protected and unprotected sub-tranches:

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 tranched protection on the securitisation exposure. In doing so, it must calculate capital requirements for each sub-tranche separately and as follows:
    1. 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.

2. 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).

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, the bank will use the risk weight of the original securitisation exposure.
2. For a sub-tranche of lower priority:
    1. 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.
    2. 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.

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 CRE22.10 to CRE22.14. 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 tranched 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 CRE22.10 to CRE22.14. 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, principal, interest, or principal and interest payments. Any referenced interest payments or discount rates should be based on commonly encountered market interest rates, but should not reference complex or complicated formulae or exotic derivatives.

1. For capital purposes, the “homogeneity” criterion should be assessed taking into account the following principles:
    1. 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.
    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 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:
    1. 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
    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.
3. Interest rate caps and/or floors would not automatically be considered exotic derivatives.

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.
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.

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 or parties to the securitisation 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:

1. 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; and
2. the obligor is not recorded on a public credit registry of persons with an adverse credit history; and,
3. the obligor does not have a credit assessment by an ECAI 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.

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.

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, the performance of the securitisation should not rely upon the ongoing selection of assets through active management 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.

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 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).

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 issuance and should clearly demonstrate the method of recourse to ultimate obligors. 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.

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 reviewed 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.

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.

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 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.

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 offering and to ensure that this information is set out in a clear and effective manner for all programmes and offerings, sufficient initial offering and draft underlying 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.

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.

1. 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 "regulatory residential real estate" exposures as defined in CRE20.77;

2. 50% on an individual exposure basis where the exposure is a "regulatory commercial real estate" exposure as defined in CRE20.78, an "other real estate" exposure as defined in CRE20.88 or a land ADC exposure as defined in CRE20.90;
3. 75% on an individual exposure basis where the exposure is a "regulatory retail" exposure, as defined in CRE20.65; 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% of the aggregated outstanding exposure value of all exposures in the portfolio.

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:
    1. 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
    2. transferred those assets through a transaction or passed on the interest 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.

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 resecuritisation.

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. 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, 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, but should not reference complex or complicated formulae or exotic derivatives.

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.

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;
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.

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 managed or otherwise cherry-picked on a discretionary basis.

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 transfer 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.

40.120

The 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.

40.121

The 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

40.122

An 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)

40.123

To 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 support 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.

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”). 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.

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 conduit ; and
2. the exposure-weighted average maturity of the underlying assets financed by the conduit calculated by:
    1. taking an exposure-weighted average of residual maturities of the underlying assets in each pool; and
    2. taking an exposure-weighted average across the conduit of the pool-level averages as calculated in Step 2a.

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 "regulatory residential real estate" exposures as defined in CRE20.77;
2. 50% on an individual exposure basis where the exposure is a "regulatory commercial real estate" exposure as defined in CRE20.78, an "other real estate" exposure as defined in

CRE20.88 or a land ADC exposure as defined in CRE20.90;

3. 75% on an individual exposure basis where the exposure is a "regulatory retail" exposure as defined in CRE20.65; 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% of the aggregated outstanding exposure value of all exposures in the programme.

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 December 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. 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.

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 tranched loss allocation.

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:

$$K_A = \left(1 - W\right) \times K_{SA} + 0.5W$$

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:

$$K_A = \left(\frac{EAD_{subpool\ 1\ where\ W\ known}}{EAD Total} \times K_A^{subpool\ 1\ where\ W\ known} \right) + \frac{EAD_{subpool\ 2\ where\ W\ unknown}}{EAD Total}$$

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 $K_{SSFA(KA)}$ is the capital requirement per unit of the securitisation exposure and the variables a, u, and l are defined as:

1. a = –(1 / (p * K_A))
2. u = D – K_A
3. 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 01 January 2023

Cross references updated due to the December 2017 Basel III standard coming into effect.

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.

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.

ERBA risk weights for long-term ratings — Table 2

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 D minus A, as defined, respectively, in CRE44.15 and CRE44.14:
$$\textit{Risk weight} = (\textit{risk weight from table after adjusting for maturity}) \times (1 - \min(T, 50\%))$$

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. 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 ECAIs can be used and these assess the credit risk of the same securitisation exposure differently, CRE21.9 to CRE21.11 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).

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 December 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
    1. that the ECAI meets the ECAI eligibility criteria outlined in CRE21 and
    2. 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 ECAIs so that supervisors can determine which internal assessment corresponds to each external rating category of the ECAIs.
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.
    1. 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.

2. 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.
3. 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.
4. 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:
    1. exclude the purchase of assets that are significantly past due or defaulted;
    2. limit excess concentration to individual obligor or geographical area; and
    3. 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 01 January 2023

References have been updated and the 1.06 scaling factor has been removed to reflect its removal in the December 2017 publication of Basel III. Chapter reflects the revised implementation date announced on 27 March 2020.

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).

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. 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 mitigated) or that it does not affect the bank's securitisation exposure.

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 tranched loss allocation.

44.6

To calculate K_{IRB}, the treatment for eligible purchased receivables described in CRE30.27 to CRE30.31, CRE34.2 to CRE34.7, CRE36.107, CRE36.109, CRE36.113 to CRE36.121 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 CRE30.30 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 CRE36.114, the purchasing bank should be interpreted as the bank calculating K_{IRB};
3. in CRE36.116 to CRE36.121 "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 CRE36.116 to CRE36.120, 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 CRE36.118(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
    1. 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
    2. 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
    1. 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
    2. 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 ith 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 ith 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≥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

44.29

The resulting risk weight is subject to a floor risk weight of 10% for senior tranches, and 15% for non-senior tranches.

