



MODULE	CA: Capital Adequacy
CHAPTER	CA-3: Credit Risk – The Standardized Approach

CA-3.1 Overview

- CA-3.1.1 Basel II identifies two methodologies for calculating capital requirements for credit risk. This module sets out the rules relating to the standardized approach. The internal rating-based approach (IRB) and securitization framework are presented in a separate module. The standardized approach makes use of external credit assessments⁸ as a means of calculating the risk weight for an exposure to a counterparty.
- CA-3.1.2 The credit equivalent amount of Securities Financing Transactions (SFT)⁹ and OTC derivatives that expose a bank to counterparty credit risk¹⁰ is to be calculated under the rules set forth in **Appendix CA-2**.
- CA-3.1.3 In determining the risk weights in the standardised approach, banks must use assessments by only those external credit assessment institutions which are recognised as eligible for capital purposes by CBB in accordance with the criteria defined in section CA-3.4.
- CA-3.1.4 Exposures must be risk-weighted net of specific provisions and taking eligible financial collateral. Where a discount is applied on fair value of an asset (as explained in CA-2.1.5), the value of the asset will be adjusted to exclude that discount part. Refer to appendix CA-17.

⁸ The notations follow the methodology used by one institution, Standard & Poor's. The use of Standard & Poor's credit ratings is an example only; those of some other external credit assessment institutions could equally well be used. The ratings used throughout this document, therefore, do not express any preferences or determinations on external assessment institutions by CBB.

⁹ Securities Financing Transactions (SFT) 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 the market valuations and the transactions are often subject to margin agreements.

¹⁰ The counterparty credit risk is defined as 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, the counterparty credit risk 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.



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CA-3.2 Segregation of Claims

Claims on Sovereigns

CA-3.2.1 Claims on governments of GCC member states (hereinafter referred to as GCC) and their central banks can be risk weighted at 0%. Claims on other sovereigns and their central banks are given a preferential risk weighting of 0% where such claims are denominated and funded in the relevant domestic currency of that sovereign/central bank (e.g. if a Bahraini bank has a claim on government of Australia and the loan is denominated and funded in Australian dollar, it will be risk weighted at 0%). Such preferential risk weight for claims on GCC/other sovereigns and their central banks will be allowed only if the relevant supervisor also allows 0% risk weighting to claims on its sovereign and central bank.

CA-3.2.2 Claims on sovereigns other than those referred to in the previous paragraph must be assigned risk weights as follows:

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

Claims on International Organizations

CA-3.2.3 Claims on the Bank for International Settlements, the International Monetary Fund and the European Central Bank must receive a 0% risk weight.

Claims on Non-central Government Public Sectors Entities (PSEs)

CA-3.2.4 Claims on the Bahraini PSEs listed in Appendix CA-18 will be treated as claims on the government of Bahrain.

CA-3.2.5 Where other supervisors also treat claims on named PSEs as claims on their sovereigns, claims to those PSEs are treated as claims on the respective sovereigns as outlined in paragraphs CA-3.2.1 and CA-3.2.2 above. These PSE's must be shown on a list maintained by the concerned central bank or financial regulator. Where PSE's are not on such a list, they must be subject to the treatment outlined in paragraph CA-3.2.6 below.



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CA-3.2 Segregation of Claims (continued)

CA-3.2.6

Claims on all other (foreign) PSEs (i.e. not having sovereign treatment) denominated and funded in the home currency of the sovereign must be risk weighted as allowed by their home country supervisors, provided the sovereign carries rating BBB- or above. Claims on PSEs with no explicit home country weighting or to PSEs in countries of BB+ sovereign rating and below are subject to ECAI ratings as per the following table:

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

CA-3.2.7

Claims on commercial companies owned by governments must be risk weighted as normal commercial entities unless they are covered by a government guarantee that satisfies the conditions in CA-4.2 and CA-4.5 in which case they may take the risk weight of the concerned government.

Claims on Multilateral Development Banks (MDB's)

CA-3.2.8

MDB's currently eligible for a 0% risk weight are: the World Bank Group comprised of the International Bank for Reconstruction and Development (IBRD) and the International Finance Corporation (IFC), the Asian Development Bank (ADB), the African Development Bank (AfDB), the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank (IADB), the European Investment Bank (EIB), the European Investment Fund (EIF), the Nordic Investment Bank (NIB), the Caribbean Development Bank (CDB), the Islamic Development Bank (IDB), Arab Monetary Fund (AMF), the Council of Europe Development Bank (CEDB), the Arab Bank for Economic Development in Africa (ABEDA), Council of European Resettlement Fund (CERF) and the Kuwait Fund for Arab Economic Development (KFAED).

CA-3.2.9

The claims on MDB's, which do not qualify for the 0% risk weighting, should be assigned risk weights as follows:

Banks Credit Quality Grades	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Un-rated
Risk weights	20%	50%	50%	100%	150%	50%



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CA-3.2 Segregation of Claims (continued)

Claims on Banks

CA-3.2.10

Claims on banks must be risk weighted as given in the following table. No claim on an unrated bank may receive a risk weight lower than that applied to claims on its sovereign of incorporation (see Guidance in Paragraph CA-3.2.11A for self-liquidating letters of credit).

Banks Credit Quality Grades	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Un-rated
Standard risk weights	20%	50%	50%	100%	150%	50%
Preferential risk weight	20%	20%	20%	50%	150%	20%

CA-3.2.11 Short-term claims on locally incorporated banks may be assigned a risk weighting of 20% where such claims on the banks are of an original maturity of 3 months or less denominated and funded in either BD or US\$. A preferential risk weight that is one category more favourable than the standard risk weighting may be assigned to claims on foreign banks licensed in Bahrain of an original maturity of 3 months or less denominated and funded in the relevant domestic currency (other than claims on banks that are rated below B-). Such preferential risk weight for short-term claims on banks licensed in other jurisdictions will be allowed only if the relevant supervisor also allows this preferential risk weighting to short-term claims on its banks.

CA-3.2.11A Self-liquidating letters of credit issued or confirmed by an unrated bank will be allowed a risk weighting of 50% or 20% without reference to the risk weight of the sovereign of incorporation. All other claims will be subject to the 'sovereign floor' of the country of incorporation of the concerned issuing or confirming bank.

CA-3.2.12 Claims with an (contractual) original maturity under 3 months that are expected to be rolled over (i.e. where the effective maturity is longer than 3 months) will not qualify for a preferential treatment for capital adequacy purposes.



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CA-3.2 Segregation of Claims (continued)

Claims on Investment Firms

CA-3.2.13

Claims on category one and category two investment firms which are subject to direct supervisory and regulatory provisions from the CBB may be treated as claims on banks for risk weighting purposes but without the use of preferential risk weight for short-term claims. Claims on category three investment firms must be treated as claims on corporates for risk weighting purposes. Claims on investment firms in other jurisdictions will be treated as claims on corporates for risk weighting purposes. However, if the bank can demonstrate that the concerned investment firm is subject to a Basel II equivalent capital adequacy regime and is treated as a bank for risk weighting purposes by its home regulator, then claims on such investment firms may be treated as claims on banks.

Claims on Corporates, including Insurance Companies

CA-3.2.14

Risk weighting for corporates including insurance companies is as follows:

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



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CA-3.2 Segregation of Claims (continued)

CA-3.2.15 Risk weighting for unrated (corporate) claims will be reviewed and where appropriate, may be increased by the CBB. Credit facilities to small/medium enterprises may be placed in the regulatory retail portfolio in limited cases below.

Claims included in the Regulatory Retail Portfolios

CA-3.2.16 No claim on any unrated corporate, where said corporate originates from a foreign jurisdiction, may be given a risk weight lower than that assigned to a corporate within its own jurisdiction, and in no case will it be below 100%.

CA-3.2.17 Claims included in the regulatory retail portfolio must be risk weighted at 75%, except as provided in CA-3.2.23 for past due loans.

CA-3.2.18 To be included in the regulatory retail portfolio, claims must meet the following criteria:

- (a) **Orientation** — the exposure is to an individual person or persons or to a small business. A small business is a Bahrain-based business with annual turnover below BD 2mn;
- (b) **Product** — The exposure takes the form of any of the following: revolving credits and lines of credit (including credit cards and overdrafts), personal term loans and leases (e.g. auto leases, student loans) and small business facilities. Securities (such as bonds and equities), whether listed or not, are specifically excluded from this category. Mortgage loans will be excluded if they qualify for treatment as claims secured by residential property (see below). Loans for purchase of shares are also excluded from the regulatory retail portfolios;
- (c) **Granularity** — The regulatory retail portfolio is sufficiently diversified to a degree that reduces the risks in the portfolio, warranting a 75% risk weight. No aggregate exposure to one counterpart¹¹ can exceed 0.2% of the regulatory retail portfolio; and
- (d) The maximum aggregated retail exposure to one counterpart must not exceed an absolute limit of BD 250,000.

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



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CA-3.2 Segregation of Claims (continued)

Claims Secured by Residential Property

CA-3.2.19 Lending fully secured by first mortgages on residential property that is or will be occupied by the borrower, or that is leased, must carry a risk weighting of 75%. However, if the bank can justify foreclosure or repossession for a claim, the risk weight allowed will be 35%. To get this lower risk weight the bank must obtain a satisfactory legal opinion that foreclosure or repossession is possible without any impediment.

Claims Secured by Commercial Real Estate

CA-3.2.20 Claims secured by mortgages on commercial real estate are subject to a minimum of 100% risk weight. If the borrower is rated below BB-, the risk-weight corresponding to the rating of the borrower must be applied.

Past Due Loans

CA-3.2.21 The unsecured portion of any loan (other than a qualifying residential mortgage loan) that is past due for more than 90 days, net of specific provisions (including partial write-offs), must be risk-weighted as follows:

- (a) 150% risk weight when specific provisions are less than 20% of the outstanding amount of the loan; and
- (b) 100% risk weight when specific provisions are greater than 20% of the outstanding amount of the loan.

CA-3.2.22 For the purposes of defining the secured portion of a past due loan, eligible collateral and guarantees will be the same as for credit risk mitigation purposes.

CA-3.2.23 Past due retail loans are to be excluded from the overall regulatory retail portfolio when assessing the granularity criterion, for risk-weighting purposes.

CA-3.2.24 In the case of qualifying residential mortgage loans, when such loans are past due for more than 90 days, they must be risk weighted at 100% net of specific provisions.



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CA-3.2 Segregation of Claims (continued)

Higher-risk Categories

CA-3.2.25 Holdings of securitization tranches that are rated between BB+ and BB- are risk weighted at 350%.

Investments in Equities and Funds

CA-3.2.26 Investments in listed equities must be risk weighted at 100% while equities other than listed must be risk weighted at 150%.

CA-3.2.27 Investments in funds (e.g. mutual funds, Collective Investment Undertakings etc.) must be risk weighted as follows:

- If the instrument (e.g. units) is rated, it should be risk-weighted according to its external rating (for risk-weighting, it must be treated as a “claim on corporate”);
- If not rated, such investment should be treated as an equity investment and risk weighted accordingly (i.e. 100% for listed and 150% for others);
- The bank can apply to CBB for using the look-through approach for such investments if it can demonstrate that the look-through approach is more appropriate to the circumstances of the bank;
- If there are no voting rights attached to investment in funds, the investment will not be subjected to consolidation and deduction requirements (except large exposure limits);
- For the purpose of determining “large exposure limit” for investment in funds, the look-through approach should be used (even if the look-through approach is not used to risk weight the investment).

CA-3.2.28 CBB may enforce a bank to adopt one of the IRB treatments for equities if the CBB considers that bank’s equity portfolio is significant.



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CA-3.2 Segregation of Claims (continued)

Holdings of Real Estate

CA-3.2.29

All holdings of real estate by banks (i.e. owned directly or by way of investments in Real Estate Companies, subsidiaries or associate companies or other arrangements such as trusts, funds or REITs) must be risk-weighted at 200%. Premises occupied by the bank may be weighted at 100%. Investments in Real Estate Companies will be subject to the materiality thresholds for commercial companies described in Module PCD and therefore any holdings which amount to 15% or more of regulatory capital will be subject to deduction. The holdings below the 15% threshold will be weighted at 200%.

Other Assets

CA-3.2.30

Gold bullion held in own vaults or on an allocated basis to the extent backed by bullion liabilities may be treated as cash and therefore risk-weighted at 0%. In addition, cash items in the process of collection must be risk-weighted at 20%. The standard risk weight for all other assets will be 100%. Investments in regulatory capital instruments issued by banks or investment firms must be risk weighted at a minimum of 100%, unless they are deducted from the capital base according to the Prudential Consolidation and Deduction Requirements Module.

Underwriting of Non-trading Book Items

CA-3.2.31

Where a bank has acquired assets on its balance sheet in the banking book which it is intending to place with third parties under a formal arrangement and is underwriting the placement, the following risk weightings apply during the underwriting period (which may not last for more than 90 days). Once the underwriting period has expired, the usual risk weights should apply:

- (a) For holdings of private equity, a risk weighting of 100% will apply instead of the usual 150% (see CA-3.2.26); and
- (b) For holdings of Real Estate, a risk weight of 100% will apply instead of the usual 200% risk weight (see CA-3.2.29).



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CA-3.3 Off-balance Sheet Items

CA-3.3.1 Off-balance-sheet items must be converted into credit exposure equivalents applying credit conversion factors (CCFs). Counterparty risk weightings for OTC derivative transactions will not be subject to any specific ceiling.

CA-3.3.2 Commitments with an original maturity of up to one year and commitments with an original maturity of over one year will receive a CCF of 20% and 50%, respectively.

CA-3.3.3 Any commitments that are unconditionally cancellable at any time by the bank without prior notice, or that are subject to automatic cancellation due to deterioration in a borrowers' creditworthiness, will receive a 0% CCF.

CA-3.3.4 Direct credit substitutes, e.g. 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) must receive a CCF of 100%.

CA-3.3.5 Sale and repurchase agreements and asset sales with recourse, where the credit risk remains with the bank, must receive a CCF of 100%.

CA-3.3.6 A CCF of 100% must be applied to the lending of banks' securities or the posting of securities as collateral by banks, including instances where these arise out of repo-style transactions (i.e. repurchase/reverse repurchase and securities lending/securities borrowing transactions). See Section CA-4.3 for the calculation of risk-weighted assets where the credit converted exposure is secured by eligible collateral.

CA-3.3.7 Forward asset purchases, forward deposits and partly-paid shares and securities, which represent commitments with certain drawdown must receive a CCF of 100%.

CA-3.3.8 Certain transaction-related contingent items (e.g. performance bonds, bid bonds, warranties and standby letters of credit related to particular transactions) must receive CCF of 50%.

CA-3.3.9 Note issuance facilities and revolving underwriting facilities must receive a CCF of 50%.



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CA-3.3 Off-balance Sheet Items (continued)

- CA-3.3.10** For short-term self-liquidating trade letters of credit arising from the movement of goods, a 20% CCF must be applied to both issuing and confirming banks.
- CA-3.3.11** 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 CCF's.
- CA-3.3.12** Credit equivalent amount of OTC derivatives and SFTs that expose a bank to counterparty credit risk must be calculated as per Appendix CA-2.
- CA-3.3.13** Banks must closely monitor securities, commodities, and foreign exchange transactions that have failed, starting the first day they fail. A capital charge to failed transactions must be calculated in accordance with CBB guidelines set forth in Appendix CA-4.
- CA-3.3.14** With regard to unsettled securities, commodities, and foreign exchange transactions, banks are encouraged to develop, implement and improve systems for tracking and monitoring the credit risk exposure arising from unsettled transactions as appropriate for producing management information that facilitates action on a timely basis.
- CA-3.3.15 Furthermore, when such transactions are not processed through a delivery-versus-payment (DvP) or payment-versus-payment (PvP) mechanism, banks must calculate a capital charge as set forth in **Appendix CA-4**.



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CA-3.4 External Credit Assessments

The Recognition Process and Eligibility Criteria

CA-3.4.1 CBB will assess all External Credit Assessment Institutions (ECAI) according to the six criteria below. Any failings, in whole or in part, to satisfy these to the fullest extent will result in the respective ECAI's methodology and associated resultant rating not being accepted by the CBB:

- (a) **Objectivity:** The methodology for assigning credit assessments must be rigorous, systematic, and subject to some form of validation based on historical experience. Moreover, assessments must be subject to ongoing review and responsive to changes in financial condition. Before being recognized by the CBB, an assessment methodology for each market segment, including rigorous back testing, must have been established for an absolute minimum of one year and with a preference of three years;
- (b) **Independence:** An ECAI must show independence and should not be subject to political or economic pressures that may influence the rating. The assessment process should be as free as possible from any constraints that could arise in situations where the composition of the board of directors, political pressure, the shareholder structure of the assessment institution or any other aspect could be seen as creating a conflict of interest;
- (c) **International access/Transparency:** The individual assessments should be available to both domestic and foreign institutions with legitimate interests and at equivalent terms. The general methodology used by the ECAI has to be publicly available;
- (d) **Disclosure:** An ECAI is required to disclose the following information: its assessment methodologies, including the definition of default, the time horizon, and the meaning of each rating; the actual default rates experienced in each assessment category; and the transitions of the assessments, e.g. the likelihood of a slide in the ratings of an exposure from one class to another over time;
- (e) **Resources:** An ECAI must have sufficient resources to carry out high quality credit assessments. These resources should allow for substantial ongoing contact with senior and operational levels within the entities assessed in order to add value to the credit assessments. Such assessments will be based on methodologies combining qualitative and quantitative approaches; and
- (f) **Credibility:** Credibility, to a certain extent, can derive from the criteria above. In addition, the reliance on an ECAI's external credit assessments by independent parties (investors, insurers, trading partners) may be evidence of the credibility of the assessments of an ECAI. The credibility of an ECAI will also be based on 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.

CA-3.4.2 The CBB recognizes Standard and Poor's, Moody's, Fitch IBCA and Capital Intelligence as eligible ECAIs. With respect to the possible recognition of other rating agencies as eligible ECAIs, CBB will update this paragraph subject to the rating agencies satisfying the eligibility requirements. (See Appendix 16 for mapping of eligible ECAIs).



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CA-3.4 External Credit Assessments (continued)

CA-3.4.3

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

CA-3.4.4

Banks must disclose ECAIs that they use for the risk weighting of their assets by type of claims, the risk weights associated with the particular rating grades as determined by CBB through the mapping process as well as the aggregated risk-weighted assets for each risk weight based on the assessments of each eligible ECAI.

Multiple Assessments

CA-3.4.5

If there are two assessments by eligible ECAIs chosen by a bank which map into different risk weights, the higher risk weight must be applied.

CA-3.4.6

If there are three or more assessments by eligible ECAIs chosen by a bank which map into different risk weights, the assessments corresponding to the two lowest risk weights should be referred to and the higher of those two risk weights must be applied.

Issuer Versus Issues Assessment

CA-3.4.7

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

- (a) In circumstances where the borrower has a specific assessment for an issued debt — but the bank's claim is not an investment in this particular debt — a high quality credit assessment (one which maps into a risk weight lower than that which applies to an unrated claim) on that specific debt may only be applied to the bank's un-assessed claim if this claim ranks pari passu or senior to the claim with an assessment in all respects. If not, the credit assessment cannot be used and the un-assessed claim will receive the risk weight for unrated claims; and
- (b) In circumstances where the borrower has an issuer assessment, this assessment typically applies to senior unsecured claims on that issuer. Consequently, only senior claims on that issuer will benefit from a high quality issuer assessment. Other un-assessed claims of a highly assessed issuer will be treated as unrated. If either the issuer or a single issue has a low quality assessment (mapping into a risk weight equal to or higher than that which applies to unrated claims), an un-assessed claim on the same counterparty will be assigned the same risk weight as is applicable to the low quality assessment.



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CA-3.4 External Credit Assessments (continued)

CA-3.4.8 Whether the bank intends to rely on an issuer- or an issue-specific assessment, the assessment must take into account and reflect the entire amount of credit risk exposure the bank has with regard to all payments owed to it.¹²

CA-3.4.9 In order to avoid any double counting of credit enhancement factors, no recognition of credit risk mitigation techniques will be taken into account if the credit enhancement is already reflected in the issue specific rating (see paragraph CA-4.1.5).

Domestic Currency and Foreign Currency Assessments

CA-3.4.10 Where unrated exposures are risk weighted based on the rating of an equivalent exposure to that borrower, the general rule is that foreign currency ratings would be used for exposures in foreign currency. Domestic currency ratings, if separate, would only be used to risk weight claims denominated in the domestic currency.

CA-3.4.11 However, when an exposure arises through a bank's participation in a loan that has been extended, or has been guaranteed against convertibility and transfer risk, by certain MDBs, its convertibility and transfer risk can be considered by CBB, on a case by case basis, to be effectively mitigated. To qualify, MDBs must have preferred creditor status recognised in the market and be included in MDB's qualifying for 0% risk rate under CA-3.2.8. In such cases, for risk weighting purposes, the borrower's domestic currency rating may be used instead of its foreign currency rating. In the case of a guarantee against convertibility and transfer risk, the local currency rating can be used only for the portion that has been guaranteed. The portion of the loan not benefiting from such a guarantee will be risk-weighted based on the foreign currency rating.

Short-term/Long-term Assessments

CA-3.4.12 For risk-weighting purposes, short-term assessments are deemed to be issue-specific. They can only be used to derive risk weights for claims arising from the rated facility. They cannot be generalised to other short-term claims, except under the conditions of paragraph CA-3.4.14. In no event can a short-term rating be used to support a risk weight for an unrated long-term claim. Short-term assessments may only be used for short-term claims against banks and corporates. The table below provides a framework for banks' exposures to specific short-term facilities, such as a particular issuance of commercial paper:

¹² For example, if a bank is owed both principal and interest, the assessment must fully take into account and reflect the credit risk associated with repayment of both principal and interest.



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CA-3.4 External Credit Assessments (continued)

Credit assessment	A-1/P-1 ¹³	A-2/P-2	A-3/P-3	Others ¹⁴
Risk weight	20%	50%	100%	150%

CA-3.4.13 If a short-term rated facility attracts a 50% risk-weight, unrated short-term claims cannot attract a risk weight lower than 100%. If an issuer has a short-term facility with an assessment that warrants a risk weight of 150%, all unrated claims, whether long-term or short-term, should also receive a 150% risk weight, unless the bank uses recognised credit risk mitigation techniques for such claims.

CA-3.4.14 For short-term claims on banks, the interaction with specific short-term assessments is expected to be the following:

- (a) The general preferential treatment for short-term claims, as defined under paragraphs CA-3.2.11 and CA-3.2.12, applies to all claims on banks of up to three months original maturity when there is no specific short-term claim assessment;
- (b) When there is a short-term assessment and such an assessment maps into a risk weight that is more favourable (i.e. lower) or identical to that derived from the general preferential treatment, the short-term assessment should be used for the specific claim only. Other short-term claims would benefit from the general preferential treatment; and
- (c) When a specific short-term assessment for a short term claim on a bank maps into a less favourable (higher) risk weight, the general short-term preferential treatment for inter-bank claims cannot be used. All unrated short-term claims should receive the same risk weighting as that implied by the specific short-term assessment.

CA-3.4.15 When a short-term assessment is to be used, the institution making the assessment needs to meet all of the eligibility criteria for recognising ECAs as presented in paragraph CA-3.4.1 in terms of its short-term assessment.

Level of Application of the Assessment

CA-3.4.16 External assessments for one entity within a corporate group must not be used to risk weight other entities within the same group.

¹³ The notations follow the methodology used by Standard & Poor's and by Moody's Investors Service. The A-1 rating of Standard & Poor's includes both A-1+ and A-1-.

¹⁴ This category includes all non-prime and B or C ratings.



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CA-3.4 External Credit Assessments (continued)

Unsolicited Ratings

- CA-3.4.17 As a general rule, banks should use solicited ratings from eligible ECAs but they are also allowed to use unsolicited ratings in the same way as solicited ratings. However, there may be the potential for ECAs to use unsolicited ratings to put pressure on entities to obtain solicited ratings. If such behaviour is identified, CBB may disallow the use of unsolicited ratings.



MODULE	CA: Capital Adequacy
CHAPTER	CA-4: Credit Risk – The Standardized Approach – Credit Risk Mitigation

CA-4.1 Overarching Issues

Introduction

CA-4.1.1 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. Off-balance sheet items will first be converted into on-balance sheet equivalents prior to the CRM being applied.

General Remarks

CA-4.1.2 The framework set out in this sub-section of “General remarks” is applicable to all banking book exposures. Certain additional types of collateral are also eligible under the IRB approach (see paragraph CA-5.3.20 and others).

CA-4.1.3 The comprehensive approach for the treatment of collateral (see paragraphs CA-4.2.12 to CA-4.2.20 and CA-4.3.1 to CA-4.3.32) will also be applied to calculate the counterparty risk charges for OTC derivatives and repo-style transactions booked in the trading book.

CA-4.1.4 No transaction in which CRM techniques are used should receive a higher capital requirement than an otherwise identical transaction where such techniques are not used.

CA-4.1.5 The effects of CRM will not be double counted. Therefore, no additional recognition of CRM for regulatory capital purposes will be applicable on claims for which an issue-specific rating is used that already reflects that CRM. As stated in paragraph CA-3.4.8 of the section on the standardised approach, principal-only ratings will also not be allowed within the framework of CRM.

CA-4.1.6 While the use of CRM techniques reduces or transfers credit risk, it simultaneously may increase other risks (residual risks). Residual risks include legal, operational, liquidity and market risks. Therefore, it is imperative that banks employ robust procedures and processes to control these risks, including strategy; consideration of the underlying credit; valuation; policies and procedures; systems; control of roll-off risks; and management of concentration risk arising from the bank’s use of CRM techniques and its interaction with the bank’s overall credit risk profile. Where these risks are not adequately controlled, the CBB may impose additional capital charges or take supervisory actions.

CA-4.1.7 Market Discipline requirements must also be observed for banks to obtain capital relief in respect of any CRM techniques.



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CA-4.1 Overarching Issues (continued)

Legal Certainty

CA-4.1.8

In order for banks to obtain capital relief for any use of CRM techniques, the following minimum standards for legal documentation must be met.

CA-4.1.9

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



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CHAPTER	CA-4: Credit Risk – The Standardized Approach – Credit Risk Mitigation

CA-4.2 Overview of Credit Risk Mitigation Techniques¹⁵

Collateralised Transactions

- CA-4.2.1 A collateralised transaction is one in which:
- Banks have a credit exposure or potential credit exposure; and
 - That credit exposure or potential credit exposure is hedged in whole or in part by collateral posted by a counterparty¹⁶ or by a third party on behalf of the counterparty.
- CA-4.2.2 Where banks take eligible financial collateral (e.g. cash or securities, more specifically defined in paragraphs CA.4.3.1 and CA4.3.2, they are allowed to reduce their credit exposure to a counterparty when calculating their capital requirements to take account of the risk mitigating effect of the collateral.

Overall Framework and Minimum Conditions

- CA-4.2.3 Banks may opt for either the simple approach, which substitutes the risk weighting of the collateral for the risk weighting of the counterparty for the collateralised portion of the exposure (generally subject to a 20% floor), or for the comprehensive approach, which allows fuller offset of collateral against exposures, by effectively reducing the exposure amount by the value ascribed to the collateral. Banks may operate under either, but not both, approaches in the banking book, but only under the comprehensive approach in the trading book. Partial collateralisation is recognised in both approaches. Mismatches in the maturity of the underlying exposure and the collateral will only be allowed under the comprehensive approach.
- CA-4.2.4 However, before capital relief will be granted in respect of any form of collateral, the standards set out below in paragraphs CA-4.2.5 to CA-4.2.8 must be met under either approach.

¹⁵ See **Appendix CA-5** for an overview of methodologies for the capital treatment of transactions secured by financial collateral under the standardised and IRB approaches.

¹⁶ In this section “counterparty” is used to denote a party to whom a bank has an on- or off-balance sheet credit exposure or a potential credit exposure. That exposure may, for example, take the form of a loan of cash or securities (where the counterparty would traditionally be called the borrower), of securities posted as collateral, of a commitment or of exposure under an OTC derivatives contract.



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CA-4.2 Overview of Credit Risk Mitigation Techniques (continued)

CA-4.2.5

In addition to the general requirements for legal certainty set out in paragraphs CA4.1.8 and CA-4.1.9, the legal mechanism by which collateral is pledged or transferred must ensure that the bank has the right to liquidate or take legal possession of it, in a timely manner, in the event of the default, insolvency or bankruptcy (or one or more otherwise-defined credit events set out in the transaction documentation) of the counterparty (and, where applicable, of the custodian holding the collateral). Furthermore banks must take all steps necessary to fulfil those requirements under the law applicable to the bank's interest in the collateral for obtaining and maintaining an enforceable security interest, e.g. by registering it with a registrar, or for exercising a right to net or set off in relation to title transfer collateral.

CA-4.2.6

In order for collateral to provide protection, the credit quality of the counterparty and the value of the collateral must not have a material positive correlation. For example, securities issued by the counterparty — or by any related group entity — would provide little protection and so would be ineligible.

CA-4.2.7

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.

CA-4.2.8

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.

CA-4.2.9

A capital requirement will be applied to a bank on either side of the collateralised transaction: for example, both repos and reverse repos will be subject to capital requirements. Likewise, both sides of a securities lending and borrowing transaction will be subject to explicit capital charges, as will the posting of securities in connection with a derivative exposure or other borrowing.

CA-4.2.10

Where a bank, acting as agent, arranges a repo-style transaction (i.e. repurchase/reverse repurchase and securities lending/borrowing transactions) between a customer and a third party and provides a guarantee to the customer that the third party will perform on its obligations, then the risk to the bank is the same as if the bank had entered into the transaction as a principal. In such circumstances, a bank will be required to calculate capital requirements as if it were itself the principal.



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CA-4.2 Overview of Credit Risk Mitigation Techniques (continued)

The Simple Approach

CA-4.2.11 In the simple approach the risk weighting of the collateral instrument collateralising or partially collateralising the exposure is substituted for the risk weighting of the counterparty. Details of this framework are provided in paragraphs CA-4.3.26 to CA-4.3.29.

The Comprehensive Approach

CA-4.2.12 In the comprehensive approach, when taking collateral, banks must calculate their adjusted exposure to a counterparty for capital adequacy purposes in order to take account of the effects of that collateral. Using haircuts, banks are required to adjust both the amount of the exposure to the counterparty and the value of any collateral received in support of that counterparty to take account of possible future fluctuations in the value of either¹⁷, occasioned by market movements. This will produce volatility adjusted amounts for both exposure and collateral. Unless either side of the transaction is cash, the volatility adjusted amount for the exposure will be higher than the exposure and for the collateral it will be lower.

CA-4.2.13 Additionally where the exposure and collateral are held in different currencies an additional downwards adjustment must be made to the volatility adjusted collateral amount to take account of possible future fluctuations in exchange rates.

CA-4.2.14 Where the volatility-adjusted exposure amount is greater than the volatility-adjusted collateral amount (including any further adjustment for foreign exchange risk), banks shall calculate their risk-weighted assets as the difference between the two multiplied by the risk weight of the counterparty. The framework for performing these calculations is set out in paragraphs CA-4.3.3 to CA-4.3.6.

CA-4.2.15 Banks must use standard haircuts given in paragraph CA-4.3.7 unless allowed to use models under CA-4.3.22.

CA-4.2.16 The size of the individual haircuts will depend on the type of instrument, type of transaction and the frequency of marking-to-market and re-margining. For example, repo- style transactions subject to daily marking-to-market and to daily re-margining will receive a haircut based on a 5-business day holding period and secured lending transactions with daily mark-to-market and no re-margining clauses will receive a haircut based on a 20-business day holding period. These haircut numbers will be scaled up using the square root of time formula depending on the frequency of remargining or marking-to-market.

¹⁷ Exposure amounts may vary where, for example, securities are being lent.



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CA-4.2 Overview of Credit Risk Mitigation Techniques (continued)

CA-4.2.17 For certain types of repo-style transactions (broadly speaking government bond repos as defined in paragraphs CA-4.3.14 and CA-4.3.15, the CBB may allow banks using standard haircuts not to apply these haircuts in calculating the exposure amount after risk mitigation.

CA-4.2.18 The effect of master netting agreements covering repo-style transactions can be recognised for the calculation of capital requirements subject to the conditions in paragraph CA-4.3.17.

CA-4.2.19 As an alternative to standard haircuts banks may, subject to approval from CBB, use VaR models for calculating potential price volatility for repo-style transactions and other similar SFTs, as set out in paragraphs CA-4.3.22 to CA-4.3.25 below. Alternatively, subject to approval from the CBB's, they may also calculate, for these transactions, an expected positive exposure, as set forth in **Appendix CA-2** of this Module.

On-balance Sheet Netting

CA-4.2.20 Where banks have legally enforceable netting arrangements for loans and deposits they may calculate capital requirements on the basis of net credit exposures subject to the conditions in paragraph CA-4.4.1.

Guarantees and Credit Derivatives

CA-4.2.21 Where guarantees or credit derivatives are direct, explicit, irrevocable and unconditional, and the CBB is satisfied that banks fulfil certain minimum operational conditions relating to risk management processes they may allow banks to take account of such credit protection in calculating capital requirements.

CA-4.2.22 A range of guarantors and protection providers are recognised, as shown in paragraph CA-4.5.7. A substitution approach will be applied. Thus only guarantees issued by or protection provided by entities with a lower risk weight than the counterparty will lead to reduced capital charges since the protected portion of the counterparty exposure is assigned the risk weight of the guarantor or protection provider, whereas the uncovered portion retains the risk weight of the underlying counterparty.

CA-4.2.23 Detailed operational requirements are given below in paragraphs CA-4.5.1 to CA-4.5.5.



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CA-4.2 Overview of Credit Risk Mitigation Techniques (continued)

Maturity Mismatch

CA-4.2.24

Where the residual maturity of the CRM is less than that of the underlying credit exposure a maturity mismatch occurs. Where there is a maturity mismatch and the CRM has an original maturity of less than one year, the CRM is not recognised for capital purposes. In other cases where there is a maturity mismatch, partial recognition is given to the CRM for regulatory capital purposes as detailed below in paragraphs CA-4.6.1 to CA-4.6.4. Under the simple approach for collateral maturity mismatches will not be allowed.

Miscellaneous

CA-4.2.25 Treatments for pools of credit risk mitigants and first- and second-to-default credit derivatives are given in paragraphs CA-4.7.1 to CA-4.7.5.



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CA-4.3 Collateral

Eligible Financial Collateral

- CA-4.3.1 The following collateral instruments are eligible for recognition in the simple approach:
- (a) Cash (as well as certificates of deposit or comparable instruments issued by the lending bank) on deposit with the bank which is incurring the counterparty exposure;^{18,19}
 - (b) Gold;
 - (c) Debt securities rated by a recognised external credit assessment institution where these are either:
 - (i) At least BB- when issued by sovereigns or PSEs that are treated as sovereigns by the CBB; or
 - (ii) At least BBB- when issued by other entities (including banks and securities firms); or
 - (iii) At least A-3/P-3 for short-term debt instruments.
 - (d) Debt securities not rated by a recognised external credit assessment institution 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 must be rated at least BBB- or A-3/P-3 by a recognised external credit assessment institution; 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 CBB is sufficiently confident about the market liquidity of the security.

¹⁸ Cash funded credit linked notes issued by the bank against exposures in the banking book which fulfil the criteria for credit derivatives will be treated as cash collateralised transactions.

¹⁹ When cash on deposit, certificates of deposit or comparable instruments issued by the lending bank are held as collateral at a third-party bank in a non-custodial arrangement, if they are openly pledged/assigned to the lending bank and if the pledge /assignment is unconditional and irrevocable, the exposure amount covered by the collateral (after any necessary haircuts for currency risk) will receive the risk weight of the third-party bank.



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CA-4.3 Collateral (continued)

- (e) Equities (including convertible bonds) that are included in a main index; and
- (f) Undertakings for Collective Investments in Transferable Securities (UCITS) and mutual funds where:
 - (i) A price for the units is publicly quoted daily; and
 - (ii) The UCITS/mutual fund is limited to investing in the instruments listed in this paragraph²⁰.

- CA-4.3.2 The following collateral instruments are eligible for recognition in the comprehensive approach:
- (a) All of the instruments in paragraph CA-4.3.1;
 - (b) Equities (including convertible bonds) which are not included in a main index but which are listed on a recognised exchange;
 - (c) UCITS/mutual funds which include such equities.

The Comprehensive Approach

Calculation of Capital Requirement

- CA-4.3.3 For a collateralised transaction, the exposure amount after risk mitigation is calculated as follows:

$$E^* = \text{Max } \{0, [E \times (1 + H_e) - C \times (1 - H_c - H_{fx})]\}$$

where:

- E* = The exposure value after risk mitigation
- E = Current value of the exposure
- H_e = Haircut appropriate to the exposure
- C = The current value of the collateral received
- H_c = Haircut appropriate to the collateral
- H_{fx} = haircut appropriate for currency mismatch between the collateral and exposure

²⁰ However, the use or potential use by a UCITS/mutual fund of derivative instruments solely to hedge investments listed in this paragraph and paragraph CA-4.3.2 shall not prevent units in that UCITS /mutual fund from being eligible financial collateral.



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CA-4.3 Collateral (continued)

CA-4.3.4 The exposure amount after risk mitigation will be multiplied by the risk weight of the counterparty to obtain the risk-weighted asset amount for the collateralised transaction.

CA-4.3.5 The treatment for transactions where there is a mismatch between the maturity of the counterparty exposure and the collateral is given in paragraphs CA-4.6.1 to CA-4.6.4.

CA-4.3.6 Where the collateral is a basket of assets, the haircut on the basket will be $H = \sum_i a_i H_i$, where a_i is the weight of the asset (as measured by units of currency) in the i basket and H_i the haircut applicable to that asset.