CRE45

Securitisations of non-performing loans

This chapter describes how to calculate capital requirements for exposures to securitisations of non-performing loans.

Version effective as of 01 January 2023

First version in the format of the consolidated framework, introduced to give effect to the treatment of exposures to securitisations of non-performing loans published on 26 November 2020.

45.1

A non-performing loan securitisation (NPL securitisation) means a securitisation where the underlying pool's variable W, as defined in CRE41.6, is equal to or higher than 90% at the origination cut-off date and at any subsequent date on which assets are added to or removed from the underlying pool due to replenishment, restructuring or any other relevant reason. The underlying pool of exposures of an NPL securitisation may only comprise loans, loan-equivalent financial instruments or tradable instruments used for the sole purpose of loan subparticipation as referred to in CRE40.24(2). Loan-equivalent financial instruments include, for example, bonds not listed on a trading venue. For the avoidance of doubt, an NPL securitisation may not be backed by exposures to other securitisations.

45.2

National supervisors may provide for a stricter definition of NPL securitisations than that laid out in CRE45.1. For these purposes, national supervisors may:

1. raise the minimum level of W to a level higher than 90%; or
2. require that the non-delinquent exposures in the underlying pool comply with a set of minimum criteria, or preclude certain types of non-delinquent exposures from forming part of the underlying pools of NPL securitisations.

Without prejudice to the foregoing, national supervisors should scrutinise NPL securitisations to prevent any instances of regulatory arbitrage. In particular, national supervisors should preclude transactions executed with the main purpose of reducing the capital charge on the non-delinquent exposures in the underlying relative to the 100% risk weight on the senior exposure to the NPL securitisation referred to in CRE45.5.

45.3

A bank is precluded from applying the SEC-IRBA to an exposure to an NPL securitisation where the bank uses the foundation approach as referred to in CRE30.35 to calculate the KIRB of the underlying pool of exposures.

45.4

The risk weight applicable to exposures to NPL securitisations according to SEC-IRBA (CRE44), SEC-SA (CRE41) or the look-through approach in CRE40.50 is floored at 100%.

45.5

Where, according to the hierarchy of approaches in CRE40.41 to CRE40.47, the bank must use the SEC-IRBA or the SEC-SA, a bank may apply a risk weight of 100% to the senior tranche of an NPL securitisation provided that the NPL securitisation is a traditional securitisation and the sum of the non-refundable purchase price discounts (NRPPD), calculated as described in CRE45.6, is equal to or higher than 50% of the outstanding balance of the pool of exposures.

45.6

For the purposes of CRE45.5, NRPPD is the difference between the outstanding balance of the exposures in the underlying pool and the price at which these exposures are sold by the originator to the securitisation entity, when neither originator nor the original lender are reimbursed for this difference. In cases where the originator underwrites tranches of the NPL securitisation for subsequent sale, the NRPPD may include the differences between the nominal amount of the tranches and the price at which these tranches are first sold to unrelated third

parties. For any given piece of a securitisation tranche, only its initial sale from the originator to investors is taken into account in the determination of NRPPD. The purchase prices of subsequent re-sales are not considered.

45.7

An originator or sponsor bank may apply the capital requirement cap specified in CRE40.54 to the aggregated capital requirement for its exposures to the same NPL securitisation. The same applies to an investor bank, provided that it is using the SEC-IRBA for an exposure to the NPL securitisation.

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.

Version effective as of 15 December 2019

Updated to incorporate the FAQ published on 5 July 2024.

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.

Version effective as of 01 January 2023

Changes to introduce minimum haircut floors, as set out in the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020.

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. 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.
    2. 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).
    1. The bank is exposed to the risk that its counterparty defaults and does not return the collateral that the bank posted.
    2. 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).
    1. The bank is exposed to the risk that its counterparty defaults and does not return the cash that the bank posted as collateral.
    2. 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.
    1. The bank is exposed to the risk that the counterparty defaults when the derivative has a positive value for the bank.
    2. The counterparty is exposed to the risk that the bank defaults when the derivative has a positive value for the counterparty.

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), 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).

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 models 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 IMM.
3. The value-at-risk (VaR) models approach, which is set out in CRE32.39 to CRE32.41. For banks applying the IRB approach to credit risk, 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) capped at 1 for each netting set for which the bank calculates CVA capital under either the basic approach (BA-CVA) or the standardised approach (SA-CVA), as provided in MAR50.12.

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.

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.

Minimum haircut floors for securities financing transactions (SFTs)

51.17

Chapter CRE56 specifies the treatment of certain non-centrally cleared SFTs with certain counterparties (in-scope SFTs). The requirements are applicable to banks in jurisdictions that are permitted to conduct in-scope SFTs below the minimum haircut floors specified within CRE56.

CRE52

Standardised approach to counterparty credit risk

This chapter sets out the standardised approach for counterparty credit risk (SA-CCR).

Version effective as of 01 January 2023

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

$$\text{EAD} = alpha * (RC + PFE)$$

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.

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.
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:
    1. 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;
    2. The law that governs the individual transactions; and
    3. 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.

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 unmargined. 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 CRE52.17

$$\text{RC} = \max\{V - C;\ 0\}$$

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. Such mechanics include, for example, "Threshold", "Minimum Transfer Amount" and "Independent Amount" in the standard industry documentation, which are factored into a call for VM. A defined, generic formulation has been created to reflect the variety of margining approaches used and those being considered by supervisors internationally.