Standard Haircuts

CA-4.3.7 These are the standard haircuts (assuming daily mark-to-market, daily re-margining and a 10-business day holding period), expressed as percentages:

Issue rating for debt securities	Residual Maturity	Sovereigns ^{21,22}	Other issuers ²³
AAA to AA-/A-1	≤ 1 year	0.5	1
	>1 year, ≤ 5 years	2	4
	> 5 years	4	8
A+ to BBB-/A-2/A-3/P-3 and unrated bank securities per para. CA-4.3.1(d)	≤ 1 year	1	2
	>1 year, ≤ 5 years	3	6
	> 5 years	6	12
BB+ to BB-	All	15	
Main index equities (including convertible bonds) and Gold		15	
Other equities (including convertible bonds) listed on a recognised exchange		25	
UCITS/Mutual funds		Highest haircut applicable to any security in which the fund can invest	
Cash in the same currency ²⁴		0	

²¹ Includes PSEs which are treated as sovereigns by the CBB.

²² Multilateral development banks receiving a 0% risk weight will be treated as sovereigns.

²³ Includes PSEs which are not treated as sovereigns by CBB.

²⁴ Eligible cash collateral specified in paragraph CA-4.3.1 (a).



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CA-4.3 Collateral (continued)

CA-4.3.8 The standard haircut for currency risk where exposure and collateral are denominated in different currencies is 8% (also based on a 10-business day holding period and daily mark-to-market)

CA-4.3.9 For transactions in which the bank lends non-eligible instruments (e.g. non-investment grade corporate debt securities), the haircut to be applied on the exposure should be the same as the one for equity traded on a recognised exchange that is not part of a main index.

Adjustment for Different Holding Periods and Non Daily Mark-to-market or re-Margining

CA-4.3.10 For some transactions, depending on the nature and frequency of the revaluation and re-margining provisions, different holding periods are appropriate. The framework for collateral haircuts distinguishes between repo-style transactions (i.e. repo/reverse repos and securities lending/borrowing), “other capital-market-driven transactions” (i.e. 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.

CA-4.3.11 The minimum holding period for various products is summarised in the following table.

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



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CA-4.3 Collateral (continued)

CA-4.3.12 When the frequency of remargining or revaluation is longer than the minimum, the minimum haircut numbers will be scaled up depending on the actual number of business days between remargining or revaluation using the square root of time formula below:

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

where:

H = Haircut

H_M = Haircut under the minimum holding period

T_M = Minimum holding period for the type of transaction

N_R = Actual number of business days between remargining for capital market transactions or revaluation for secured transactions.

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

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

T_N = Holding period used by the bank for deriving H_N

H_N = Haircut based on the holding period T_N



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CA-4.3 Collateral (continued)

CA-4.3.13 For example, for banks using the standard CBB haircuts, the 10-business day haircuts provided in paragraph CA-4.3.7 will be the basis and this haircut will be scaled up or down depending on the type of transaction and the frequency of re-margining or revaluation using the formula below:

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

where:

H	=	Haircut
H ₁₀	=	10-business day standard CBB haircut for instrument
N _R	=	Actual number of business days between re-margining for capital
	=	Market transactions or revaluation for secured transactions.
T _M	=	Minimum holding period for the type of transaction

Conditions for Zero H

CA-4.3.14 For repo-style transactions where the following conditions are satisfied, and the counterparty is a core market participant, banks are not required to apply the haircuts specified in the comprehensive approach and may instead apply a haircut of zero. This carve-out will not be available for banks using the modelling approaches as described in paragraphs CA-4.3.22 to CA-4.3.25:

- Both the exposure and the collateral are cash or a sovereign security or PSE security qualifying for a 0% risk weight in the standardised approach;
- Both the exposure and the collateral are denominated in the same currency;
- Either the transaction is overnight or both the exposure and the collateral are marked-to-market daily and are subject to daily re-margining;
- Following a counterparty's failure to re-margin, the time that is required between the last mark-to-market before the failure to re-margin and the liquidation²⁵ of the collateral is considered to be no more than four business days;
- The transaction is settled across a settlement system proven for that type of transaction;

²⁵ This does not require the bank to always liquidate the collateral but rather to have the capability to do so within the given time frame.



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CA-4.3 Collateral (continued)

- (f) The documentation covering the agreement is standard market documentation for repo-style transactions in the securities concerned;
- (g) 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
- (h) 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.

CA-4.3.15 Core market participants include the following entities:

- (a) Sovereigns, central banks and PSEs;
- (b) Banks and securities firms;
- (c) Other financial companies (including insurance companies) eligible for a 20% risk weight in the standardised approach;
- (d) Regulated mutual funds that are subject to capital or leverage requirements;
- (e) Regulated pension funds; and
- (f) Recognised clearing organisations.

CA-4.3.16 Where a supervisor has applied a specific carve-out to repo-style transactions in securities issued by its domestic government, then banks incorporated in Bahrain are allowed to adopt the same approach to the same transactions.

Treatment of Repo-style Transactions Covered under Master Netting Agreements

CA-4.3.17 The effects of bilateral netting agreements covering repo-style transactions will be recognised on a counterparty-by-counterparty basis if the agreements are legally enforceable in each relevant jurisdiction upon the occurrence of an event of default and regardless of whether the counterparty is insolvent or bankrupt. In addition, netting agreements must:

- (a) 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;
- (b) 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;
- (c) Allow for the prompt liquidation or setoff of collateral upon the event of default; and
- (e) Be, together with the rights arising from the provisions required in (a) to (c) above, legally enforceable in each relevant jurisdiction upon the occurrence of an event of default and regardless of the counterparty's insolvency or bankruptcy.



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CA-4.3 Collateral (continued)

CA-4.3.18 Netting across positions in the banking and trading book will only be recognised when the netted transactions fulfil the following conditions:

- (a) All transactions are marked to market daily²⁶; and
- (b) The collateral instruments used in the transactions are recognised as eligible financial collateral in the banking book.

CA-4.3.19 The formula in paragraph CA-4.3.3 will be adapted to calculate the capital requirements for transactions with netting agreements.

CA-4.3.20 For banks using the standard haircuts, the framework below will apply to take into account the impact of master netting agreements.

$$E^* = \text{Max} \{0, [(\sum(E) - \sum(C)) + \sum (E_S \times H_S) + \sum (E_{FX} \times H_{FX})]\}^{27}$$

Where:

E^* = The exposure value after risk mitigation
 E = Current value of the exposure
 C = The value of the collateral received
 E_S = Absolute value of the net position in a given security
 H_S = Haircut appropriate to E_S
 E_{FX} = Absolute value of the net position in a currency different from the settlement currency
 H_{FX} = Haircut appropriate for currency mismatch

CA-4.3.21 The intention here is to obtain a net exposure amount after netting of the exposures and collateral and have an add-on amount reflecting possible price changes for the securities involved in the transactions and for foreign exchange risk if any. The net long or short position of each security included in the netting agreement will be multiplied by the appropriate haircut. All other rules regarding the calculation of haircuts stated in paragraphs CA4.3.3 to CA-4.3.16 equivalently apply for banks using bilateral netting agreements for repo-style transactions.

²⁶ The holding period for the haircuts will depend as in other repo-style transactions on the frequency of margining.

²⁷ The starting point for this formula is the formula in paragraph CA-4.3.3 which can also be presented as the following: $E^* = \text{max} \{0, [(E - C) + (E \times H_e) + (C \times H_c) + (C \times H_{fx})]\}$



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CA-4.3 Collateral (continued)

Use of Models

CA-4.3.22 As an alternative to the use of standard haircuts, CBB may allow banks to use a VaR models approach to reflect the price volatility of the exposure and collateral for repo-style transactions, taking into account correlation effects between security positions. This approach would apply to repo-style transactions covered by bilateral netting agreements on a counterparty-by-counterparty basis. At the discretion of CBB, firms are also eligible to use the VaR model approach for margin lending transactions, if the transactions are covered under a bilateral master netting agreement that meets the requirements of paragraphs CA-4.3.17 and CA-4.3.18. The VaR models approach is available to banks that have received CBB's recognition for an internal market risk model under the chapter CA-14. Banks which have not received CBB's recognition for use of models under the chapter CA-14 can separately apply for CBB's recognition to use their internal VaR models for calculation of potential price volatility for repo-style transactions. Internal models will only be accepted when a bank can prove the quality of its model to CBB through the backtesting of its output using one year of historical data. Banks must meet the model validation requirement of paragraph 43 of **Appendix CA-2** to use VaR for repo-style and other SFTs. In addition, other transactions similar to repo-style transactions (like prime brokerage) and that meet the requirements for repo-style transactions, are also eligible to use the VaR models approach provided the model used meets the operational requirements set forth in Section I.F of **Appendix CA-2**.

CA-4.3.23 The quantitative and qualitative criteria for recognition of internal market risk models for repo-style transactions and other similar transactions are in principle the same as under Chapter CA-14. With regard to the holding period, the minimum will be 5- business days for repo-style transactions, rather than the 10-business days under the Market Risk Amendment. 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.

CA-4.3.24 The calculation of the exposure E* for banks using their internal model will be the following:

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

In calculating capital requirements banks will use the previous business day's VaR number.

CA-4.3.25 Subject to CBB's approval, instead of using the VaR approach, banks may also calculate an expected positive exposure for repo-style and other similar SFTs, in accordance with the Internal Model Method set out in **Appendix CA-2** of this Module.



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CA-4.3 Collateral (continued)

The Simple Approach

Minimum Conditions

CA-4.3.26

For collateral to be recognised in the simple approach, the collateral must be pledged for at least the life of the exposure and it must be marked to market and revalued with a minimum frequency of six months. Those portions of claims collateralised by the market value of recognised collateral receive the risk weight applicable to the collateral instrument. The risk weight on the collateralised portion will be subject to a floor of 20% except under the conditions specified in paragraphs CA-4.3.27 to CA-4.3.29. The remainder of the claim should be assigned to the risk weight appropriate to the counterparty. A capital requirement will be applied to banks on either side of the collateralised transaction: for example, both repos and reverse repos will be subject to capital requirements.

Exceptions to the Risk Weight Floor

CA-4.3.27

Transactions which fulfil the criteria outlined in paragraph CA-4.3.14 and are with a core market participant, as defined in paragraph CA-4.3.15, receive a risk weight of 0%. If the counterparty to the transactions is not a core market participant the transaction should receive a risk weight of 10%.

CA-4.3.28

OTC derivative transactions subject to daily mark-to-market, collateralised by cash and where there is no currency mismatch receive a 0% risk weight. Such transactions collateralised by sovereign or PSE securities qualifying for a 0% risk weight in the standardised approach will receive a 10% risk weight.

CA-4.3.29

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

- The collateral is cash on deposit as defined in paragraph CA-4.3.1(a); or
- 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%.



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CA-4.3 Collateral (continued)

Collateralised OTC Derivatives Transactions

CA-4.3.30 Under the Current Exposure Method, the calculation of the counterparty credit risk charge for an individual contract will be as follows:

$$\text{Counterparty charge} = [(\text{RC} + \text{add-on}) - C_A] \times r \times 8\%$$

Where:

RC = The replacement cost,

Add-on = The amount for potential future exposure calculated in CBB's 2004 Rule Book.

C_A = The volatility adjusted collateral amount under the comprehensive approach prescribed in paragraphs CA-4.3.3 to CA-4.3.16, or zero if no eligible collateral is applied to the transaction, and

r = The risk weight of the counterparty.

CA-4.3.31 When effective bilateral netting contracts are in place, RC will be the net replacement cost and the add-on will be A_{Net} as calculated according to paragraph 96 (i) to 96 (vi) of **Appendix 2**. The haircut for currency risk (H_{fx}) should be applied when there is a mismatch between the collateral currency and the settlement currency. Even in the case where there are more than two currencies involved in the exposure, collateral and settlement currency, a single haircut assuming a 10-business day holding period scaled up as necessary depending on the frequency of mark-to-market will be applied.

CA-4.3.32 As an alternative to the Current Exposure Method for the calculation of the counterparty credit risk charge, banks may also use the Standardised Method and, subject to CBB's approval, the Internal Model Method as set out in **Appendix CA-2** of this Module.



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CA-4.4 On-balance Sheet Netting

CA-4.4.1 Where a bank:

- (a) 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;
- (b) Is able at any time to determine those assets and liabilities with the same counterparty that are subject to the netting agreement;
- (c) Monitors and controls its roll-off risks; and
- (d) Monitors and controls the relevant exposures on a net basis,

it may use the net exposure of loans and deposits as the basis for its capital adequacy calculation in accordance with the formula in paragraph CA-4.3.3. Assets (loans) are treated as exposure and liabilities (deposits) as collateral. The haircuts will be zero except when a currency mismatch exists. A 10-business day holding period will apply when daily mark-to-market is conducted and all the requirements contained in paragraphs CA-4.3.7, CA-4.3.13, and CA-4.6.1 to CA-4.6.4 will apply.



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CHAPTER	CA-4: Credit Risk – The Standardized Approach – Credit Risk Mitigation

CA-4.5 Guarantees and Credit Derivatives

Operational Requirements

Operational Requirements Common to Guarantees and Credit Derivatives

CA-4.5.1

A guarantee (counter-guarantee) or credit derivative must represent a direct claim on the protection provider and must be explicitly referenced to specific exposures or a pool of exposures, so that the extent of the cover is clearly defined and incontrovertible. Other than non-payment by a protection purchaser of money due in respect of the credit protection contract it must be irrevocable; there must be no clause in the contract that would allow the protection provider unilaterally to cancel the credit cover or that would increase the effective cost of cover as a result of deteriorating credit quality in the hedged exposure²⁸. It must also be unconditional; there should be no clause in the protection contract outside the direct control of the bank that could prevent the protection provider from being obliged to pay out in a timely manner in the event that the original counterparty fails to make the payment(s) due.

Additional Operational Requirements for Guarantees

CA-4.5.2

In addition to the legal certainty requirements in paragraphs CA-4.1.8 and CA-4.1.9 above, in order for a guarantee to be recognised, the following conditions must be satisfied:

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

²⁸ Note that the irrevocability condition does not require that the credit protection and the exposure be maturity matched; rather that the maturity agreed *ex ante* may not be reduced *ex post* by the protection provider. Paragraph CA-4.6.2 sets forth the treatment of call options in determining remaining maturity for credit protection.



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CA-4.5 Guarantees and Credit Derivatives (continued)

- (c) Except as noted in the following sentence, the guarantee covers all types of payments the underlying obligor is expected to make under the documentation governing the transaction, for example notional amount, margin payments etc. Where a guarantee covers payment of principal only, interests and other uncovered payments should be treated as an unsecured amount in accordance with paragraph CA-4.5.10.

Additional Operational Requirements for Credit Derivatives

CA-4.5.3 In order for a credit derivative contract to be recognised, the following conditions must be satisfied:

- (a) The credit events specified by the contracting parties must at a minimum cover:
- 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);
 - 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
 - restructuring of the underlying obligation involving forgiveness or postponement of principal, interest or fees that results in a credit loss event (i.e. charge-off, specific provision or other similar debit to the profit and loss account). When restructuring is not specified as a credit event, refer to paragraph CA-4.5.4.
- (b) If the credit derivative covers obligations that do not include the underlying obligation, section (g) below governs whether the asset mismatch is permissible;
- (c) The credit derivative shall not terminate prior to expiration of any grace period required for a default on the underlying obligation to occur as a result of a failure to pay, subject to the provisions of paragraph CA-4.6.2;
- (d) Credit derivatives allowing for cash settlement are recognised for capital purposes insofar as a robust valuation process is in place in order to estimate loss reliably. There must be a clearly specified period for obtaining post-credit- event valuations of the underlying obligation. If the reference obligation specified in the credit derivative for purposes of cash settlement is different than the underlying obligation, section (g) below governs whether the asset mismatch is permissible;



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CA-4.5 Guarantees and Credit Derivatives (continued)

- (e) 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;
- (f) 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;
- (g) A mismatch between the underlying obligation and the reference obligation under the credit derivative (i.e. 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 (i.e. the same legal entity) and legally enforceable cross-default or cross-acceleration clauses are in place; and
- (h) 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 (i.e. the same legal entity) and legally enforceable cross-default or cross- acceleration clauses are in place.

CA-4.5.4 When the restructuring of the underlying obligation is not covered by the credit derivative, but the other requirements in paragraph CA-4.5.3 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 obligation²⁹.

CA-4.5.5 Only credit default swaps and total return swaps that provide credit protection equivalent to guarantees will be eligible for recognition. The following exception applies. Where a bank buys credit protection through a total return swap and records the net payments received on the swap as net income, but does not record offsetting deterioration in the value of the asset that is protected (either through reductions in fair value or by an addition to reserves), the credit protection will not be recognised. The treatment of first-to-default and second-to-default products is covered separately in paragraphs CA-4.7.2 to CA-4.7.5.

²⁹ The 60% recognition factor is provided as an interim treatment, which the CBB may refine in the future.



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CA-4.5 Guarantees and Credit Derivatives (continued)

CA-4.5.6 Other types of credit derivatives will not be eligible for recognition at this time³⁰.

Range of Eligible Guarantors (counter-guarantors)/Protection Providers

CA-4.5.7 Credit protection given by the following entities will be recognised:

- (a) Sovereign entities³¹, PSEs, banks³² and securities firms with a lower risk weight than the counterparty;
- (b) Other entities rated A- or better. This would include credit protection provided by parent, subsidiary and affiliate companies when they have a lower risk weight than the obligor.

Risk Weights

CA-4.5.8 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.

CA-4.5.9 Materiality thresholds on payments below which no payment is made in the event of loss are equivalent to retained first loss positions and must be deducted in full from the capital of the bank purchasing the credit protection.

Proportional Cover

CA-4.5.10 Where the amount guaranteed, or against which credit protection is held, is less than the amount of the exposure, and the secured and unsecured portions are of equal seniority, i.e. the bank and the guarantor share losses on a pro-rata basis capital relief will be afforded on a proportional basis: i.e. the protected portion of the exposure will receive the treatment applicable to eligible guarantees/credit derivatives, with the remainder treated as unsecured.

³⁰ Cash funded credit linked notes issued by the bank against exposures in the banking book which fulfil the criteria for credit derivatives will be treated as cash collateralised transactions.

³¹ This includes the Bank for International Settlements, the International Monetary Fund, the European Central Bank and the European Community, as well as those MDBs referred to in footnote 24.

³² This includes other MDBs.



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CHAPTER	CA-4: Credit Risk – The Standardized Approach – Credit Risk Mitigation

CA-4.5 Guarantees and Credit Derivatives (continued)

Tranched Cover

- CA-4.5.11 Where the bank transfers a portion of the risk of an exposure in one or more tranches to a protection seller or sellers and retains some level of risk of the loan and the risk transferred and the risk retained are of different seniority, banks may obtain credit protection for either the senior tranches (e.g. second loss portion) or the junior tranche (e.g. first loss portion). In this case the rules as set out in CA-6 (Credit risk — securitisation framework) will apply.

Currency Mismatches

- CA-4.5.12 Where the credit protection is denominated in a currency different from that in which the exposure is denominated — i.e. there is a currency mismatch — the amount of the exposure deemed to be protected will be reduced by the application of a haircut H_{FX} , i.e.

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

Where:

- G = Nominal amount of the credit protection
 H_{FX} = Haircut appropriate for currency mismatch between the credit protection and underlying obligation.

The appropriate haircut based on a 10-business day holding period (assuming daily marking-to-market) will be applied. If a bank uses the standard haircuts it will be 8%. The haircuts must be scaled up using the square root of time formula, depending on the frequency of revaluation of the credit protection as described in paragraph CA-4.3.12.

Sovereign Guarantees and Counter-guarantees

- CA-4.5.13 Portions of claims guaranteed by the entities detailed in paragraph CA-3.2.1 above, where the guarantee is denominated in the domestic currency (and US\$ in case of a guarantee provided by the Government of Bahrain and CBB) may get a 0% risk-weighting. A claim may be covered by a guarantee that is indirectly counter-guaranteed by such entities. Such a claim may be treated as covered by a sovereign guarantee provided that:
- The sovereign counter-guarantee covers all credit risk elements of the claim;
 - Both the original guarantee and the counter-guarantee meet all operational requirements for guarantees, except that the counter-guarantee need not be direct and explicit to the original claim; and
 - CBB 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.



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CA-4.6 Maturity Mismatches

CA-4.6.1 For the purposes of calculating risk-weighted assets, a maturity mismatch occurs when the residual maturity of a hedge is less than that of the underlying exposure.

Definition of Maturity

CA-4.6.2 The maturity of the underlying exposure and the maturity of the hedge should both be defined conservatively. The effective maturity of the underlying should be gauged as the longest possible remaining time before the counterparty is scheduled to fulfil its obligation, taking into account any applicable grace period. For the hedge, embedded options which may reduce the term of the hedge should be taken into account so that the shortest possible effective maturity is used. Where a call is at the discretion of the protection seller, the maturity will always be at the first call date. If the call is at the discretion of the protection buying bank but the terms of the arrangement at origination of the hedge contain a positive incentive for the bank to call the transaction before contractual maturity, the remaining time to the first call date will be deemed to be the effective maturity. For example, where there is a step-up in cost in conjunction with a call feature or where the effective cost of cover increases over time even if credit quality remains the same or increases, the effective maturity will be the remaining time to the first call.

Risk Weights for Maturity Mismatches

CA-4.6.3 As outlined in paragraph CA-4.2.24, hedges with maturity mismatches are only recognised when their original maturities are greater than or equal to one year. As a result, the maturity of hedges for exposures with original maturities of less than one year must be matched to be recognised. In all cases, hedges with maturity mismatches will no longer be recognised when they have a residual maturity of three months or less.

CA-4.6.4 When there is a maturity mismatch with recognised credit risk mitigants (collateral, on-balance sheet netting, guarantees and credit derivatives) the following adjustment will be applied.

$$Pa = P \times (t - 0.25) / (T - 0.25)$$

Where:

- Pa = Value of the credit protection adjusted for maturity mismatch.
- P = Credit protection (e.g. collateral amount, guarantee amount) adjusted for any haircuts.
- T = Min (T, residual maturity of the credit protection arrangement) expressed in years.
- T' = Min (5, residual maturity of the exposure) expressed in years.



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CA-4.7 Other Items Related to the Treatment of CRM Techniques

Treatment of Pools of CRM Techniques

- CA-4.7.1 In the case where a bank has multiple CRM techniques covering a single exposure (e.g. a bank has both collateral and guarantee partially covering an exposure), the bank will be required to subdivide the exposure into portions covered by each type of CRM technique (e.g. portion covered by collateral, portion covered by guarantee) and the risk-weighted assets of each portion must be calculated separately. When credit protection provided by a single protection provider has differing maturities, they must be subdivided into separate protection as well.

First-to-default Credit Derivatives

- CA-4.7.2 There are cases where a bank obtains credit protection for a basket of reference names and where the first default among the reference names triggers the credit protection and the credit event also terminates the contract. In this case, the bank may recognise regulatory capital relief for the asset within the basket with the lowest risk-weighted amount, but only if the notional amount is less than or equal to the notional amount of the credit derivative.
- CA-4.7.3 With regard to the bank providing credit protection through such an instrument, if the product has an external credit assessment from an eligible credit assessment institution, the risk weight in paragraph CA-6.4.8 applied to securitisation tranches will be applied. If the product is not rated by an eligible external credit assessment institution, the risk weights of the assets included in the basket will be aggregated up to a maximum of 1250% and multiplied by the nominal amount of the protection provided by the credit derivative to obtain the risk-weighted asset amount.

Second-to-default Credit Derivatives

- CA-4.7.4 In the case where the second default among the assets within the basket triggers the credit protection, the bank obtaining credit protection through such a product will only be able to recognise any capital relief if first-default-protection has also been obtained or when one of the assets within the basket has already defaulted.
- CA-4.7.5 For banks providing credit protection through such a product, the capital treatment is the same as in paragraph CA-4.7.3 above with one exception. The exception is that, in aggregating the risk weights, the asset with the lowest risk weighted amount can be excluded from the calculation.



MODULE	CA: Capital Adequacy
CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.1 Overview

- CA-5.1.1 This chapter of the Capital Adequacy Module describes the IRB approach to credit risk. Subject to certain minimum conditions and disclosure requirements, banks that have received CBB's 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 most cases, banks are required to use a value given by the CBB as opposed to an internal estimate for one or more of the risk components.
- CA-5.1.2 The IRB approach is based on measures of unexpected losses (UL) and expected losses (EL). The risk-weight functions produce capital requirements for the UL portion. Expected losses are treated separately, as outlined in paragraph CA-2.1.5 and section CA-5.7.
- CA-5.1.3 In this chapter, the asset classes are defined first. Adoption of the IRB approach across all asset classes is also discussed early in this section, as are transitional arrangements. The risk components, each of which is defined later in this section, serve as inputs to the risk-weight functions that have been developed for separate asset classes. For example, there is a risk-weight function for corporate exposures and another one for qualifying revolving retail exposures. The treatment of each asset class begins with a presentation of the relevant risk-weight function(s) followed by the risk components and other relevant factors, such as the treatment of credit risk mitigants. The legal certainty standards for recognising CRM as set out in Section CA-4.1 apply for both the foundation and advanced IRB approaches. The minimum requirements that banks must satisfy to use the IRB approach are presented at the end of this chapter starting at section CA-5.8, paragraph CA-5.8.1.
- CA-5.1.4 A scaling factor of 1.06 must be applied to the risk-weighted assets for credit risk assessed under the IRB approach.**



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.2 Mechanics of the IRB Approach

CA-5.2.1 In sub-section 1, the risk components (e.g. PD and LGD) and asset classes (e.g. corporate exposures and retail exposures) of the IRB approach are defined. Sub-section 2 provides a description of the risk components to be used by banks by asset class. Sub-sections 3 and 4 discuss a bank's adoption of the IRB approach and transitional arrangements, respectively. 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.

1. Categorisation of Exposures

CA-5.2.2 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.

CA-5.2.3 Some banks may use different classifications to those listed above in their internal risk management and measurement systems. While it is not the intention of the CBB 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 CBB that their methodology for assigning exposures to different classes is appropriate and consistent over time.

CA-5.2.4 For a discussion of the IRB treatment of securitisation exposures, see chapter CA-6.

(i) Definition of Corporate Exposures

CA-5.2.5 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- and medium-sized entities (SME), as defined in paragraph CA-5.3.4.



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.2 Mechanics of the IRB Approach (continued)

CA-5.2.6 Within the corporate asset class, five sub-classes of specialised lending (SL) are identified. Such lending possesses all the following characteristics, either in legal form or economic substance:

- (a) The exposure is typically to an entity (often a special purpose entity (SPE)) which was created specifically to finance and/or operate physical assets;
- (b) 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;
- (c) The terms of the obligation give the lender a substantial degree of control over the asset(s) and the income that it generates; and
- (d) 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.

CA-5.2.7 The five sub-classes of specialised lending are project finance, object finance, commodities finance, income-producing real estate, and high-volatility commercial real estate. Each of these sub-classes is defined below.

Project Finance

CA-5.2.8 Project finance (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.

CA-5.2.9 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.



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CA-5.2 Mechanics of the IRB Approach (continued)

Object Finance

- CA-5.2.10 Object finance (OF) refers to a method of funding the acquisition of physical assets (e.g. ships, aircraft, satellites, railcars, and fleets) where the repayment of the exposure is dependent on the cash flows generated by the specific assets that have been financed and pledged or assigned to the lender. A primary source of these cash flows might be rental or lease contracts with one or several third parties. In contrast, if the exposure is to a borrower whose financial condition and debt-servicing capacity enables it to repay the debt without undue reliance on the specifically pledged assets, the exposure should be treated as a collateralised corporate exposure.

Commodities Finance

- CA-5.2.11 Commodities finance (CF) refers to structured short-term lending to finance reserves, inventories, or receivables of exchange-traded commodities (e.g. 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.
- CA-5.2.12 The CBB 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.



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.2 Mechanics of the IRB Approach (continued)

Income-producing Real Estate

CA-5.2.13 Income-producing real estate (IPRE) refers to a method of providing funding to real estate (such as, office buildings to let, retail space, multifamily residential buildings, industrial or warehouse space, and hotels) where the prospects for repayment and recovery on the exposure depend primarily on the cash flows generated by the asset. The primary source of these cash flows would generally be lease or rental payments or the sale of the asset. The borrower may be, but is not required to be, an SPE, an operating company focused on real estate construction or holdings, or an operating company with sources of revenue other than real estate. The distinguishing characteristic of IPRE versus other corporate exposures that are collateralised by real estate is the strong positive correlation between the prospects for repayment of the exposure and the prospects for recovery in the event of default, with both depending primarily on the cash flows generated by a property.

High-volatility Commercial Real Estate

CA-5.2.14 High-volatility commercial real estate (HVCRE) lending is the financing of commercial real estate that exhibits higher loss rate volatility (i.e. higher asset correlation) compared to other types of SL. HVCRE includes:

- (a) Commercial real estate exposures secured by properties of types that are categorised by the CBB periodically as sharing higher volatilities in portfolio default rates;
- (b) Loans financing any of the land acquisition, development and construction (ADC) phases for properties of those types in such jurisdictions; and
- (c) 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 (e.g. 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.



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CA-5.2 Mechanics of the IRB Approach (continued)

CA-5.2.15 Where other supervisors categorise certain types of commercial real estate exposures as HVCRE in their jurisdictions, Bahraini banks are also required to classify such exposures in those jurisdictions as HVCRE.

(ii) Definition of Sovereign Exposures

CA-5.2.16 This asset class covers all exposures to counterparties treated as sovereigns under the standardised approach. This includes sovereigns (and their central banks), certain PSEs identified as sovereigns in the standardised approach, MDBs that are given a 0% risk weight under the standardised approach, and the entities referred to in paragraph CA-3.2.3.

(iii) Definition of Bank Exposures

CA-5.2.17 This asset class covers exposures to banks and those investment firms outlined in paragraph CA-3.2.13. Bank exposures also include claims on domestic PSEs that are treated like claims on banks under the standardised approach, and MDBs that are not assigned a 0% risk weight under the standardised approach.

(iv) Definition of Retail Exposures

CA-5.2.18 An exposure is categorised as a retail exposure if it meets all of the following criteria:

Nature of Borrower or Low Value of Individual Exposures

- (a) Exposures to individuals — such as revolving credits and lines of credit (e.g. credit cards, overdrafts, and retail facilities secured by financial instruments) as well as personal term loans and leases (e.g. instalment loans, auto loans and leases, student and educational loans, personal finance, and other exposures with similar characteristics). There will be an exposure threshold of BD250,000 to distinguish between retail and corporate exposures;



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.2 Mechanics of the IRB Approach (continued)

- (b) Residential mortgage loans (including first and subsequent liens, term loans and revolving home equity lines of credit) are eligible for retail treatment regardless of exposure size so long as the credit is extended to an individual that is an owner- occupier of the property (with buildings containing only a few rental units — otherwise they are treated as corporate). Loans secured by a single or small number of condominium or co-operative residential housing units in a single building or complex also fall within the scope of the residential mortgage category. CBB may set limits on the maximum number of housing units per exposure, on a case by case basis;
- (c) Loans extended to small businesses and managed as retail exposures are eligible for retail treatment provided the total exposure of the banking group to a small business borrower (on a consolidated basis where applicable) is less than BD 250,000 . Small business loans extended through or guaranteed by an individual are subject to the same exposure threshold; and
- (d) CBB will provide flexibility in the practical application of such thresholds such that banks are not forced to develop extensive new information systems simply for the purpose of ensuring perfect compliance. CBB will however, check on regular basis 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.

Large Number of Exposures

CA-5.2.19 The exposure must be one of a large pool of exposures, which are managed by the bank on a pooled basis. CBB may, on a case by case basis, set a minimum number of exposures within a pool for exposures in that pool to be treated as retail:

- (a) Small business exposures below BD 250,000 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.



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.2 Mechanics of the IRB Approach (continued)

CA-5.2.20 Within the retail asset class category, banks are required to identify separately three sub-classes of exposures: (a) exposures secured by residential properties as defined above, (b) qualifying revolving retail exposures, as defined in the following paragraph, and (c) all other retail exposures.

(v) *Definition of Qualifying Revolving Retail Exposures*

CA-5.2.21 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:

- (a) 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;
- (b) The exposures are to individuals;
- (c) The maximum exposure to a single individual in the sub-portfolio is BD 25,000 or less;
- (d) 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. CBB will review the relative volatility of loss rates across the QRRE subportfolios, as well as the aggregate QRRE portfolio;
- (e) Data on loss rates for the sub-portfolio must be retained in order to allow analysis of the volatility of loss rates; and
- (f) CBB must concur that treatment as a qualifying revolving retail exposure is consistent with the underlying risk characteristics of the sub-portfolio.



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CA-5.2 Mechanics of the IRB Approach (continued)

(vi) *Definition of Equity Exposures*

- CA-5.2.22 In general, equity exposures are defined on the basis of the economic substance of the instrument. They include both direct and indirect ownership interests,³³ whether voting or non-voting, in the assets and income of a commercial enterprise or of a financial institution that is not consolidated or deducted pursuant to Prudential Consolidation and Deduction Requirements Module. An instrument is considered to be an equity exposure if it meets all of the following requirements:
- (a) 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;
 - (b) It does not embody an obligation on the part of the issuer; and
 - (c) It conveys a residual claim on the assets or income of the issuer.
- CA-5.2.23 Additionally any of the following instruments must be categorised as an equity exposure:
- (a) An instrument with the same structure as those permitted as Tier 1 capital for banking organisations;
 - (b) An instrument that embodies an obligation on the part of the issuer and meets any of the following conditions:
 - The issuer may defer indefinitely the settlement of the obligation;
 - The obligation requires (or permits at the issuer's discretion) settlement by issuance of a fixed number of the issuer's equity shares;

³³ Indirect equity interests include holdings of derivative instruments tied to equity interests, and holdings in corporations, partnerships, limited liability companies or other types of enterprises that issue ownership interests and are engaged principally in the business of investing in equity instruments.



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CA-5.2 Mechanics of the IRB Approach (continued)

- 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;³⁴ or,
- 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 CBB 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 CBB 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 CBB.

CA-5.2.24 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.³⁵ This includes liabilities from which the return is linked to that of equities.³⁶ 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.

CA-5.2.25 The CBB may, on a case by case basis, re-characterise debt holdings as equities for regulatory purposes or otherwise ensure the proper treatment of holdings.

³⁴ For certain obligations that require or permit settlement by issuance of a variable number of the issuer's equity shares, the change in the monetary value of the obligation is equal to the change in the fair value of a fixed number of equity shares multiplied by a specified factor. Those obligations meet the conditions of this bullet if both the factor and the referenced number of shares are fixed. For example, an issuer may be required to settle an obligation by issuing shares with a value equal to three times the appreciation in the fair value of 1,000 equity shares. That obligation is considered to be the same as an obligation that requires settlement by issuance of shares equal to the appreciation in the fair value of 3,000 equity shares.

³⁵ Equities that are recorded as a loan but arise from a debt/equity swap made as part of the orderly realisation or restructuring of the debt are included in the definition of equity holdings. However, these instruments may not attract a lower capital charge than would apply if the holdings remained in the debt portfolio.

³⁶ Such liabilities are not required to be included where they are directly hedged by an equity holding, such that the net position does not involve material risk.



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CA-5.2 Mechanics of the IRB Approach (continued)

(vii) Definition of Eligible Purchased Receivables

CA-5.2.26 Eligible purchased receivables are divided into retail and corporate receivables as defined below.

Retail Receivables

CA-5.2.27 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 sections CA-5.6 and CA-5.8.

Corporate Receivables

CA-5.2.28 For purchased corporate receivables, banks are required to assess the default risk of individual obligors as specified in section CA-5.3 (starting with paragraph CA-5.3.2) consistent with the treatment of other corporate exposures.

2. Foundation and Advanced Approaches

CA-5.2.29 For each of the asset classes covered under the IRB framework, there are three key elements:

- (a) Risk components — estimates of risk parameters provided by banks some of which are CBB's estimates;
- (b) Risk-weight functions — the means by which risk components are transformed into risk-weighted assets and therefore capital requirements; and
- (c) Minimum requirements — the minimum standards that must be met in order for a bank to use the IRB approach for a given asset class.

CA-5.2.30 The CBB has decided to allow only the foundation approach for corporate, sovereign and bank asset classes. However, banks are required to adopt the advanced approach for retail asset class. Under the foundation approach, as a general rule, banks provide their own estimates of PD and rely on CBB's estimates for other risk components. Under the advanced approach, banks provide more of their own estimates of PD, LGD and EAD, and their own calculation of M, subject to meeting minimum standards. For both the foundation and advanced approaches, banks must always use the risk-weight functions provided in this chapter for the purpose of deriving capital requirements. The full suite of approaches is described below.



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.2 Mechanics of the IRB Approach (continued)

(i) Corporate, Sovereign, and Bank Exposures

- CA-5.2.31 For corporate, sovereign and bank exposures only the foundation approach is allowed under which banks must provide their own estimates of PD associated with each of their borrower grades, but must use CBB's estimates for the other relevant risk components. The other risk components are LGD, EAD and M.³⁷
- CA-5.2.32 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

- CA-5.2.33 Banks that do not meet the requirements for the estimation of PD under the corporate foundation approach for their SL assets are required to map their internal risk grades to five supervisory categories, each of which is associated with a specific risk weight. This version is termed the 'supervisory slotting criteria approach'.
- CA-5.2.34 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. Subject to CBB's discretion, on a case by case basis, banks meeting the requirements for HVCRE exposure are able to use a foundation approach that is similar in all respects to the corporate approach, with the exception of a separate risk-weight function as described in paragraph CA-5.3.11.

(ii) Retail Exposures

- CA-5.2.35 For retail exposures, banks must provide their own estimates of PD, LGD and EAD. There is no distinction between a foundation and advanced approach for this asset class.

(iii) Equity Exposures

- CA-5.2.36 There are two broad approaches to calculate risk-weighted assets for equity exposures not held in the trading book: a market-based approach and a PD/LGD approach. These are set out in full in paragraphs CA-5.5.1 to CA-5.5.23.

³⁷ As noted in section CA-5.3.45, CBB may require/allow banks using the foundation approach to calculate M using the definition provided in section CA-5.3.46 to CA-5.3.50.



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.2 Mechanics of the IRB Approach (continued)

(iv) Eligible Purchased Receivables

CA-5.2.37 The treatment potentially straddles two asset classes. For eligible corporate receivables, only the foundation approach is available subject to certain operational requirements being met. For eligible retail receivables, as with the retail asset class, there is no distinction between a foundation and advanced approach.