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

$$\mathrm{RC} = \max\{V - C; TH + MTA - NICA;\ 0\}$$

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. AddOnaggregate is the aggregate add-on component (see CRE52.25 below)
2. multiplier is defined as a function of three inputs: V, C and AddOnaggregate

$$PFE = multiplier * AddOn^{aggregate}$$

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(…) 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

$$multiplier = \min\left\{1;\ Floor + (1\text{-Floor})*\exp\left(\frac{V-C}{2*(1\text{-Floor})*AddOn^{aggregate}}\right)\right\}$$

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.

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 * δ):
    1. 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).
    2. 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.
    3. 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 is 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

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 = notional * SD_i). The calculated value of SD_i is floored at ten business days. If the start date has occurred (eg an ongoing interest rate swap), S_i must be set to zero.

$$SD_i = \frac{\exp\left(-0.05 * S_i\right) - \exp\left(-0.05 * E_i\right)}{0.05}$$

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.

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_i) 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:

δ_i	Long in the primary risk factor	Short in the primary risk factor
Instruments that are not options or CDO tranches	+1	-1

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:
    1. P_i : Underlying price (spot, forward, average, etc)
    2. K_i : Strike price
    3. 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	$-\Phi\left(-\frac{\ln(P_i / K_i)+0.5*\sigma_i^2*T_i}{\sigma_i*\sqrt{T_i}}\right)$	$+\Phi\left(-\frac{\ln(P_i / K_i)+0.5*\sigma_i^2*T_i}{\sigma_i*\sqrt{T_i}}\right)$

52.41

The delta adjustments for CDO tranches 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	$+\frac{15}{(1+14*A_i)*(1+14*D_i)}$	$-\frac{15}{(1+14*A_i)*(1+14*D_i)}$

Effective notional for options

52.42

For single-payment options the effective notional (ie D = d * MF * δ) 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 $0.95 \bullet K_i$ and $1.05 \bullet K_i$. 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. 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.

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 (basis transactions) must be treated within separate hedging sets within the corresponding asset class. There is a separate hedging set 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.

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. 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:

$$MF_i^{(\text{unmargined})} = \sqrt{\frac{\min\{M_i;\ 1\,year\}}{1\,year}}$$

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.

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).

$$MF_i^{(\text{margined})} = \frac{3}{2}\sqrt{\frac{MPOR_i}{1year}}$$

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 (AddOnaggregate) 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 (AddOnIR) 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); (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: 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 DB1, DB2 and DB3 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 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):

$$Offset\ formula: EN_{HS} = \left[\left(D^{B1}\right)^2 + \left(D^{B2}\right)^2 + \left(D^{B3}\right)^2 + 1.4 * D^{B1} * D^{B2} + 1.4 * D^{B2} * D^{B3} + 0.6 * D^{B1} * D^{B3}\right]^{\frac{1}{2}}$$

$$No\ offset\ formula: EN_{HS} = \left|D^{B1}\right| + \left|D^{B2}\right| + \left|D^{B3}\right|$$

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 (AddOnIR) by adding together all of the hedging set level add-ons calculated in step 6:

$$AddOn^{IR} = \sum_{HS} AddOn_{HS}$$

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 (AddOnFX) 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); (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: 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 (AddOnFX) by adding together all of the hedging set level add-ons calculated in step 5: $$AddOn^{FX} = \sum_{HS} AddOn_{HS}$$

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 (AddOnCredit) 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 (AddOnCredit) 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.

$$AddOn^{Credit} = \left[\left(\sum_{entity} \rho_{entity} * AddOn_{entity}\right)^2 + \sum_{entity}\left(1-\left(\rho_{entity}\right)^2\right) * \left(AddOn_{entity}\right)^2\right]^{\frac{1}{2}}$$

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 (AddOnEquity) 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); (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 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 ($AddOn_{entity}$) 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 are set out in Table 2 in CRE52.72 and vary according to whether the entity is a single name (SF_{entity} = 32%) or an index (SF_{entity} =20%).
4. Step 4: Calculate the asset class level add-on (AddOnEquity) 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.

$$AddOn^{Equity} = \left[\left(\sum_{entity} \rho_{entity} * AddOn_{entity} \right)^2 + \sum_{entity} \left(1 - \left(\rho_{entity} \right)^2 \right) * \left(AddOn_{entity} \right)^2 \right]^{\frac{1}{2}}$$

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 to translate this estimate into an estimate of individual volatilities.

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 (AddOnCommodity) 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); (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: 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 ($EN_{ComType}$) 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 ($AddOn_{ComType}$) 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.
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.

$$AddOn_{HS} = \left[\left(\sum_{ComType} \rho_{ComType} * AddOn_{ComType} \right)^2 + \sum_{ComType} \left(1 - \left(\rho_{ComType} \right)^2 \right) * \left(AddOn_{ComType} \right)^2 \right]^{\frac{1}{2}}$$

6. Step 6: Calculate the asset class level add-on (AddOnCommodity) 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%

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.

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 ∈ 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 cash equivalent value of all currently available collateral under the margin agreement

$$\mathrm{RC}_{\mathrm{MA}} = \max\left\{\sum_{NS\in MA}\max\left\{V_{NS};\ 0\right\} - \max\left\{C_{MA};0\right\};\ 0\right\} + \max\left\{\sum_{NS\in MA}\min\left\{V_{NS};\ 0\right\} - \min\left\{C_{MA};0\right\};\ 0\right\}$$

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 $\mathrm{PFE}_{\mathrm{NS}}^{(\mathrm{unmargined})}$ is the PFE add-on for the netting set NS calculated according to the unmargined requirements:

$$PFE_{\mathrm{MA}} = \sum_{NS\in MA}\mathrm{PFE}_{\mathrm{NS}}^{(\mathrm{unmargined})}$$

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 01 January 2023

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 CRE22.45 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):

$$EAD = \alpha \times Effective\,EPE \qquad (equation\ 1)$$

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... Specifically, "Effective EE" is computed recursively using the following formula, where the current date is denoted as t_0 and Effective EE_{t0} equals current exposure:

$$Effective\,EE_{t_k} = \max\left(Effective\,EE_{t_{k-1}}, EE_{t_k}\right) \qquad \left(equation\ 2\right)$$

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:

$$Effective\ EPE = \sum_{k=1}^{\min(1\,year,\,maturity)} Effective\,EE_{t_k} \times \Delta t_k \qquad \left(equation\ 3\right)$$

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 CRE32.47 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.

$$M = \frac{\sum_{k=1}^{t_k \le 1\,year} (EffectiveEE_k \times \Delta t_k \times df_k) + \sum_{t_k > 1\,year}^{maturity} (EE_k \times \Delta t_k \times df_k)}{\sum_{k=1}^{t_k \le 1\,year} (EffectiveEE_k \times \Delta t_k \times df_k)}$$

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 CRE32.47 is unchanged and a floor of one year applies, with the exception of short-term exposures as described in CRE32.52 to CRE32.54.

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 unmargined 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.

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.

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:

$$\textit{Margin Period of Risk} = F + N - 1$$

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:
    1. The adequacy of the documentation of the risk management system and process;
    2. The organisation of the risk control unit;

3. The integration of counterparty credit risk measures into daily risk management;
4. The approval process for counterparty credit risk models used in the calculation of counterparty credit risk used by front office and back office personnel;
5. The validation of any significant change in the risk measurement process;
6. The scope of counterparty credit risks captured by the risk measurement model;
7. The integrity of the management information system;
8. The accuracy and completeness of position data;
9. The verification of the consistency, timeliness and reliability of data sources used to run internal models, including the independence of such data sources;
10. The accuracy and appropriateness of volatility and correlation assumptions;
11. The accuracy of valuation and risk transformation calculations; and
12. 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 re-create 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. 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.

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. 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%.

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.

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 the standard supervisory haircuts of the comprehensive approach.

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.

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 01 January 2023

Cross references updated to take account of the revised credit risk standards that come into effect due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020.

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. The settlement of cash transactions remains subject to the treatment described in CRE70.

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. This treatment also applies to transactions between lower-level clients and higher-level clients in a multi-level client structure.

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 paragraphs CRE54.7 to CRE54.40 will apply. In the case of non-qualifying CCPs, paragraphs 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 CCP 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. 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.

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 CRE22.62 and, where applicable, also CRE22.63 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 the 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).

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:

1. the bank is a client of the clearing member; and
2. 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:
   1. the bank is a client of a clearing member; and
   2. 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:
   1. 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.
   2. 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.

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:
    1. a 2% risk weight applies if the conditions established in CRE54.14 and CRE54.15 are met; or
    2. 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 overcollateralidation.
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 QCCP, 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%
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:
    1. the clearing member's own transactions and client transactions guaranteed by the clearing member; and
    2. all values of collateral held by the CCP (including the clearing member's prefunded default fund contribution) against the transactions in (a).

$$K_{CCP} = \sum_{CM_i} EAD_i \cdot RW \cdot capital\ ratio$$

5. The sum is over all clearing member accounts.

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.

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, 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_ipref is the prefunded default fund contributions provided by clearing member bank i

$$K_{CM_i} = \max\left(K_{CCP} \cdot \left(\frac{DF_i^{pref}}{DF_{CCP} + DF_{CM}^{pref}} \right); 8\% * 2\% * DF_i^{pref} \right)$$

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 01 January 2023

Cross references updated and references to own estimates of haircuts deleted to take account of the revised credit risk standards that come into effect due to the December 2017 Basel III publication, the revised implementation date announced on 27 March 2020 and a FAQ published on 14 December 2023.

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. 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 CRE30.45 to CRE30.52. For counterparties included in portfolios where the IRB approach is being used the IRB risk weights will have to be applied.

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 CRE22.49 and CRE22.50). Where banks are using a value-at-risk approach to measuring exposure for securities financing transactions, they also may apply this approach in the trading book in accordance with CRE32.39 to CRE32.42 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 CRE31.8 shall also be applicable in the trading book.

CRE56

Minimum haircut floors for securities financing transactions

This chapter sets out the minimum haircut floors for securities financing transactions and the treatment of portfolios that breach the floors.

Version effective as of 01 January 2023

First version in the format of the consolidated framework, updated to take account of the revised implementation date announced on 27 March 2020 and the technical amendments announced on 1 July 2021.

Scope

56.1

This chapter specifies the treatment of certain non-centrally cleared securities financing transactions (SFTs) with certain counterparties. The requirements are not applicable to banks in jurisdictions that are prohibited from conducting such transactions below the minimum haircut floors specified in CRE56.6 below.

56.2

The haircut floors found in CRE56.6 below apply to the following transactions:

1. Non-centrally cleared SFTs in which the financing (ie the lending of cash) against collateral other than government securities is provided to counterparties who are not supervised by a regulator that imposes prudential requirements consistent with international norms.
2. Collateral upgrade transactions with these same counterparties. A collateral upgrade transaction is when a bank lends a security to its counterparty and the counterparty pledges a lower-quality security as collateral, thus allowing the counterparty to exchange a lower-quality security for a higher quality security. For these transactions, the floors must be calculated according to the formula set out in CRE56.9 below.

56.3

SFTs with central banks are not subject to the haircut floors.