3. Adoption of the IRB Approach Across Asset Classes

CA-5.2.38 Once a bank adopts an IRB approach for part of its holdings, it is expected to extend it across the entire banking group. The CBB recognises however, that, for many banks, it may not be practicable for various reasons to implement the IRB approach across all material asset classes and business units at the same time. Furthermore, once on IRB, data limitations may mean that banks can meet the standards for the use of own estimates of LGD and EAD for some but not all of their business units at the same time. CBB will expect banks to define their business units in line with asset classes given in this chapter, however banks can apply to CBB for exemption from this rule.

CA-5.2.39 As such, CBB allows banks to adopt a phased rollout of the IRB approach across the banking group. The phased rollout includes (i) adoption of IRB across asset classes within the same business unit (or in the case of retail exposures across individual sub-classes); and (ii) adoption of IRB across business units in the same banking group. However, when a bank adopts an IRB approach for an asset class within a particular business unit (or in the case of retail exposures for an individual sub-class), it must apply the IRB approach to all exposures within that asset class (or sub-class) in that unit.

CA-5.2.40 A bank must produce an implementation plan, specifying to what extent and when it intends to roll out IRB approaches across significant asset classes (or sub-classes in the case of retail) and business units over time. The plan should be exacting, yet realistic, and must be agreed with the CBB. 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, CBB 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.



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CA-5.2 Mechanics of the IRB Approach (continued)

- CA-5.2.41 Some exposures in non-significant business units as well as asset classes (or sub-classes in the case of retail) that are immaterial in terms of size and perceived risk profile may be exempt from the requirements in the previous two paragraphs, subject to CBB's approval. Capital requirements for such operations will be determined according to the standardised approach, with the CBB determining whether a bank should hold more capital for such positions.
- CA-5.2.42 Notwithstanding the above, once a bank has adopted the IRB approach for all or part of any of the corporate, bank, sovereign, or retail asset classes, it will be required to adopt the IRB approach for its equity exposures at the same time, subject to materiality. Further, once a bank has adopted the general IRB approach for corporate exposures, it will be required to adopt the IRB approach for the SL sub-classes within the corporate exposure class.
- CA-5.2.43 Banks adopting an IRB approach are expected to continue to employ an IRB approach. A voluntary return to the standardised approach is permitted only in extraordinary circumstances, such as divestiture of a large fraction of the bank's credit-related business, and approval must be obtained from the CBB.
- CA-5.2.44 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 approach for other sub-classes within the corporate asset class.



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CHAPTER	CA-5	Credit Risk – The Internal Ratings-Based Approach

CA-5.2 Mechanics of the IRB Approach (continued)

4. Transition Arrangements

(i) Parallel Calculation

CA-5.2.45

Banks adopting the foundation IRB (advanced IRB for retail class) approach are required to calculate their capital requirement using these approaches, as well as the capital adequacy regulations issued by CBB dated July 2004 for the time period specified in section CA-A.4. The transition period for adoption of IRB will begin from the publication of this Module. Parallel calculation for banks adopting the foundation IRB approach to credit risk will start in the year beginning year-end 2007.

(ii) Corporate, Sovereign, Bank, and Retail Exposures

CA-5.2.46

The transition period starts on the date of implementation of this Module and will last for 3 years from that date. During the transition period, the following minimum requirements can be relaxed:

- (a) For corporate, sovereign, and bank exposures under the foundation approach, paragraph CA-5.8.74, the requirement that, regardless of the data source, banks must use at least five years of data to estimate the PD;
- (b) For retail exposures, paragraph CA-5.8.77, the requirement that regardless of the data source banks must use at least five years of data to estimate loss characteristics (EAD, and either expected loss (EL) or PD and LGD);
- (c) For corporate, sovereign, bank, and retail exposures, paragraph CA-5.8.56, the requirement that a bank must demonstrate it has been using a rating system that was broadly in line with the minimum requirements articulated in this document for at least three years prior to qualification; and
- (d) The applicable aforementioned transitional arrangements also apply to the PD/LGD approach to equity. There are no transitional arrangements for the market-based approach to equity.

CA-5.2.47

Under these transitional arrangements for IRB, banks must have a minimum of two years of data at the implementation of this Module. This requirement will increase by one year for each of three years of transition.



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CA-5.2 Mechanics of the IRB Approach (continued)

CA-5.2.48 Owing to the potential for very long-run cycles in house prices which short-term data may not adequately capture, during this transition period, LGDs for retail exposures secured by residential properties cannot be set below 10% for any sub-segment of exposures to which the formula in paragraph CA-5.4.3 is applied.³⁸ During the transition period the CBB will review the potential need for continuation of this floor.

(iii) Equity Exposures

CA-5.2.49 For a maximum of ten years, CBB may, on a case by case basis, exempt from the IRB treatment particular equity investments held at the time of the publication of this Module. This exemption period will begin from the publication of this Module. The exempted position is measured as the number of shares as of that date and any additional arising directly as a result of owning those holdings, as long as they do not increase the proportional share of ownership in a portfolio company.

CA-5.2.50 If an acquisition increases the proportional share of ownership in a specific holding (e.g. due to a change of ownership initiated by the investing company subsequent to the publication of this Module) the exceeding part of the holding is not subject to the exemption. Nor will the exemption apply to holdings that were originally subject to the exemption, but have been sold and then bought back.

CA-5.2.51 Equity holdings covered by these transitional provisions will be subject to the capital requirements of the standardised approach.

³⁸ The 10% LGD floor shall not apply, however, to sub-segments that are subject to/benefit from sovereign guarantees. Further, the existence of the floor does not imply any waiver of the requirements of LGD estimation as laid out in the minimum requirements starting with section CA-5.8.79.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures

CA-5.3.1 This section presents the method of calculating the unexpected loss (UL) capital requirements for corporate, sovereign and bank exposures. As discussed in proceeding paragraphs, one risk-weight function is provided for determining the capital requirement for all three asset classes with one exception. Supervisory risk weights are provided for each of the specialised lending sub-classes of corporates, and a separate risk-weight function is also provided for HVCRE. Then the risk components are discussed. The method of calculating expected losses, and for determining the difference between that measure and provisions is described in section CA-5.7.

1. *Risk-weighted Assets for Corporate, Sovereign, and Bank Exposures*

(i) *Formula for Derivation of Risk-weighted Assets*

CA-5.3.2 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. Paragraphs CA-5.3.45 to CA-5.3.50 discuss the circumstances in which the maturity adjustment applies.

CA-5.3.3 Throughout this section, PD and LGD are measured as decimals, and EAD is measured as currency (e.g. euros), except where explicitly noted otherwise. For exposures not in default, the formula for calculating risk-weighted assets is:^{39, 40}

$$\text{Correlation (R)} = 0.12 \times (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50)) + 0.24 \times [1 - (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50))]$$

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

$$\text{Capital requirement}^{41} (\text{K}) = [\text{LGD} \times \text{N}[(1 - \text{R})^{-0.5} \times \text{G}(\text{PD}) + (\text{R} / (1 - \text{R}))^{0.5} \times \text{G}(0.999)] - \text{PD} \times \text{LGD}] \times (1 - 1.5 \times \text{b})^{-1} \times (1 + (\text{M} - 2.5) \times \text{b})$$

$$\text{Risk-weighted assets (RWA)} = \text{K} \times 12.5 \times \text{EAD}$$

³⁹ Ln denotes the natural logarithm.

⁴⁰ N(x) denotes the cumulative distribution function for a standard normal random variable (i.e. the probability that a normal random variable with mean zero and variance of one is less than or equal to x). G(z) denotes the inverse cumulative distribution function for a standard normal random variable (i.e. the value of x such that N(x) = z). The normal cumulative distribution function and the inverse of the normal cumulative distribution function are, for example, available in Excel as the functions NORMSDIST and NORMSINV.

⁴¹ If this calculation results in a negative capital charge for any individual sovereign exposure, banks must apply a zero capital charge for that exposure.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in paragraph CA-5.8.79) and the bank's best estimate of expected loss (described in paragraph CA-5.8.82). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

Illustrative risk weights are shown in **Appendix CA-6**.

(ii) Firm-size Adjustment for Small- and Medium-sized Entities (SME)

CA-5.3.4 Under the IRB approach for corporate credits, banks will be permitted to separately distinguish exposures to SME borrowers (defined as corporate exposures, being an unlisted or unincorporated enterprise where the reported annual sales for the consolidated group of which the firm is a part is less than BD 2 million) from those to large firms. A firm-size adjustment (i.e. $0.04 \times (1 - (S - 0.2)/1.8)$) is made to the corporate risk weight formula for exposures to SME borrowers. S is expressed as total annual sales in millions of BD with values of S falling in the range of equal to or less than BD 2 million or greater than or equal to BD 0.2 million. Reported sales of less than 0.2 million BD will be treated as if they were equivalent to 0.2 million BD for the purposes of the firm-size adjustment for SME borrowers.

$$\text{Correlation (R)} = 0.12 \times (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50)) + 0.24 \times [1 - (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50))] - 0.04 \times (1 - (S - 0.2) / 1.8)$$

CA-5.3.5 Banks are allowed, 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. The criteria for definition of SME will be assessed by CBB on a regular basis. The external auditors are required to assess the reasonableness of identification criteria.

(iii) Risk Weights for Specialised Lending

Risk Weights for PF, OF, CF, and IPRE

CA-5.3.6 Banks that do not meet the requirements for the estimation of PD under the corporate 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 **Appendix CA-7**. The risk weights for unexpected losses associated with each supervisory category are:



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

Supervisory Categories and UL Risk Weights for other SL Exposures

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

CA-5.3.7 Although banks are expected to map their internal ratings to the supervisory categories for specialised lending using the slotting criteria provided in **Appendix CA-7**, 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

CA-5.3.8 Banks that meet the requirements for the estimation of PD will be able to use the general foundation approach for the corporate asset class to derive risk weights for SL sub- classes.

Risk Weights for HVCRE

CA-5.3.9 Banks that do not meet the requirements for estimation of PD, 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 **Appendix CA-7**. The risk weights associated with each category are:



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

Supervisory Categories and UL Risk Weights for High-volatility Commercial Real Estate

Strong	Good	Satisfactory	Weak	Default
95%	120%	140%	250%	0%

CA-5.3.10 As indicated in paragraph CA-5.3.7, each supervisory category broadly corresponds to a range of external credit assessments.

CA-5.3.11 Banks that meet the requirements for the estimation of PD will use the same formula for the derivation of risk weights that is used for other SL exposures, except that they will apply the following asset correlation formula:

$$\text{Correlation (R)} = 0.12 \times (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50)) + 0.30 \times [1 - (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50))]$$

(iv) Calculation of Risk-weighted Assets for Exposures Subject to the Double Default Framework

CA-5.3.12 For hedged exposures to be treated within the scope of the double default framework, capital requirements may be calculated according to paragraphs CA-5.3.13 to CA-5.3.16.

CA-5.3.13 The capital requirement for a hedged exposure subject to the double default treatment (K_{DD}) is calculated by multiplying K_0 as defined below by a multiplier depending on the PD of the protection provider (PD_g):

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



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

CA-5.3.14 K_0 is calculated in the same way as a capital requirement for an unhedged corporate exposure (as defined in paragraphs CA-5.3.3 and CA-5.3.4), but using different parameters for LGD and the maturity adjustment.

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

CA-5.3.15 PD_o and PD_g are the probabilities of default of the obligor and guarantor, respectively, both subject to the PD floor set out in paragraph CA-5.3.17. The correlation ρ_{os} is calculated according to the formula for correlation (R) in paragraph CA-5.3.3 (or, if applicable, paragraph CA-5.3.4), with PD being equal to PD_o , and LGD_g is the LGD of a comparable direct exposure to the guarantor (i.e. consistent with paragraph CA-5.3.29, the LGD associated with an unhedged facility to the guarantor or the unhedged facility to the obligor, depending upon whether in the event both the guarantor and the obligor default during the life of the hedged transaction available evidence and the structure of the guarantee indicate that the amount recovered would depend on the financial condition of the guarantor or obligor, respectively; in estimating either of these LGDs, a bank may recognise collateral posted exclusively against the exposure or credit protection, respectively, in a manner consistent with paragraphs CA-5.3.31 or CA-5.3.8 and CA-5.8.79 to CA-5.8.83, as applicable). There may be no consideration of double recovery in the LGD estimate. The maturity adjustment coefficient b is calculated according to the formula for maturity adjustment (b) in paragraph CA-5.3.3, with PD being the minimum of PD_o and PD_g . M is the effective maturity of the credit protection, which may under no circumstances be below the one-year floor if the double default framework is to be applied.

CA-5.3.16 The risk-weighted asset amount is calculated in the same way as for unhedged exposures, i.e.

$$RWA_{DD} = K_{DD} \times 12.5 \times EAD_g$$



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

2. Risk Components

(i) Probability of Default (PD)

CA-5.3.17

For corporate and bank exposures, the PD is the greater of the one-year PD associated with the internal borrower grade to which that exposure is assigned, or 0.03%. For sovereign exposures, the PD is the one-year PD associated with the internal borrower grade to which that exposure is assigned. The PD of borrowers assigned to a default grade(s), consistent with the reference definition of default, is 100%. The minimum requirements for the derivation of the PD estimates associated with each internal borrower grade are outlined in paragraphs CA-5.8.72 to CA-5.8.74.

(ii) Loss Given Default (LGD)

- Treatment of Unsecured Claims and Non-recognised Collateral

CA-5.3.18

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

CA-5.3.19

All subordinated claims on corporates, sovereigns and banks must be assigned a 75% LGD. A subordinated loan is a facility that is expressly subordinated to another facility. This also includes economic subordination, such as cases where the facility is unsecured and the bulk of the borrower's assets are used to secure other exposures. CBB will review subordinated claims on a case by case basis. In case the subordinated claim (i) is on a banking, securities or other financial entity and (ii) exceeds (when combined with other investments in regulatory capital instruments of the investee) 20% of the concerned investee's eligible regulatory capital, such holding must be treated as described in Prudential Consolidation and Deduction Requirements Module.



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

- Collateral under the Foundation Approach

CA-5.3.20 In addition to the eligible financial collateral recognised in the standardised approach, under the foundation IRB approach some other forms of collateral, known as eligible IRB collateral, are also recognised. These include receivables, specified commercial and residential real estate (CRE/RRE), and other collateral, where they meet the minimum requirements set out in paragraphs CA-5.8.119 to CA-5.8.134.⁴² For eligible financial collateral, the requirements are identical to the operational standards as set out in chapter CA-4.

- Methodology for Recognition of Eligible Financial Collateral under the Foundation Approach

CA-5.3.21 The methodology for the recognition of eligible financial collateral closely follows that outlined in the comprehensive approach to collateral in the standardised approach in paragraphs CA-4.3.3 to CA-4.3.25. The simple approach to collateral presented in the standardised approach will not be available to banks applying the IRB approach.

CA-5.3.22 Following the comprehensive approach, the effective loss given default (LGD*) applicable to a collateralised transaction can be expressed as follows, where:

- (a) LGD is that of the senior unsecured exposure before recognition of collateral (45%);
- (b) E is the current value of the exposure (i.e. cash lent or securities lent or posted);
- (c) E* is the exposure value after risk mitigation as determined in paragraphs CA-4.3.3 to CA-4.3.6 of the standardised approach. This concept is only used to calculate LGD*. Banks must continue to calculate EAD without taking into account the presence of any collateral, unless otherwise specified.

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

CA-5.3.23 Banks that qualify for the foundation IRB approach may calculate E* using any of the ways specified under the comprehensive approach for collateralised transactions under the standardised approach.

⁴² The LGD applied to the collateralised portion of such exposures, subject to the limitations set out in paragraphs CA-4.2.1 to CA-4.3.25 of the standardised approach, will be set at 35%. The LGD applied to the remaining portion of this exposure will be set at 45%.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

CA-5.3.24 Where repo-style transactions are subject to a master netting agreement, a bank may choose not to recognise the netting effects in calculating capital. Banks that want to recognise the effect of master netting agreements on such transactions for capital purposes must satisfy the criteria provided in paragraph CA-4.3.17 and CA-4.3.18 of the standardised approach. The bank must calculate E* in accordance with paragraphs CA-4.3.20 and 4.3.21 or CA-4.3.22 to 4.3.25 and equate this to EAD. The impact of collateral on these transactions may not be reflected through an adjustment to LGD.

- Carve Out from the Comprehensive Approach

CA-5.3.25 As in the standardised approach, for transactions where the conditions in paragraph CA-4.3.14 are met, and in addition, the counterparty is a core market participant as specified in paragraph CA-4.3.15, banks can apply a zero H.

- Methodology for Recognition of Eligible IRB Collateral

CA-5.3.26 The methodology for determining the effective LGD under the foundation approach for cases where banks have taken eligible IRB collateral to secure a corporate exposure is as follows:

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

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



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

Minimum LGD for Secured Portion of Senior Exposures

	Minimum LGD	Required minimum collateralisation level of the exposure (C*)	Required level of over-collateralisation for full LGD recognition (C**)
Eligible Financial collateral	0%	0%	n.a.
Receivables	35%	0%	125%
CRE/RRE	35%	30%	140%
Other collateral ⁴³	40%	30%	140%

- (a) Senior exposures are to be divided into fully collateralised and un-collateralised portions;
- (b) The part of the exposure considered to be fully collateralised, C/C**, receives the LGD associated with the type of collateral;
- (c) The remaining part of the exposure is regarded as unsecured and receives an LGD of 45%.

- Methodology for the Treatment of Pools of Collateral

CA-5.3.27 The methodology for determining the effective LGD of a transaction under the foundation approach where banks have taken both financial collateral and other eligible IRB collateral is aligned to the treatment in the standardised approach and based on the following guidance:

- (a) In the case where a bank has obtained multiple forms of CRM, it will be required to subdivide the adjusted value of the exposure (after the haircut for eligible financial collateral) into portions each covered by only one CRM type. That is, the bank must divide the exposure into the portion covered by eligible financial collateral, the portion covered by receivables, the portion covered by CRE/RRE collateral, a portion covered by other collateral, and an unsecured portion, where relevant;

⁴³ Other collateral excludes physical assets acquired by the bank as a result of a loan default.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

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

Treatment of Certain Repo-style Transactions

- CA-5.3.28 Banks that want to recognise the effects of master netting agreements on repo-style transactions for capital purposes must apply the methodology outlined in paragraph CA-5.3.24 for determining E* for use as the EAD.