56.4

Cash-collateralised securities lending transactions are exempted from the haircut floors where:

1. Securities are lent (to the bank) at long maturities and the lender of securities reinvests or employs the cash at the same or shorter maturity, therefore not giving rise to material maturity or liquidity mismatch.
2. Securities are lent (to the bank) at call or at short maturities, giving rise to liquidity risk, only if the lender of the securities reinvests the cash collateral into a reinvestment fund or account subject to regulations or regulatory guidance meeting the minimum standards for reinvestment of cash collateral by securities lenders set out in Section 3.1 of the Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos. For this purpose, banks may rely on representations by securities lenders that their reinvestment of cash collateral meets the minimum standards.

56.5

Banks that borrow (or lend) securities are exempted from the haircut floors on collateral upgrade transactions if the recipient of the securities that the bank has delivered as collateral (or lent) is either: (i) unable to re-use the securities (for example, because the securities have been provided under a pledge arrangement); or (ii) provides representations to the bank that they do not and will not re-use the securities.

Haircut floors

56.6

These are the haircut floors for SFTs referred to above (herein referred to as “in-scope SFTs”), expressed as percentages:

Residual maturity of collateral	Haircut level	
	Corporate and other issuers	Securitised products
≤ 1 year debt securities, and floating rate notes	0.5%	1%
> 1 year, ≤ 5 years debt securities	1.5%	4%
> 5 years, ≤ 10 years debt securities	3%	6%
> 10 years debt securities	4%	7%
Main index equities	6%	
Other assets within the scope of the framework	10%	

56.7

In-scope SFTs which do not meet the haircut floors must be treated as unsecured loans to the counterparties.

56.8

To determine whether the treatment in CRE56.7 applies to an in-scope SFT (or a netting set of SFTs in the case of portfolio-level haircuts), we must compare the collateral haircut H (real or calculated as per the rules below) and a haircut floor f (from CRE56.6 above or calculated as per the below rules).

Single in-scope SFTs

56.9

For a single in-scope SFT not included in a netting set, the values of H and f are computed as:

1. For a single cash-lent-for-collateral SFT, H and f are known since H is simply defined by the amount of collateral received and f is given in CRE56.6. For the purposes of this calculation, collateral that is called by either counterparty can be treated collateral received from the moment that it is called (ie the treatment is independent of the settlement period).
2. For a single collateral-for-collateral SFT, lending collateral A and receiving collateral B, the H is still be defined by the amount of collateral received but the effective floor of the transaction must integrate the floor of the two types of collateral and can be computed using the following formula, which will be compared to the effective haircut of the

transaction, ie (C_B/C_A)-1: $$f = \left[\left(\frac{1}{1+f_A}\right) \Big/ \left(\frac{1}{1+f_B}\right)\right] - 1 = \frac{1+f_B}{1+f_A} - 1$$

Netting set of SFTs

56.10

For a netting set of SFTs an effective "portfolio" floor of the transaction must be computed using the following formula, where:

1. E_s is the net position in each security (or cash) s that is net lent;
2. C_t the net position that is net borrowed; and
3. f_s and f_t are the haircut floors for the securities that are net lent and net borrowed

respectively. $$f_{Portfolio} = \left[\left(\frac{\sum_s \left(\frac{E_s}{1+f_s}\right)}{\sum_s E_s}\right) \Big/ \left(\frac{\sum_t \left(\frac{C_t}{1+f_t}\right)}{\sum_t C_t}\right)\right] - 1$$

56.11

For a netting of SFTs, the portfolio does not breach the floor where:

$$\frac{\sum C_t - \sum E_s}{\sum E_s} \geq f_{Portfolio}$$

56.12

If the portfolio haircut does breach the floor, then the netting set of SFTs is subject to the treatment in CRE56.7. This treatment should be applied to all trades for which the security received appears in the table in CRE56.6 and for which, within the netting set, the bank is also a net receiver in that security. For the purposes of this calculation, collateral that is called by either counterparty can be treated collateral received from the moment that it is called (ie the treatment is independent of the settlement period).

56.13

The following portfolio of trades gives an example of how this methodology works (it shows a portfolio that does not breach the floor):

Actual trades	Cash	Sovereign debt	Collateral A	Collateral B
Floor (f_s)	*0%*	*0%*	*6%*	*10%*
Portfolio of trades	50	100	-400	250
E_s	50	100	0	250

C_t	0	0	400	0

$f_{Portfolio}$	-0.00023
$\frac{\sum C_t - \sum E_s}{\sum E_s}$	0

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 01 January 2023

Consequential changes resulting from changes to scope of internal ratings-based approach for credit risk that come into effect due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020.

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.

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. See CRE99 for an example of how to calculate risk-weighted assets using the LTA.

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.

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. 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.
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.
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 the 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. 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.

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:

$$RWAinvestment = Avg\ RWfund * Lvg * equity\ investment$$

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 IRB approaches for credit risk. The formula can therefore be re-written as:

$$RWAinvestment = RWAfund * percentage\ of\ shares$$

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 PD of the underlying exposures and, where applicable, LGD and EAD) associated with the fund's underlying exposures (except where the underlying exposures are equity exposures, in respect of which the standardised approach must be used as required by CRE30.34).
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 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
2. 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.

Version effective as of 15 December 2019

First version in the format of the consolidated framework.

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), 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.

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. 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.

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.

CRE90

Transition

This chapter sets out the various transitional arrangements that apply to the credit risk standard.

Version effective as of 01 January 2023

First version in the format of the consolidated framework, updated to take account of the revised implementation date announced on 27 March 2020.

Phase-in for standardised approach treatment of equity exposures

90.1

The risk weight treatment described in CRE20.57, excluding equity holdings referred to in CRE20.59, will be subject to a five-year linear phase-in arrangement from 1 January 2023. For speculative unlisted equity exposures, the applicable risk weight will start at 100% and increase by 60 percentage points at the end of each year until the end of Year 5. For all other equity holdings, the applicable risk weight will start at 100% and increase by 30 percentage points at the end of each year until the end of Year 5.

Phase-in for the removal of the internal ratings-based approach for equity exposures

90.2

The requirement to use the standardised approach for equity exposures CRE30.43 will be subject to a five-year linear phase-in arrangement from 1 January 2023. During the phase-in period, the risk weight for equity exposures will be the greater of:

1. the risk weight as calculated using the internal ratings-based approach that applied to equity exposures prior to 1 January 2023; and
2. the risk weight set for the linear phase-in arrangement under the standardised approach for credit risk (see CRE90.1 above).

90.3

Alternatively, supervisory authorities may require banks to apply the fully phased-in standardised approach treatment from 1 January 2023.

CRE99

Application guidance

This chapter provides guidance on various aspects of the credit risk standard, including illustrative examples.

Version effective as of 01 January 2023

Updated cross references and illustrative examples to take account of the revised credit risk standards that come into effect due to the December 2017 Basel III publication and the revised implementation date announced on 27 March 2020.

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:	40%	40%	45%	25%	45%	85%	50%	85%
Turnover (millions of €):	50	5						

Maturity:	2.5 years	2.5 years						
PD:								
0.05%	17.47%	13.69%	6.23%	3.46%	6.63%	12.52%	1.68%	2.86%
0.10%	26.36%	20.71%	10.69%	5.94%	11.16%	21.08%	3.01%	5.12%
0.25%	43.97%	34.68%	21.30%	11.83%	21.15%	39.96%	6.40%	10.88%
0.40%	55.75%	43.99%	29.94%	16.64%	28.42%	53.69%	9.34%	15.88%
0.50%	61.88%	48.81%	35.08%	19.49%	32.36%	61.13%	11.16%	18.97%
0.75%	73.58%	57.91%	46.46%	25.81%	40.10%	75.74%	15.33%	26.06%
1.00%	82.06%	64.35%	56.40%	31.33%	45.77%	86.46%	19.14%	32.53%
1.30%	89.73%	70.02%	67.00%	37.22%	50.80%	95.95%	23.35%	39.70%
1.50%	93.86%	72.99%	73.45%	40.80%	53.37%	100.81%	25.99%	44.19%
2.00%	102.09%	78.71%	87.94%	48.85%	57.99%	109.53%	32.14%	54.63%
2.50%	108.58%	83.05%	100.64%	55.91%	60.90%	115.03%	37.75%	64.18%
3.00%	114.17%	86.74%	111.99%	62.22%	62.79%	118.61%	42.96%	73.03%
4.00%	124.07%	93.37%	131.63%	73.13%	65.01%	122.80%	52.40%	89.08%
5.00%	133.20%	99.79%	148.22%	82.35%	66.42%	125.45%	60.83%	103.41%
6.00%	141.88%	106.21%	162.52%	90.29%	67.73%	127.94%	68.45%	116.37%
10.00%	171.63%	130.23%	204.41%	113.56%	75.54%	142.69%	93.21%	158.47%
15.00%	196.92%	152.81%	235.72%	130.96%	88.60%	167.36%	115.43%	196.23%
20.00%	211.76%	167.48%	253.12%	140.62%	100.28%	189.41%	131.09%	222.86%

Illustrative examples for recognition of dilution risk when applying SEC-IRBA to securitisation exposures

99.4

The following two 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 years
4. $PD_{Dilution}$ = 0.55%
5. $LGD_{Dilution}$ =100%
6. $PD_{Default}$ = 0.95%
7. $LGD_{Default}$ = 45%

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 years

99.8

RWA calculation:

1. Step 1: calculate $K_{IRB,Dilution}$ and $K_{IRB,Default}$ for the underlying portfolio:
    1. $K_{IRB,Dilution}$ = €1,000,000 x (161.44% x 8% + 0.55% x 100%) / €1,000,000 = 13.47%
    2. $K_{IRB,Default}$ = (€1,000,000 – €129,200) x (90.62% x 8% + 0.95% x 45%) / €1,000,000 = 6.69%
2. Step 2: calculate $K_{IRB,Pool} = K_{IRB,Dilution} + K_{IRB,Default}$ = 13.47% + 6.69% = 20.16%
3. Step 3: apply the SEC-IRBA to the three tranches
    1. Pool parameters:
    (i)

    N = 100

    (ii)

    $LGD_{Pool} = (LGD_{Default} \times K_{IRB,Default} + LGD_{Dilution} \times K_{IRB,Dilution}) / K_{IRB,Pool}$ = (45% x 6.69% + 100% x 13.47%) / 20.16% = 81.75%

    2. 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	21.22%	€148,540
Tranche B	1013.85%	€2,534,625
Tranche C	1250%	€625,000

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) 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:
    1. Default waterfall
       (i)

       Tranche A is a senior note of €950,000

       (ii)

       Tranche C is a purchase discount of €50,000

    2. 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 €50,000

5. M_T of all tranches is 2.5 years.

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 $K_{IRB,Pool}$. $K_{IRB,Pool} = K_{IRB,Dilution} = 13.47\%$
2. Step 2: apply the SEC-IRBA.

1. Pool parameters:
   (i)

   N = 100

   (ii)

   $LGD_{Pool} = LGD_{Dilution} = 100\%$

2. Tranche parameters:
   (i)

   $M_T = 2.5$ years

   (ii)

   Attachment point = 0%

   (iii)

   Detachment point = €250,000 / €950,000 = 26.32%

3. Resulting risk-weighted exposure amounts for Tranche B:
   1. SEC-IRBA risk weight = 886.94%
   2. RWA = €2,217,350

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 $K_{IRB,Default}$ and $K_{IRB,Dilution}$ (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 €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 €300,000 up to €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.
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.