Treatment of Guarantees and Credit Derivatives

- CA-5.3.29 CRM in the form of guarantees and credit derivatives must not reflect the effect of double default (see paragraph CA-5.8.93). 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.
- CA-5.3.30 The approach to guarantees and credit derivatives closely follows the treatment under the standardised approach as specified in paragraphs CA-4.5.1 to CA-4.5.13. The range of eligible guarantors is the same as under the standardised approach except that companies that are internally rated and associated with a PD equivalent to A- or better may also be recognised. To receive recognition, the requirements outlined in paragraphs CA-4.5.1 to CA-4.5.6 must be met.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

- CA-5.3.31 Eligible guarantees from eligible guarantors will be recognised as follows:
- (a) For the covered portion of the exposure, a risk weight is derived by taking:
 - the risk-weight function appropriate to the type of guarantor, and
 - the PD appropriate to the guarantor's borrower grade, or some grade between the underlying obligor and the guarantor's borrower grade if the bank deems a full substitution treatment not to be warranted.
 - (b) 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.
- CA-5.3.32 The uncovered portion of the exposure is assigned the risk weight associated with the underlying obligor.
- CA-5.3.33 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 this approach follows that outlined in the standardised approach in paragraphs CA-4.5.10 to CA-4.5.12, and depends upon whether the cover is proportional or tranching.
- CA-5.3.34 A bank using an IRB approach has the option of using the substitution approach in determining the appropriate capital requirement for an exposure. However, for exposures hedged by one of the following instruments the double default framework according to paragraphs CA-5.3.12 to CA-5.3.16 may be applied subject to the additional operational requirements set out in paragraph CA-5.3.39. A bank may decide separately for each eligible exposure to apply either the double default framework or the substitution approach:
- (a) Single-name, unfunded credit derivatives (e.g. credit default swaps) or single-name guarantees;
 - (b) First-to-default basket products — the double default treatment will be applied to the asset within the basket with the lowest risk-weighted amount; and
 - (c) nth-to-default basket products — the protection obtained is only eligible for consideration under the double default framework if eligible (n–1)th default protection has also been obtained or where (n–1) of the assets within the basket have already defaulted.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

Operational Requirements for Recognition of Double Default

CA-5.3.35

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

- (a) The risk weight that is associated with the exposure prior to the application of the framework does not already factor in any aspect of the credit protection;
- (b) The entity selling credit protection is a bank⁴⁴, investment firm or insurance company (but only those that are in the business of providing credit protection, including mono-lines, re-insurers, and non-sovereign credit export agencies⁴⁵), referred to as a financial firm, that:
 - It is regulated in a manner broadly equivalent to that in this Module (where there is appropriate supervisory oversight and transparency/market discipline), or externally rated as at least investment grade by a credit rating agency deemed suitable for this purpose by CBB;
 - Had an internal rating with a PD equivalent to or lower than that associated with an external A– rating at the time the credit protection for an exposure was first provided or for any period of time thereafter; and
 - Has an internal rating with a PD equivalent to or lower than that associated with an external investment-grade rating.
- (c) The underlying obligation is:
 - A corporate exposure as defined in paragraphs CA-5.2.5 to CA-5.2.15 (excluding specialised lending exposures for which the supervisory slotting criteria approach described in paragraphs CA-5.3.6 to CA-5.3.11 is being used); or
 - A claim on a PSE that is not a sovereign exposure as defined in paragraph CA-5.2.16; or
 - A loan extended to a small business and classified as a retail exposure as defined in paragraph CA-5.2.18.

⁴⁴ This does not include PSEs and MDBs, even though claims on these may be treated as claims on banks according to paragraph CA-5.2.17.

⁴⁵ By non-sovereign it is meant that credit protection in question does not benefit from any explicit sovereign counter-guarantee.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

- (d) The underlying obligor is not:
- A financial firm as defined in (b); or
 - A member of the same group as the protection provider.
- (e) The credit protection meets the minimum operational requirements for such instruments as outlined in paragraphs CA-4.5.1 to CA-4.5.5;
- (f) In keeping with paragraph CA-4.5.2 for guarantees, for any recognition of double default effects for both guarantees and credit derivatives a bank must have the right and expectation to receive payment from the credit protection provider without having to take legal action in order to pursue the counterparty for payment. To the extent possible, a bank must take steps to satisfy itself that the protection provider is willing to pay promptly if a credit event should occur;
- (g) The purchased credit protection absorbs all credit losses incurred on the hedged portion of an exposure that arise due to the credit events outlined in the contract;
- (h) If the payout structure provides for physical settlement, then there must be legal certainty with respect to the deliverability of a loan, bond, or contingent liability. If a bank intends to deliver an obligation other than the underlying exposure, it must ensure that the deliverable obligation is sufficiently liquid so that the bank would have the ability to purchase it for delivery in accordance with the contract;
- (i) The terms and conditions of credit protection arrangements must be legally confirmed in writing by both the credit protection provider and the bank;
- (j) In the case of protection against dilution risk, the seller of purchased receivables must not be a member of the same group as the protection provider; and
- (k) There is no excessive correlation between the creditworthiness of a protection provider and the obligor of the underlying exposure due to their performance being dependent on common factors beyond the systematic risk factor. The bank has a process to detect such excessive correlation. An example of a situation in which such excessive correlation would arise is when a protection provider guarantees the debt of a supplier of goods or services and the supplier derives a high proportion of its income or revenue from the protection provider.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

(iii) Exposure at Default (EAD)

CA-5.3.36 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 paragraph CA-5.7.7, discounts may be included in the measurement of total eligible provisions for purposes of the EL-provision calculation set out in section CA-5.7.

Exposure Measurement for On-balance Sheet Items

CA-5.3.37 On-balance sheet netting of loans and deposits will be recognised subject to the same conditions as under the standardised approach (see paragraph CA-4.4.1). Where currency or maturity mismatched on-balance sheet netting exists, the treatment follows the standardised approach, as set out in paragraphs CA-4.5.12 and CA-4.6.1 to CA-4.6.4.

Exposure Measurement for Off-balance Sheet Items (with the Exception of FX and Interest-rate, Equity, and Commodity-related Derivatives)

CA-5.3.38 For off-balance sheet items, exposure is calculated as the committed but undrawn amount multiplied by a CCF.

CA-5.3.39 The types of instruments and the CCFs applied to them are the same as those in the standardised approach, as outlined in paragraphs CA-3.3.1 to CA-3.3.15 with the exception of commitments, Note Issuance Facilities (NIFs) and Revolving Underwriting Facilities (RUFs).

CA-5.3.40 A CCF of 75% will be applied to commitments, NIFs and RUFs regardless of the maturity of the underlying facility. This does not apply to those facilities which are uncommitted, that are unconditionally cancellable, or that effectively provide for automatic cancellation, for example due to deterioration in a borrower's creditworthiness, at any time by the bank without prior notice. A CCF of 0% will be applied to these facilities.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

CA-5.3.41 The amount to which the CCF is applied is the lower of the value of the unused committed credit line, and the value that reflects any possible constraining availability of the facility, such as the existence of a ceiling on the potential lending amount which is related to a borrower's reported cash flow. If the facility is constrained in this way, the bank must have sufficient line monitoring and management procedures to support this contention.

CA-5.3.42 In order to apply a 0% CCF for unconditionally and immediately cancellable corporate overdrafts and other facilities, banks must demonstrate that they actively monitor the financial condition of the borrower, and that their internal control systems are such that they could cancel the facility upon evidence of a deterioration in the credit quality of the borrower.

CA-5.3.43 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.

Exposure Measurement for Transactions that Expose Banks to Counterparty Credit risk

CA-5.3.44 Measures of exposure for SFTs and OTC derivatives that expose banks to counterparty credit risk under the IRB approach will be calculated as per the rules set forth in **Appendix CA-2** of this Module.

(iv) Effective Maturity (M)

CA-5.3.45 Effective maturity (M) will be 2.5 years except for repo-style transactions where the effective maturity will be 6 months. However, banks can apply to CBB for approval to measure M for each facility using the definition provided below.

CA-5.3.46 Except as noted in proceeding paragraph, M is defined as the greater of one year and the remaining effective maturity in years as defined below. In all cases, M will be no greater than 5 years:

- (a) For an instrument subject to a determined cash flow schedule, effective maturity M is defined as:

$$\text{Effective Maturity (M)} = \sum_t t * CF_t / \sum_t CF_t$$

where CF_t denotes the cash flows (principal, interest payments and fees) contractually payable by the borrower in period t.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

- (b) 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; and
- (c) For derivatives subject to a master netting agreement, the weighted average maturity of the transactions should be used when applying the explicit maturity adjustment. Further, the notional amount of each transaction should be used for weighting the maturity.

CA-5.3.47 The one-year floor does not apply to certain short-term exposures, comprising fully or nearly-fully collateralised⁴⁶ capital market-driven transactions (i.e. OTC derivatives transactions and margin lending) and repo-style transactions (i.e. 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).

CA-5.3.48 In addition to the transactions considered in the preceding paragraph 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 are eligible for exemption from the one-year floor. Such transactions include:

- (a) Some capital market-driven transactions and repo-style transactions that might not fall within the scope of the preceding paragraph;
- (b) Some short-term self-liquidating trade transactions. Import and export letters of credit and similar transactions could be accounted for at their actual remaining maturity;
- (c) 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;

⁴⁶ The intention is to include both parties of a transaction meeting these conditions where neither of the parties is systematically under-collateralised.



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CA-5.3 Rules for Corporate, Sovereign, and Bank Exposures (continued)

- (d) 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;
- (e) Some exposures to banks arising from foreign exchange settlements; and
- (f) Some short-term loans and deposits.

CA-5.3.49 For transactions falling within the scope of paragraph CA-5.3.47 subject to a master netting agreement, the weighted average maturity of the transactions should be used when applying the explicit maturity adjustment. A floor equal to the minimum holding period for the transaction type set out in paragraph CA-4.3.11 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.

CA-5.3.50 Where there is no explicit adjustment, the effective maturity (M) assigned to all exposures is set at 2.5 years unless otherwise specified in paragraph CA-5.3.45.

Treatment of Maturity Mismatches

CA-5.3.51 The treatment of maturity mismatches under IRB is identical to that in the standardised approach — see paragraphs CA-4.6.1 to CA-4.6.4.



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CA-5.4 Rules for Retail Exposures

CA-5.4.1 This section presents in detail the method of calculating the UL capital requirements for retail exposures. The first sub-section provides three risk-weight functions, one for residential mortgage exposures, a second for qualifying revolving retail exposures, and a third for other retail exposures. Second sub-section presents the risk components to serve as inputs to the risk-weight functions. The method of calculating expected losses, and for determining the difference between that measure and provisions is described in section CA-5.7.

1. Risk-weighted Assets for Retail Exposures

CA-5.4.2 There are three separate risk-weight functions for retail exposures, as defined in paragraphs CA-5.4.3 to CA-5.4.5. 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 contains an explicit maturity adjustment. Throughout this section, PD and LGD are measured as decimals, and EAD is measured as currency.

(i) Residential Mortgage Exposures

CA-5.4.3 For exposures defined in paragraph CA-5.2.18 that are not in default and are secured or partly secured⁴⁷ by residential mortgages, risk weights will be assigned based on the following formula:

Correlation (R) = 0.15

$$\text{Capital requirement (K)} = \text{LGD} \times N[(1 - R)^{-0.5} \times G(\text{PD}) + (R / (1 - R))^{0.5} \times G(0.999)] - \text{PD} \times \text{LGD}$$

Risk-weighted assets = K x 12.5 x EAD

The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in paragraph CA-5.8.79) and the bank's best estimate of expected loss (described in paragraph CA-5.8.82). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

⁴⁷ This means that risk weights for residential mortgages also apply to the unsecured portion of such residential mortgages.



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CA-5.4 Rules for Retail Exposures (continued)

(ii) Qualifying Revolving Retail Exposures

CA-5.4.4 For qualifying revolving retail exposures as defined in paragraph CA-5.2.21 that are not in default, risk weights are defined based on the following formula:

Correlation (R) = 0.04

$$\text{Capital requirement (K)} = \text{LGD} \times N[(1 - R)^{-0.5} \times G(\text{PD}) + (R / (1 - R))^{0.5} \times G(0.999)] - \text{PD} \times \text{LGD}$$

Risk-weighted assets = K x 12.5 x EAD

The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in paragraph CA-8.79) and the bank's best estimate of expected loss (described in paragraph CA-5.8.82). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

(iii) Other Retail Exposures

CA-5.4.5 For all other retail exposures that are not in default, risk weights are assigned based on the following function, which allows correlation to vary with PD:

$$\text{Correlation (R)} = 0.03 \times (1 - \text{EXP}(-35 \times \text{PD})) / (1 - \text{EXP}(-35)) + 0.16 \times [1 - (1 - \text{EXP}(-35 \times \text{PD})) / (1 - \text{EXP}(-35))]$$

$$\text{Capital requirement (K)} = \text{LGD} \times N[(1 - R)^{-0.5} \times G(\text{PD}) + (R / (1 - R))^{0.5} \times G(0.999)] - \text{PD} \times \text{LGD}$$

Risk-weighted assets = K x 12.5 x EAD

The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in paragraph CA-5.8.79) and the bank's best estimate of expected loss (described in paragraph CA-5.8.82). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

Illustrative risk weights are shown in **Appendix CA-6**.



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CA-5.4 Rules for Retail Exposures (continued)

2. Risk Components

(i) Probability of Default (PD) and Loss Given Default (LGD)

CA-5.4.6 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 section CA-5.8. Additionally, the PD for retail exposures is the greater of the one- year PD associated with the internal borrower grade to which the pool of retail exposures is assigned or 0.03%.

(ii) Recognition of Guarantees and Credit Derivatives

CA-5.4.7 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 paragraphs CA-5.8.91 to CA-5.8.100. Whether adjustments are done through PD or LGD, they must be done in a consistent manner for a given guarantee or credit derivative type.

CA-5.4.8 Consistent with the requirements outlined above for corporate, sovereign, and bank exposures, banks must not include the effect of double default in such adjustments. The adjusted risk weight must not be less than that of a comparable direct exposure to the protection provider. Consistent with the standardised approach, banks may choose not to recognise credit protection if doing so would result in a higher capital requirement.

(iii) Exposure at Default (EAD)

CA-5.4.9 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 paragraph CA-5.7.7, discounts may be included in the measurement of total eligible provisions for purposes of the EL-provision calculation set out in Section CA-5.7.



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CA-5.4 Rules for Retail Exposures (continued)

- CA-5.4.10 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 paragraph CA-4.4.1 of the standardised approach. For retail off-balance sheet items, banks must use their own estimates of CCFs provided the minimum requirements in paragraphs CA-5.8.84 to CA-5.8.87 and CA-5.8.90 are satisfied.
- CA-5.4.11 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.
- CA-5.4.12 When only the drawn balances of retail facilities have been securitised, banks must ensure that they continue to hold required capital against their share (i.e. seller's interest) of undrawn balances related to the securitised exposures using the IRB approach to credit risk. This means that for such facilities, banks must reflect the impact of CCFs in their EAD estimates rather than in the LGD estimates. For determining the EAD associated with the seller's interest in the undrawn lines, the undrawn balances of securitised exposures would be allocated between the seller's and investors' interests on a pro rata basis, based on the proportions of the seller's and investors' shares of the securitised drawn balances. The investors' share of undrawn balances related to the securitised exposures is subject to the treatment in paragraph CA-6.4.32.
- CA-5.4.13 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.



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.5 Rules for Equity Exposures

CA-5.5.1 This section presents the method of calculating the UL capital requirements for equity exposures. The first sub-section discusses (a) the market-based approach (which is further sub- divided into a simple risk weight method and an internal models method), and (b) the PD/LGD approach. The risk components are provided in the second sub-section. The method of calculating expected losses, and for determining the difference between that measure and provisions is described in section CA-5.7.

1. Risk-weighted Assets for Equity Exposures

CA-5.5.2 Risk-weighted assets for equity exposures in the trading book are subject to the market risk capital rules detailed in chapter CA-10.

CA-5.5.3 There are two approaches to calculate risk-weighted assets for equity exposures not held in the trading book: a market-based approach and a PD/LGD approach. Banks are permitted to select the approach subject to approval of CBB. Certain equity holdings are excluded as defined in paragraphs CA-5.5.18 to CA-5.5.20 and are subject to the capital charges required under the standardised approach.

CA-5.5.4 Banks' choices must be made consistently, and in particular not determined by regulatory arbitrage considerations.

(i) Market-based Approach

CA-5.5.5 Under the market-based approach, institutions are permitted to calculate the minimum capital requirements for their banking book equity holdings using one or both of two separate and distinct methods: a simple risk weight method or an internal models method. The method used should be consistent with the amount and complexity of the institution's equity holdings and commensurate with the overall size and sophistication of the institution. CBB may require the use of either method based on the individual circumstances of a bank.

- Simple Risk Weight Method

CA-5.5.6 Under the simple risk weight method, a 300% risk weight is to be applied to equity holdings that are publicly traded and a 400% risk weight is to be applied to all other equity holdings. A publicly traded holding is defined as any equity security traded on a recognised security exchange.



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.5 Rules for Equity Exposures (continued)

CA-5.5.7 Short cash positions and derivative instruments held in the banking book are permitted to offset long positions in the same individual stocks provided that these instruments have been explicitly designated as hedges of specific equity holdings and that they have remaining maturities of at least one year. Other short positions are to be treated as if they are long positions with the relevant risk weight applied to the absolute value of each position. In the context of maturity mismatched positions, the methodology is that for corporate exposures.

Internal Models Method

CA-5.5.8 IRB banks may use, or may be required by CBB to use, internal risk measurement models to calculate the risk-based capital requirement. Under this alternative, banks must hold capital equal to the potential loss on the institution's equity holdings as derived using internal value-at-risk models subject to the 99th percentile, one-tailed confidence interval of the difference between quarterly returns and an appropriate risk-free rate computed over a long-term sample period. The capital charge would be incorporated into an institution's risk-based CAR through the calculation of risk-weighted equivalent assets.

CA-5.5.9 The risk weight used to convert holdings into risk-weighted equivalent assets would be calculated by multiplying the derived capital charge by 12.5 (i.e. the inverse of the minimum 8% risk-based capital requirement). Capital charges calculated under the internal models method may be no less than the capital charges that would be calculated under the simple risk weight method using a 200% risk weight for publicly traded equity holdings and a 300% risk weight for all other equity holdings. These minimum capital charges would be calculated separately using the methodology of the simple risk weight approach. Further, these minimum risk weights are to apply at the individual exposure level rather than at the portfolio level.

CA-5.5.10 A bank may be permitted by CBB to employ different market-based approaches to different portfolios based on appropriate considerations and where the bank itself uses different approaches internally.

CA-5.5.11 Banks are permitted to recognise guarantees but not collateral obtained on an equity position wherein the capital requirement is determined through use of the market-based approach.



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CA-5.5 Rules for Equity Exposures (continued)

(ii) PD/LGD Approach

CA-5.5.12 The minimum requirements and methodology for the PD/LGD approach for equity exposures (including equity of companies that are included in the retail asset class) are the same as those for the IRB foundation approach for corporate exposures subject to the following specifications:

- (a) The bank's estimate of the PD of a corporate entity in which it holds an equity position must satisfy the same requirements as the bank's estimate of the PD of a corporate entity where the bank holds debt.⁴⁸ If a bank does not hold debt of the company in whose equity it has invested, and does not have sufficient information on the position of that company to be able to use the applicable definition of default in practice but meets the other standards, a 1.5 scaling factor will be applied to the risk weights derived from the corporate risk-weight function, given the PD set by the bank. If, however, the bank's equity holdings are material and it is permitted to use a PD/LGD approach for regulatory purposes but the bank has not yet met the relevant standards, the simple risk-weight method under the market-based approach will apply;
- (b) An LGD of 90% would be assumed in deriving the risk weight for equity exposures; and
- (c) For these purposes, the risk weight is subject to a five-year maturity adjustment whether or not the bank is using the explicit approach to maturity elsewhere in its IRB portfolio.