99.19

RWA calculation for Tranche A:

1. Step 1: calculate RWA for CRE99.18(1).
    1. Pool parameters:
    (i)

    $K_{IRB,Pool} = K_{IRB,Default} = 6.69\%$

    (ii)

    $LGD_{Pool} = LGD_{Default} = 45\%$

    2. 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%

    3. Resulting risk-weighted exposure amounts:
    (i)

    SEC-IRBA risk weight = 51.67%

    (ii)

    RWA = €490,865

2. Step 2: calculate RWA for CRE99.18(2).
    1. Pool parameters:
    (i)

    $K_{IRB,Pool} = K_{IRB,Dilution} = 13.47\%$

    (ii)

    $LGD_{Pool} = LGD_{Dilution} = 100\%$

    2. Tranche parameters:
    (i)

    $M_T = 2.5$ 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%

3. 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*	11.16%	€78,120
Tranche C	1250%	€625,000

(3)

Step 3: Sum up the RWA of CRE99.19(1) and CRE99.19(2)

1. Final RWA amount for investor in Tranche A = €490,865 + €78,120 + €625,000 = €1,193,985
2. Implicit risk weight for Tranche A = max (15%, €1,193,985 / €950,000) = 125.68%

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, or IM) 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; and
2. C is the haircut value of the IM, 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 (AddOnaggregate). All the transactions in the netting set belong to the interest rate asset class. The AddOnaggregate 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); (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 $D_i = d_i * MF_i * \delta_i$.

99.28

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 = 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.

$$SD_i = \frac{\exp\left(-0.05 * S_i\right) - \exp\left(-0.05 * E_i\right)}{0.05}$$

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 $D_i = d_i * MF_i * \delta_i$ 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	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 (DB1, DB2 and DB3) 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: DB1 is zero, DB2 is -36,254 (thousand USD) and DB3 is 78,694 (thousand USD).
2. For the EUR hedging set: DB1 and DB2 are zero and DB3 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):

$$Offset\ formula: EN_{hs} = \left[\left(D^{B1}\right)^2 + \left(D^{B2}\right)^2 + \left(D^{B3}\right)^2 + 1.4 * D^{B1} * D^{B2} + 1.4 * D^{B2} * D^{B3} + 0.6 * D^{B1} * D^{B3} \right]^{\frac{1}{2}}$$

$$No\ offset\ formula: EN_{hs} = \left|D^{B1}\right| + \left|D^{B2}\right| + \left|D^{B3}\right|$$

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):

$$EN_{USD} = \left[\left(-36,254\right)^2 + \left(78,694\right)^2 + 1.4 * (-36,254) * 78,694 \right]^{\frac{1}{2}} = 59,270$$

$$EN_{EUR} = \left[(-10,083)^2 \right]^{\frac{1}{2}} = 10,083$$

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):

$$EAD = alpha * (RC + multiplier * AddOn^{aggregate}) = 1.4 * \left(60 + 1 * 347\right) = 569$$

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/IM) 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 IM, which is zero in this example $RC = \max\left\{V - C; 0\right\}$

99.43

Thus, using the market values indicated in the table (expressed in USD thousands):

$$RC = \max\left\{20 - 40 + 0 - 0; 0\right\} = 0$$

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 (AddOnaggregate) needs to be determined.

99.45

All the transactions in the netting set belong to the credit derivatives asset class. The

AddOnaggregate 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); (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 $D_i = d_i * MF_i * \delta_i$.

99.47

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 = 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 (AddOnCredit) 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).

$$AddOn^{Credit} = \left[\underbrace{\left(\sum_{entity} \rho_{entity} * AddOn_{entity} \right)^2}_{systematic\ component} + \underbrace{\sum_{entity} \left(1 - \left(\rho_{entity} \right)^2 \right) * \left(AddOn_{entity} \right)^2}_{idiosyncratic\ component} \right]^{\frac{1}{2}}$$

99.54

The following table shows a simple way to calculate of the systematic and idiosyncratic components in the formula:

Reference Entity	**ρ_{entity}**	**$AddOn_{entity}$**	**ρ_{entity} * $AddOn_{entity}$**	**1-(ρ_{entity})2**	**($AddOn_{entity}$)2**	**(1-(ρ_{entity})2)* ($AddOn_{entity}$)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:

$$AddOn^{Credit} = \left[2{,}253 + 77{,}344\right]^{\frac{1}{2}} = 282$$

99.56

For this netting set the credit add-on (AddOnCredit) is also the aggregate add-on (AddOnaggregate) 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:

$$multiplier = \min\left\{1; 0.05 + 0.95 * \exp\left(\frac{-20}{2 * 0.95 * 282}\right)\right\} = 0.965$$

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):

$$EAD = 1.4 * (0 + 0.965 * 282) = 381$$

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/IM) 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 AddOnaggregate 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:

$$MF = \sqrt{\frac{\min\{M_i;\ 1year\}}{1year}} = \sqrt{\frac{\min\{9/12;\ 1\}}{1}} = \sqrt{9/12}$$

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. $EN_{CrudeOil}$ = 8,660 + (-20,000) = -11,340
2. 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. $AddOn_{CrudeOil}$ = -11,340 * 0.18 = -2,041
2. $AddOn_{Silver}$ = 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 at 40% for all commodity types.