CA-5.5.13 Under the PD/LGD approach, minimum risk weights as set out in section CA-5.5.14 and CA-5.5.15 apply. When the sum of UL and EL associated with the equity exposure results in less capital than would be required from application of one of the minimum risk weights, the minimum risk weights must be used. In other words, the minimum risk weights must be applied, if the risk weights calculated according to the preceding paragraph plus the EL associated with the equity exposure multiplied by 12.5 are smaller than the applicable minimum risk weights.

⁴⁸ In practice, if there is both an equity exposure and an IRB credit exposure to the same counterparty, a default on the credit exposure would thus trigger a simultaneous default for regulatory purposes on the equity exposure.



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CA-5.5 Rules for Equity Exposures (continued)

CA-5.5.14 A minimum risk weight of 100% applies for the following types of equities for as long as the portfolio is managed in the manner outlined below:

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

CA-5.5.15 For all other equity positions, including net short positions (as defined in section CA-5.5.7), capital charges calculated under the PD/LGD approach may be no less than the capital charges that would be calculated under a simple risk weight method using a 200% risk weight for publicly traded equity holdings and a 300% risk weight for all other equity holdings.

CA-5.5.16 The maximum risk weight for the PD/LGD approach for equity exposures is 1250%. This maximum risk weight can be applied, if risk weights calculated according to section CA-5.5.12 plus the EL associated with the equity exposure multiplied by 12.5 exceed the 1250% risk weight. Alternatively, banks may deduct the entire equity exposure amount, assuming it represents the EL amount, 50% from Tier 1 capital and 50% from Tier 2 capital.

CA-5.5.17 Hedging for PD/LGD equity exposures is, as for corporate exposures, subject to an LGD of 90% on the exposure to the provider of the hedge. For these purposes equity positions will be treated as having a five-year maturity.

(iii) Exclusions to the Market-based and PD/LGD Approaches

CA-5.5.18 Banks are allowed to exclude equity holdings in entities whose debt obligations qualify for a zero risk weight under the standardised approach to credit risk from the IRB approaches to equity (including those publicly sponsored entities where a zero risk weight can be applied).



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CA-5.5 Rules for Equity Exposures (continued)

CA-5.5.19 Equity exposures of a bank can be excluded from the IRB treatment based on materiality as defined in the following paragraph.

CA-5.5.20 The equity exposures of a bank are considered material if their aggregate value exceeds, on average over the prior year, 10% of bank's Tier 1 plus Tier 2 capital. This materiality threshold is lowered to 5% of a bank's Tier 1 plus Tier 2 capital if the equity portfolio consists of less than 10 individual holdings. CBB may use lower materiality thresholds in future.

2. Risk Components

CA-5.5.21 In general, the measure of an equity exposure on which capital requirements is based is the value presented in the financial statements, which may include unrealised revaluation gains. Thus, for example, equity exposure measures will be:

- (a) For investments held at fair value with changes in value flowing directly through income and into regulatory capital and where a discount is applied on fair value (as explained in CA-2.1.5), the exposure is equal to the fair value adjusted to exclude that discount part. Refer to appendix CA-17;
- (b) For investments held at fair value with changes in value not flowing through income but into a tax-adjusted separate component of equity and where a discount is applied on fair value (as explained in CA-2.1.5), the exposure is equal to the fair value adjusted to exclude that discount part. Refer to appendix CA-17; and
- (c) For investments held at cost or at the lower of cost or market, exposure is equal to the cost or market value presented in the balance sheet.⁴⁹

CA-5.5.22 Holdings in funds containing both equity investments and other non-equity types of investments can be either treated, in a consistent manner, as a single investment based on the majority of the fund's holdings or, where possible, as separate and distinct investments in the fund's component holdings based on a look-through approach.

CA-5.5.23 Where only the investment mandate of the fund is known, the fund can still be treated as a single investment. For this purpose, it is assumed that the fund first invests, to the maximum extent allowed under its mandate, in the asset classes attracting the highest capital requirement, and then continues making investments in descending order until the maximum total investment level is reached. The same approach can also be used for the look-through approach, but only where the bank has rated all the potential constituents of such a fund.

⁴⁹ If "latent gain" is allowed on such investment (as explained in CA-2.1.5), the cost will be adjusted to include that allowed gain.



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CA-5.6 Rules for Purchased Receivables

CA-5.6.1 This section presents the method of calculating the UL capital requirements for purchased receivables. For such assets, there are IRB capital charges for both default risk and dilution risk. The first sub-section discusses the calculation of risk-weighted assets for default risk. The calculation of risk-weighted assets for dilution risk is provided in the second sub-section. The method of calculating expected losses, and for determining the difference between that measure and provisions, is described in section CA-5.7.

1. Risk-weighted Assets for Default Risk

CA-5.6.2 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 meets 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 paragraph CA-5.2.21), 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.

(i) Purchased Retail Receivables

CA-5.6.3 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 PDs and LGDs. The estimates for PD and LGD (or 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.

(ii) Purchased Corporate Receivables

CA-5.6.4 For purchased corporate receivables, the purchasing bank is required to apply the existing IRB risk quantification standards for the bottom-up approach.



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CA-5.6 Rules for Purchased Receivables (continued)

2. Risk-weighted Assets for Dilution Risk

CA-5.6.5 Dilution refers to the possibility that the receivable amount is reduced through cash or non-cash credits to the receivable's obligor.⁵⁰ For both corporate and retail receivables, unless the bank demonstrates to the CBB that the dilution risk for the purchasing bank is immaterial, the treatment of dilution risk must be the following: 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. For the purpose of calculating risk weights for dilution risk, the corporate risk-weight function must be used with the following settings: the PD must be set equal to the estimated EL, and the LGD must be set at 100%. An appropriate maturity treatment applies when determining the capital requirement for dilution risk.

CA-5.6.6 This treatment will be applied regardless of whether the underlying receivables are corporate or retail exposures.

3. Treatment of Purchase Price Discounts for Receivables

CA-5.6.7 In many cases, the purchase price of receivables will reflect a discount (not to be confused with the discount concept defined in paragraphs CA-5.3.40 and CA-5.4.9) that provides first loss protection for default losses, dilution losses or both (see paragraph CA-6.4.73). To the extent a portion of such a purchase price discount will be refunded to the seller, this refundable amount may be treated as first loss protection under the IRB securitisation framework. Non-refundable purchase price discounts for receivables do not affect either the EL-provision calculation in section CA-5.7 or the calculation of risk-weighted assets.

⁵⁰ Examples include offsets or allowances arising from returns of goods sold, disputes regarding product quality, possible debts of the borrower to a receivables obligor, and any payment or promotional discounts offered by the borrower (e.g. a credit for cash payments within 30 days).



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CA-5.6 Rules for Purchased Receivables (continued)

CA-5.6.8 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 IRB securitisation framework (see paragraph CA-6.4.73). When the same mitigant covers both default and dilution risk, banks using the Supervisory Formula that are able to calculate an exposure-weighted LGD must do so as defined in paragraph CA-6.4.79.

4. Recognition of Credit Risk Mitigants

CA-5.6.9 Credit risk mitigants will be recognised generally using the same type of framework as set forth in paragraphs CA-5.3.33 to CA-5.3.37. 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:

- (a) 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;
- (b) 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; and
- (c) 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 CRM rules for proportional or tranching coverage (i.e. the risk weights of the uncovered risk components will be added to the risk weights of the covered risk components).

CA-5.6.10 If protection against dilution risk has been purchased, and the conditions of paragraphs CA-5.3.38 and CA-5.3.39 are met, the double default framework may be used for the calculation of the risk-weighted asset amount for dilution risk. In this case, paragraphs CA-5.3.12 to CA-5.3.16 apply with PDo being equal to the estimated EL, LGDg being equal to 100 percent, and effective maturity being set according to paragraph CA-5.6.6.



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CA-5.7 Treatment of Expected Losses and Recognition of Provisions

CA-5.7.1 This section discusses the method by which the difference between provisions (specific provisions and collective impairment provisions) and expected losses may be included in or must be deducted from regulatory capital, as outlined in paragraph CA-2.1.5 (e). However any excess provision representing impairment loss will not be allowed to be included in regulatory capital.

1. Calculation of Expected Losses

CA-5.7.2 A bank must sum the EL amount (defined as EL multiplied by EAD) associated with its exposures (excluding the EL amount associated with equity exposures under the PD/LGD approach and securitisation exposures) to obtain a total EL amount. While the EL amount associated with equity exposures subject to the PD/LGD approach is excluded from the total EL amount, paragraphs CA-5.7.3 and CA-5.7.13 apply to such exposures. The treatment of EL for securitisation exposures is described in paragraph CA-6.4.4.

(i) Expected Loss for Exposures other than SL Subject to the Supervisory Slotting Criteria

CA-5.7.3 Banks must calculate an EL as $PD \times LGD$ for corporate, sovereign, bank, and retail exposures both not in default and not treated as hedged exposures under the double default treatment. For corporate, sovereign, bank, and retail exposures that are in default, banks must use their best estimate of expected loss as defined in paragraph CA-5.8.82 and banks on the foundation approach must use the CBB's LGD. For SL exposures subject to the supervisory slotting criteria EL is calculated as described in paragraphs CA-5.7.4 and CA-5.7.5. For equity exposures subject to the PD/LGD approach, the EL is calculated as $PD \times LGD$ unless paragraphs CA-5.5.13 to CA-5.5.16 apply. Securitisation exposures do not contribute to the EL amount, as set out in paragraph CA-6.4.4. For all other exposures, including hedged exposures under the double default treatment, the EL is zero.

(ii) Expected Loss for SL Exposures Subject to the Supervisory Slotting Criteria

CA-5.7.4 For SL exposures subject to the supervisory slotting criteria, the EL amount is determined by multiplying 8% by the risk-weighted assets produced from the appropriate risk weights, as specified below, multiplied by EAD.



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CA-5.7 Treatment of Expected Losses and Recognition of Provisions (continued)

Supervisory Categories and EL Risk Weights for other SL Exposures

CA-5.7.5 The risk weights for SL, other than HVCRE, are as follows:

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

Supervisory Categories and EL Risk Weights for HVCRE

CA-5.7.6 The risk weights for HVCRE are as follows:

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

2. Calculation of Provisions

(i) Exposures subject to IRB Approach

CA-5.7.7 Total eligible provisions are defined as the sum of all provisions (specific provisions and collective impairment provisions) that are attributed to exposures treated under the IRB approach. In addition, total eligible provisions may include any discounts on defaulted assets. Specific provisions set aside against equity and securitisation exposures must not be included in total eligible provisions.



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CA-5.7 Treatment of Expected Losses and Recognition of Provisions (continued)

(ii) *Portion of Exposures Subject to the Standardised Approach to Credit Risk*

CA-5.7.8 Banks using the standardised approach for a portion of their credit risk exposures, either on a transitional basis (as defined in paragraphs CA-5.2.44 and CA-5.2.45), or on a permanent basis if the exposures subject to the standardised approach are immaterial (paragraph CA-5.2.46), must determine the portion of collective impairment provisions attributed to the standardised or IRB treatment of provisions (see section CA-2.1 (d) according to the methods outlined in paragraphs CA-5.7.9 and CA-5.7.10.

CA-5.7.9 Banks should generally attribute total 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 (i.e. standardised or IRB approach) is used exclusively within an entity, provisions booked within the entity may be attributed to that approach.

CA-5.7.10 Subject to CBB's discretion, banks using both the standardised and IRB approaches may rely on their internal methods for allocating 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 CBB will establish the standards surrounding their use. Banks will need to obtain prior approval from CBB to use an internal allocation method for this purpose.

3. *Treatment of EL and Provisions*

CA-5.7.11 As specified in paragraph CA-2.1.5 (e), banks using the IRB approach must compare the total amount of total eligible provisions (as defined in paragraph CA-5.7.7) with the total EL amount as calculated within the IRB approach (as defined in paragraph CA-5.7.2).



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CA-5.7 Treatment of Expected Losses and Recognition of Provisions (continued)

- CA-5.7.12 Where the calculated EL amount is lower than the provisions of the bank, CBB will 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.
- CA-5.7.13 The EL amount for equity exposures under the PD/LGD approach is deducted 50% from Tier 1 and 50% from Tier 2. Provisions or write-offs for equity exposures under the PD/LGD approach will not be used in the EL-provision calculation. The treatment of EL and provisions related to securitisation exposures is outlined in paragraph CA-6.4.4.



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CA-5.8 Minimum Requirements for IRB Approach

CA-5.8.1 This section presents the minimum requirements for entry and on-going use of the IRB approach. The minimum requirements are set out in 12 separate sections concerning: (a) composition of minimum requirements, (b) compliance with minimum requirements, (c) rating system design, (d) risk rating system operations, (e) corporate governance and oversight, (f) use of internal ratings, (g) risk quantification, (h) validation of internal estimates, (i) CBB's LGD and EAD estimates, (j) requirements for recognition of leasing, (k) calculation of capital charges for equity exposures, and (l) disclosure requirements. It may be helpful to note that the minimum requirements cut across asset classes. Therefore, more than one asset class may be discussed within the context of a given minimum requirement.

1. *Composition of Minimum Requirements*

CA-5.8.2

To be eligible for the IRB approach a bank must demonstrate to CBB 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.

CA-5.8.3 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. CBB will periodically develop detailed review procedures to ensure that banks' systems and controls are adequate to serve as the basis for the IRB approach.

CA-5.8.4 The minimum requirements set out in this section 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.5 The minimum requirements set out in this section apply to both foundation and advanced approaches unless noted otherwise. Generally, all IRB banks must produce their own estimates of PD⁵¹ 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 using their own estimates of LGD and EAD for retail exposures must also meet the incremental minimum requirements for these risk factors included in paragraphs CA-5.8.79 to CA-5.8.100.

2. Compliance with Minimum Requirements

CA-5.8.6 To be eligible for an IRB approach, a bank must demonstrate to CBB that it meets the IRB requirements in this sub-section, 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 Basel Committee (See www.bis.org for guidance) and CBB periodically.

CA-5.8.7 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 CBB, 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 CBB to reconsider the bank's eligibility for the IRB approach. Furthermore, for the duration of any non-compliance, CBB will consider the need for the bank to hold additional capital or take other appropriate supervisory action.

3. Rating System Design

CA-5.8.8 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.

⁵¹ Banks are not required to produce their own estimates of PD for certain equity exposures and certain exposures that fall within the SL sub-class.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.9

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 (e.g. 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 (i.e. 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.

(i) Rating Dimensions

- Standards for Corporate, Sovereign, and Bank Exposures

CA-5.8.10

A qualifying IRB rating system must have two separate and distinct dimensions: (i) the risk of borrower default, and (ii) transaction-specific factors.

CA-5.8.11

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.

CA-5.8.12

The second dimension must reflect transaction-specific factors, such as collateral, seniority, product type, etc. 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 EL by incorporating both borrower strength (PD) and CBB's loss severity (LGD) considerations would qualify.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.13 Banks using the supervisory slotting criteria for the SL sub-class are exempt from this two-dimensional requirement for these exposures. Given the interdependence between borrower/transaction characteristics in SL, banks may satisfy the requirements under this heading through a single rating dimension that reflects EL by incorporating both borrower strength (PD) and CBB's loss severity (LGD) considerations. This exemption does not apply to banks using the general corporate foundation approach for the SL sub- class.

- Standards for Retail Exposures

CA-5.8.14 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.

CA-5.8.15 For each pool, banks must estimate PD, LGD, and EAD. Multiple pools may share identical PD, LGD and EAD estimates. At a minimum, banks must consider the following risk drivers when assigning exposures to a pool:

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

(ii) Rating Structure

- Standards for Corporate, Sovereign, and Bank Exposures

CA-5.8.16 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.17 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; CBB may require banks, which lend to borrowers of diverse credit quality, to have a greater number of borrower grades.

CA-5.8.18 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.

CA-5.8.19 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.

CA-5.8.20 Banks using the supervisory slotting criteria for the SL asset classes must have at least four grades for non-defaulted borrowers, and one for defaulted borrowers. The requirements for SL exposures that qualify for the corporate foundation approach are the same as those for general corporate exposures.

- Standards for Retail Exposures

CA-5.8.21 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

(iii) Rating Criteria

CA-5.8.22

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:

- (a) 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;
- (b) 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; and
- (c) The criteria must also be consistent with the bank's internal lending standards and its policies for handling troubled borrowers and facilities.

CA-5.8.23

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.

- SL Product Lines within the Corporate Asset Class

CA-5.8.24

Banks using the supervisory slotting criteria for SL exposures must assign exposures to their internal rating grades based on their own criteria, systems and processes, subject to compliance with the requisite minimum requirements. Banks must then map these internal rating grades into the five supervisory rating categories. Tables 1 to 4 in Appendix CA-7 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.25 The CBB 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 must take special care to ensure that any overrides of their internal criteria do not render the mapping process ineffective.

(iv) Rating Assignment Horizon

CA-5.8.26 Although the time horizon used in PD estimation is one year (as described in paragraph CA-5.8.59), banks are expected to use a longer time horizon in assigning ratings.

CA-5.8.27 A borrower rating must represent the bank's assessment of the borrower's ability and willingness to contractually perform despite adverse economic conditions or the occurrence of unexpected events. For example, a bank may base rating assignments on specific, appropriate stress scenarios. Alternatively, a bank may take into account borrower characteristics that are reflective of the borrower's vulnerability to adverse economic conditions or unexpected events, without explicitly specifying a stress scenario. The range of economic conditions that are considered when making assessments must be consistent with current conditions and those that are likely to occur over a business cycle within the respective industry/geographic region.

CA-5.8.28 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

(v) *Use of Models*

CA-5.8.29

The requirements in this sub-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:

- (a) The burden is on the bank to satisfy CBB 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;
- (b) 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;
- (c) 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;
- (d) 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;
- (e) 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; and
- (f) 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

(vi) Documentation of Rating System Design

CA-5.8.30

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 CBB's review. The organisation of rating assignment, including the internal control structure, must also be documented.

CA-5.8.31

Banks must document the specific definitions of default and loss used internally and demonstrate consistency with the reference definitions set out in paragraphs CA-5.8.63 to CA-5.8.71.

CA-5.8.32

If the bank employs statistical models in the rating process, the bank must document their methodologies. This material must:

- (a) 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;
- (b) Establish a rigorous statistical process (including out-of-time and out-of-sample performance tests) for validating the model; and
- (c) Indicate any circumstances under which the model does not work effectively.

CA-5.8.33

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 CBB.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

4. Risk Rating System Operations

(i) Coverage of Ratings

CA-5.8.34 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.

CA-5.8.35 Each separate legal entity to which the bank is exposed must be separately rated. A bank must have policies acceptable to CBB 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.

(ii) Integrity of Rating Process

- Standards for Corporate, Sovereign, and Bank Exposures

CA-5.8.36 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 by the bank through a range of practices that will be carefully reviewed by CBB. 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.

CA-5.8.37 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.

- Standards for Retail Exposures

CA-5.8.38 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

(iii) Overrides

CA-5.8.39 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.

(iv) Data Maintenance

CA-5.8.40 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 section, and to serve as a basis for CBB 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 may be required under disclosure requirements specified by CBB periodically.

- For Corporate, Sovereign, and Bank Exposures

CA-5.8.41 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.

CA-5.8.42 Banks under the foundation approach which utilise CBB's estimates are encouraged to retain the relevant data (i.e. data on loss and recovery experience for corporate exposures under the foundation approach, data on realised losses for banks using the supervisory slotting criteria for SL).