$$AddOn_{HS} = \left[\left(\sum_{ComType} \rho_{ComType} * AddOn_{ComType}\right)^2 + \sum_{ComType}\left(1-\left(\rho_{ComType}\right)^2\right) * \left(AddOn_{ComType}\right)^2\right]^{\frac{1}{2}}$$

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:

$$AddOn_{Energy} = \left[\left(\rho_{CrudeOil} * AddOn_{CrudeOil} \right)^2 + \left(1 - \left(\rho_{CrudeOil} \right)^2 \right) * \left(AddOn_{CrudeOil} \right)^2 \right]^{\frac{1}{2}}$$

$$AddOn_{Energy} = \left[\left(0.4 * (-2,041) \right)^2 + \left(1 - \left(0.4 \right)^2 \right) * \left(-2,041 \right)^2 \right]^{\frac{1}{2}} = 2,041$$

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:

$$AddOn_{Metals} = \left| AddOn_{Silver} \right| = 1,800$$

99.74

Step 6: Calculate the asset class level add-on (AddOnCommodity) 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 (AddOnCommodity) is also the aggregate add-on (AddOnaggregate) 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:

$$RC = \max\left\{ V - C; 0 \right\} = \max\left\{ 30 - 20 + 50 + 20 - 40 + 0; 0 \right\} = 40$$

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 (VM) 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 to 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):

$$MF_i^{(\text{margined})} = \frac{3}{2}\sqrt{\frac{MPOR_i}{1\,year}} = 1.5 * \sqrt{14/250}$$

99.85

For the interest rate add-on, the effective notional for each trade (Di = di * MFi * δi) 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, D_i (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: DB1 is zero, DB2 is -12,869 (thousand USD) and DB3 is 27,934 (thousand USD).
2. For the EUR hedging set: DB1 and DB2 are zero and DB3 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:

$$EN_{USD} = \left[\left(-12,869\right)^2 + \left(27,934\right)^2 + 1.4 * (-12,869) * 27,934 \right]^{\frac{1}{2}} = 21,039$$

$$EN_{EUR} = \left[(-3,579)^2 \right]^{\frac{1}{2}} = 3,579$$

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 (AddOnIR) 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 * MFi * δi) 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**	**Effective notional, D_i (USD, thousands)**
1	10,000	Energy	Crude Oil	10,000	$1.5 * \sqrt{14/250}$	1	3,550
2	20,000	Energy	Crude Oil	20,000	$1.5 * \sqrt{14/250}$	-1	-7,100
3	10,000	Metals	Silver	10,000	$1.5 * \sqrt{14/250}$	1	3,550

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. $EN_{CrudeOil}$ = 3,550 + (-7,100) = -3,550
2. 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. $AddOn_{CrudeOil}$ = -3,550 * 0.18 = -639
2. $AddOn_{Silver}$ = 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:

$$AddOn_{Energy} = \left|AddOn_{CrudeOil}\right| = 639$$

$$AddOn_{Metals} = \left|AddOn_{Silver}\right| = 639$$

99.94

Finally, calculate the commodity asset class level add-on (AddOnCommodity) 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 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" (IA) 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 cost formula are:

1. V - C =€80 million – €90 million = negative €10 million.
2. TH + MTA – NICA = €0 + €1 million - €10 million = negative €9 million.
3. The third term in the RC 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 million – (€79.5 million + €10 million - €10 million)= €0.5 million.
2. TH + MTA – NICA = €0 + €1 million – €0 = €1 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 IM 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 IM 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 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 NICA. Therefore, the NICA is €0 because the bankruptcy-remote IM posted to the CCP can be exclude 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 formula are:

1. V – C = (-€50 million) – (-€50 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 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 million) – (-€60 million) = €10 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 million)= €10 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 (SA) 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 central counterparty (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
Variation margin 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 SA risk weight of 0%. Thus, RWA_{cash} = 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_{bonds} = USD 0.
3. The RWA for the exposures to the listed equities underlying the forward contracts ($RWA_{underlying}$) 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 250%. Thus, $RWA_{underlying}$ = 100% * USD100 * 250% = USD 250.
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} = USD 56 * 2% = 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 USD 251.12 = (0 + 0 +250 + 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 banks equity investment. That is:

$$RWA = \frac{RWA_{fund}}{Total\ Assets_{fund}} * Leverage * Equity\ investment = \frac{251.12}{100} * \frac{100}{95} * (95 * 20\%) = USD\,50.2$$

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 listed 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 listed equity exposures (RW=250%), ie $RWA_{on\text{-}BS}$ = USD 100 * 250% = USD 250.

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 listed equities under the SA which is 250%. Thus, $RWA_{underlying}$ = 100% * USD100 * 250% = USD 250.

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 CCR exposure is calculated by multiplying (i) the sum of the replacement cost and aggregate add-on for potential future exposure; by (ii) 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_{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 $RWA_{on\text{-}BS}$, $RWA_{underlying}$ and RWA_{CCR}, ie USD 503.2 (=250 + 250 + 3.2).

99.127

The RWA (USD 503.2) will be divided by the total assets of the fund (USD 100) resulting in an average risk-weight of 503.2%. 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 503.2% * 1.1 * USD 18.18 = USD 100.6.

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 BBB- bonds	USD 30
BB+ to 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*75% + USD40*100%)/USD100 = 72.5%. The financial leverage of 20 would result in an effective risk weight of 1,450% 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*0% + USD75*20% + USD20*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 SA risk weights or the IRB approach. For example, for a "risky" portfolio (72.5% average risk weight), the 1,250% limit is reached fairly quickly with a leverage of 17.2x, while for a "low risk" portfolio (25% average risk weight) this limit is reached at a leverage of 50x.