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- For Retail Exposures

CA-5.8.43

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.

(v) Stress Tests used in Assessment of Capital Adequacy

CA-5.8.44

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 (i) economic or industry downturns; (ii) market-risk events; and (iii) liquidity conditions.

CA-5.8.45

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 CBB's 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.

CA-5.8.46

Banks using the double default framework must consider as part of their stress testing framework the impact of a deterioration in the credit quality of protection providers, in particular the impact of protection providers falling outside the eligibility criteria due to rating changes. Banks should also consider the impact of the default of one but not both of the obligor and protection provider, and the consequent increase in risk and capital requirements at the time of that default.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.47 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.

CA-5.8.48 CBB may issue guidance to banks on how the tests to be used for this purpose should be designed, bearing in mind conditions in the Kingdom of Bahrain. The results of the stress test may indicate no difference in the capital calculated under the IRB rules described in this section of this chapter 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 must stress portfolios containing the vast majority of its total exposures.

5. Corporate Governance and Oversight

(i) Corporate Governance

CA-5.8.49 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.

CA-5.8.50 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.51 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 retail asset class) against expectations. Reporting frequencies may vary with the significance and type of information and the level of the recipient.

(ii) Credit Risk Control

CA-5.8.52 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:

- (a) Testing and monitoring internal grades;
- (b) 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;
- (c) Implementing procedures to verify that rating definitions are consistently applied across departments and geographic areas;
- (d) Reviewing and documenting any changes to the rating process, including the reasons for the changes; and
- (e) 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 CBB to review.

CA-5.8.53 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.

(iii) Internal and External Audit

CA-5.8.54 Internal audit or an equally independent function must review at least bi-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. External auditors are also required to conduct above-mentioned review on an annual basis.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

6. *Use of Internal Ratings*

CA-5.8.55 Internal ratings and default and loss estimates should 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 CBB.

CA-5.8.56

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 section for at least the three years prior to qualification. For the retail asset class, banks must demonstrate that they have 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.

7. *Risk Quantification*

(i) *Overall Requirements for Estimation*

- *Structure and Intent*

CA-5.8.57 This section addresses the broad standards for own-estimates of PD, LGD, and EAD. Generally, all banks using the IRB approaches must estimate a PD⁵² for each internal borrower grade for corporate, sovereign and bank exposures or for each pool in the case of retail exposures.

⁵² Banks are not required to produce their own estimates of PD for certain equity exposures and certain exposures that fall within the SL sub-classes.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.58 PD estimates must be a long-run average of one-year default rates for borrowers in the grade, with the exception of retail exposures (see below). Requirements specific to PD estimation are provided in paragraphs CA-5.8.72 to CA-5.8.78. For retail asset class banks must estimate an appropriate LGD (as defined in paragraphs CA-5.8.79 to CA-5.8.83) for each of its retail pools and must also estimate an appropriate long-run default-weighted average EAD for each of its facilities as defined in paragraphs CA-5.8.84 and CA-5.8.85. Requirements specific to EAD estimation appear in paragraphs CA-5.8.84 to CA-5.8.89.

CA-5.8.59 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.

CA-5.8.60 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.

CA-5.8.61 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 paragraphs CA-5.8.79 to CA-5.8.89. 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.62

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. CBB may allow some flexibility in application of the required standards for data that are collected prior to the date of implementation of this Module. However, banks must demonstrate to CBB 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.

(ii) Definition of Default

CA-5.8.63

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:

- (a) 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); and
- (b) 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.

CA-5.8.64

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

- (a) The bank puts the credit obligation on non-accrued status;
- (b) 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;⁵³
- (c) The bank sells the credit obligation at a material credit-related economic loss;
- (d) 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.⁵⁴

⁵³ Specific provisions on equity exposures set aside for price risk do not signal default.

⁵⁴ Including, in the case of equity holdings assessed under a PD/LGD approach, such distressed restructuring of the equity itself.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- (e) 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; and
- (f) 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.

CA-5.8.65 CBB will periodically provide appropriate guidance as to how these elements must be implemented and monitored.

CA-5.8.66 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.

CA-5.8.67

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 paragraph CA-5.8.75. However, in such cases, banks must demonstrate to CBB 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 Module. Internal data (including that pooled by banks) used in such estimates beyond the date of implementation of this Module must be consistent with the reference definition.

CA-5.8.68 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

(iii) Re-ageing

CA-5.8.69

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' (i.e. 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). The CBB may choose to establish more specific requirements on re-ageing for banks.

(iv) Treatment of Overdrafts

CA-5.8.70

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 days, 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, 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.

(v) Definition of Loss for all Asset Classes

CA-5.8.71

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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

(vi) Requirements Specific to PD Estimation

- Corporate, Sovereign, and Bank Exposures

CA-5.8.72 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.

CA-5.8.73 Banks may have a primary technique and use others as a point of comparison and potential adjustment. CBB 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:

- (a) 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;
- (b) 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 paragraph CA-5.8.63 to CA-5.8.68. The bank must document the basis for the mapping; and
- (c) 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 paragraph CA-5.8.29.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.74 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.

- Retail Exposures

CA-5.8.75 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.

CA-5.8.76 One method for deriving long-run average estimates of PD and default-weighted average loss rates given default (as defined in paragraph CA-5.8.79) 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 paragraph CA-5.8.79.

CA-5.8.77 Irrespective of whether banks are using external, internal, pooled data sources, or a combination of the three, for their estimation of loss characteristics, the length of the underlying historical observation period used must be at least five years. If the available observation spans a longer period for any source, and these data are relevant, this longer period must be used. A bank need not give equal importance to historic data if it can convince CBB that more recent data are a better predictor of loss rates.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.78 The CBB recognises that seasoning can be quite material for some long-term retail exposures characterised by seasoning effects that peak several years after origination. Banks must anticipate the implications of rapid exposure growth and take steps to ensure that their estimation techniques are accurate, and that their current capital level and earnings and funding prospects are adequate to cover their future capital needs. In order to avoid gyrations in their required capital positions arising from short-term PD horizons, banks are also encouraged to adjust PD estimates upward for anticipated seasoning effects, provided such adjustments are applied in a consistent fashion over time. The CBB may make such adjustments mandatory.

(vii) Requirements Specific to Own-LGD Estimates

CA-5.8.79

A bank must estimate an LGD for each facility that aims to reflect economic downturn conditions where necessary to capture the relevant risks. This LGD cannot be less than the long-run default-weighted average loss rate given default calculated based on the average economic loss of all observed defaults within the data source for that type of facility. In addition, a bank must take into account the potential for the LGD of the facility to be higher than the default-weighted average during a period when credit losses are substantially higher than average. For certain types of exposures, loss severities may not exhibit such cyclical variability and LGD estimates may not differ materially (or possibly at all) from the long-run default-weighted average. However, for other exposures, this cyclical variability in loss severities may be important and banks will need to incorporate it into their LGD estimates. For this purpose, banks may use averages of loss severities observed during periods of high credit losses, forecasts based on appropriately conservative assumptions, or other similar methods. Appropriate estimates of LGD during periods of high credit losses might be formed using either internal and/or external data. CBB will continue to monitor and encourage the development of appropriate approaches to this issue.

CA-5.8.80

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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.81

LGD estimates must be grounded in historical recovery rates and, when applicable, must not solely be based on the collateral's estimated market value. This requirement recognises the potential inability of banks to gain both control of their collateral and liquidate it expeditiously. To the extent, that LGD estimates take into account the existence of collateral, banks must establish internal requirements for collateral management, operational procedures, legal certainty and risk management process that are generally consistent with those required for the standardised approach.

CA-5.8.82

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 paragraphs CA-5.3.3 and CA-5.4.3 to CA-5.4.5. 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 CBB's scrutiny and must be justified by the bank.

CA-5.8.83

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

(viii) Requirements Specific to Own-EAD Estimates

CA-5.8.84

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 for retail class, 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 **Appendix CA-2**. Banks must have established procedures in place for the estimation of EAD for off-balance sheet items for retail asset class. 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.85

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

CA-5.8.86

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.

CA-5.8.87

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.

CA-5.8.88

For transactions that expose banks to counterparty credit risk, estimates of EAD must fulfil the requirements set forth in Appendix CA-2 of this Module.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.89

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

(ix) Minimum Requirements for Assessing Effect of Guarantees and Credit Derivatives

- Standards for Corporate, Sovereign, and Bank Exposures

CA-5.8.90

The minimum requirements outlined in paragraphs CA-5.8.91 to CA-5.8.100 apply to banks using the foundation LGD estimates with the following exceptions:

- (a) The bank is not able to use an 'LGD-adjustment' option; and
- (b) The range of eligible guarantees and guarantors is limited to those outlined in paragraph CA-5.3.34.

- Standards for Retail Exposures

a. Guarantees

CA-5.8.91

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.

CA-5.8.92

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 section, including the regular monitoring of the guarantor's condition and ability and willingness to honour its obligations. Consistent with the requirements in section CA-5.8.43, a bank must retain all relevant information on the assignment of an exposure to a pool, and the estimation of PD.

CA-5.8.93

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."



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CA-5.8 Minimum Requirements for IRB Approach (continued)

b. Eligible Guarantors and Guarantees

CA-5.8.94

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.

CA-5.8.95

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

c. Adjustment Criteria

CA-5.8.96

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 paragraphs CA-5.8.22 and CA-5.8.23, and must follow all minimum requirements for assigning borrower or facility ratings set out in this section.

CA-5.8.97

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.

CA-5.8.98

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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

d. Credit Derivatives

CA-5.8.99 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.

CA-5.8.100 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.

(x) Requirements Specific to Estimating PD and LGD (or EL) for Qualifying Purchased Receivables

CA-5.8.101 The following minimum requirements for risk quantification must be satisfied for any purchased retail receivables making use of the top-down treatment of default risk and/or the IRB treatments of dilution risk.

CA-5.8.102 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- Minimum Operational Requirements

CA-5.8.103

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:

- Legal Certainty

CA-5.8.104

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.

- Effectiveness of Monitoring Systems

CA-5.8.105

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

- (a) The bank must (i) assess the correlation among the quality of the receivables and the financial condition of both the seller and servicer, and (ii) 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;
- (b) 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;



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- (c) The bank must have the ability to assess the characteristics of the receivables pool, including (i) over-advances; (ii) history of the seller's arrears, bad debts, and bad debt allowances; (iii) payment terms, and (iv) potential contra accounts;
- (d) The bank must have effective policies and procedures for monitoring on an aggregate basis single-obligor concentrations both within and across receivables pools; and
- (e) The bank must receive timely and sufficiently detailed reports of receivables ageings and dilutions to (i) ensure compliance with the bank's eligibility criteria and advancing policies governing purchased receivables, and (ii) provide an effective means with which to monitor and confirm the seller's terms of sale (e.g. invoice date ageing) and dilution.

- Effectiveness of Work-out Systems

CA-5.8.106

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:

- (a) The bank should have clear and effective policies, procedures, and information systems to monitor compliance with (i) all contractual terms of the facility (including covenants, advancing formulas, concentration limits, early amortisation triggers, etc.) as well as (ii) 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;
- (b) To limit inappropriate draws, the bank should have effective policies and procedures for detecting, approving, monitoring, and correcting over-advances; and
- (c) 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- Effectiveness of Systems for Controlling Collateral, Credit Availability and Cash

CA-5.8.107

The bank must have clear and effective policies and procedures governing the control of receivables, credit, and cash. In particular:

- (a) 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; and
- (b) Internal systems must ensure that funds are advanced only against specified supporting collateral and documentation (such as servicer attestations, invoices, shipping documents, etc.).

- Compliance with the Bank's Internal Policies and Procedures

CA-5.8.108

Given the reliance on monitoring and control systems to limit credit risk, the bank must have an effective internal process for assessing compliance with all critical policies and procedures, including:

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

CA-5.8.109

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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

8. Validation of Internal Estimates

CA-5.8.110

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 CBB that the internal validation process enables it to assess the performance of internal rating and risk estimation systems consistently and meaningfully.

CA-5.8.111

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.

CA-5.8.112

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.

CA-5.8.113

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.

CA-5.8.114

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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.115 Where banks rely on the CBB's, rather than internal estimates of risk parameters, they are encouraged to compare realised LGDs and EADs to those set by the CBB. The information on realised LGDs and EADs should form part of the bank's assessment of economic capital.

9. CBB's LGD and EAD Estimates

CA-5.8.116 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 chapter CA-4). They must meet the following additional minimum requirements in order to receive recognition for additional collateral types.

(i) Definition of Eligibility of CRE and RRE as Collateral

CA-5.8.117 Eligible CRE and RRE collateral for corporate, sovereign and bank exposures are defined as:

- (a) 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 CRE/RRE serving as collateral;⁵⁵ and
- (b) 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.

⁵⁵ If the CBB ascertains that public housing policy is supportive of certain real estate sectors, considering them to be an important part of housing market in Bahrain, by means of guarantees or other credit support from government agencies, then mortgage on such multifamily residential real estate can be recognised as eligible collateral for corporate exposures.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.118 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.

(ii) *Operational Requirements for Eligible CRE/RRE*

CA-5.8.119

Subject to meeting the definition above, CRE and RRE will be eligible for recognition as collateral for corporate claims only if all of the following operational requirements are met:

- (a) **Legal enforceability:** any claim on a collateral taken must be legally enforceable in all relevant jurisdictions, and any claim on collateral must be properly filed on a timely basis. Collateral interests must reflect a perfected lien (i.e. 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;
- (b) **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;
- (c) **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 (e.g. 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; and
- (d) **Junior liens:** Junior liens may be taken into account where there is no doubt that the claim for collateral is legally enforceable and constitutes an efficient credit risk mitigant. When recognised, junior liens are to be treated using the C*/C** threshold, which is used for senior liens. In such cases, the C* and C** are calculated by taking into account the sum of the junior lien and all more senior liens.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.120 Additional collateral management requirements are as follows:

- (a) The types of CRE and RRE collateral accepted by the bank and lending policies (advance rates) when this type of collateral is taken must be clearly documented;
- (b) The bank must take steps to ensure that the property taken as collateral is adequately insured against damage or deterioration;
- (c) The bank must monitor on an ongoing basis the extent of any permissible prior claims (e.g. tax) on the property; and
- (d) 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.

(iii) *Requirements for Recognition of Financial Receivables*

- Definition of Eligible Receivables

CA-5.8.121 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.

- Operational Requirements

a. Legal Certainty

CA-5.8.122 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.

CA-5.8.123 Banks must take all steps necessary to fulfil local requirements in respect of the enforceability of security interest, e.g. 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.124 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.

CA-5.8.125 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 must have legal authority to sell or assign the receivables to other parties without consent of the receivables' obligors.

b. Risk Management

CA-5.8.126 The bank must have a sound process for determining the credit risk in the receivables. Such a process should include, among other things, analyses of the borrower's business and industry (e.g. effects of the business cycle) and the types of customers with whom the borrower does business. Where the bank relies on the borrower to ascertain the credit risk of the customers, the bank must review the borrower's credit policy to ascertain its soundness and credibility.

CA-5.8.127 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.

CA-5.8.128 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.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.129 The receivables pledged by a borrower should be diversified and not be unduly correlated with the borrower. Where the correlation is high, e.g. where some issuers of the receivables are reliant on the borrower for their viability or the borrower and the issuers belong to a common industry, the attendant risks should be taken into account in the setting of margins for the collateral pool as a whole. Receivables from affiliates of the borrower (including subsidiaries and employees) will not be recognised as risk mitigants.

CA-5.8.130 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.

c. Requirements for Recognition of other Collateral

CA-5.8.131 CBB may, on a case by case basis, allow for recognition of the credit risk mitigating effect of certain other physical collateral if the bank can demonstrate that such collateral meets the following two standards:

- (a) Existence of liquid markets for disposal of collateral in an expeditious and economically efficient manner; and
- (b) Existence of well established, publicly available market prices for the collateral. CBB will seek to ensure that the amount a bank receives when collateral is realised does not deviate significantly from these market prices.

CA-5.8.132

In order for a given bank to receive recognition for additional physical collateral, it must meet all the standards in paragraphs CA-5.8.119 and CA-5.8.120, subject to the following modifications:

- (a) **First Claim:** 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;
- (b) The loan agreement must include detailed descriptions of the collateral plus detailed specifications of the manner and frequency of revaluation;
- (c) 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;



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- (d) 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; and
- (e) In cases of inventories (e.g. raw materials, work-in-process, finished goods, dealers’ inventories of autos) and equipment, the periodic revaluation process must include physical inspection of the collateral.

10. Requirements for Recognition of Leasing

- CA-5.8.133 Leases other than those that expose the bank to residual value risk (see paragraph CA-5.8.134) 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 (CRE/RRE or other collateral). In addition, the bank must also meet the following standards:
- (a) 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;
 - (b) 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
 - (c) 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 CRM attributed to the leased assets.
- CA-5.8.134 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:
- (a) The discounted lease payment stream will receive a risk weight appropriate for the lessee’s financial strength (PD) and CBB’s or own-estimate of LGD, whichever is appropriate; and
 - (b) The residual value will be risk-weighted at 100%.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

11. Calculation of Capital Charges for Equity Exposures

(i) The Internal Models Market-based Approach

CA-5.8.135 To be eligible for the internal models market-based approach a bank must demonstrate to CBB that it meets certain quantitative and qualitative minimum requirements at the outset and on an ongoing basis. A bank that fails to demonstrate continued compliance with the minimum requirements must develop a plan for rapid return to compliance, obtain CBB's approval of the plan, and implement that plan in a timely fashion. In the interim, banks would be expected to compute capital charges using a simple risk weight approach.

CA-5.8.136 CBB will periodically develop detailed examination procedures to ensure that banks' risk measurement systems and management controls are adequate to serve as the basis for the internal models approach.

(ii) Capital Charge and Risk Quantification

CA-5.8.137 The following minimum quantitative standards apply for the purpose of calculating minimum capital charges under the internal models approach:

- (a) The capital charge is equivalent to the potential loss on the institution's equity portfolio arising from an assumed instantaneous shock equivalent to the 99th percentile, one-tailed confidence interval of the difference between quarterly returns and an appropriate risk-free rate computed over a long-term sample period;



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- (b) The estimated losses should be robust to adverse market movements relevant to the long-term risk profile of the institution's specific holdings. The data used to represent return distributions should reflect the longest sample period for which data are available and meaningful in representing the risk profile of the bank's specific equity holdings. The data used should be sufficient to provide conservative, statistically reliable and robust loss estimates that are not based purely on subjective or judgmental considerations. Institutions must demonstrate to CBB that the shock employed provides a conservative estimate of potential losses over a relevant long-term market or business cycle. Models estimated using data not reflecting realistic ranges of long-run experience, including a period of reasonably severe declines in equity market values relevant to a bank's holdings, are presumed to produce optimistic results unless there is credible evidence of appropriate adjustments built into the model. In the absence of built-in adjustments, the bank must combine empirical analysis of available data with adjustments based on a variety of factors in order to attain model outputs that achieve appropriate realism and conservatism. In constructing Value at Risk (VaR) models estimating potential quarterly losses, institutions may use quarterly data or convert shorter horizon period data to a quarterly equivalent using an analytically appropriate method supported by empirical evidence. Such adjustments must be applied through a well-developed and well-documented thought process and analysis. In general, adjustments must be applied conservatively and consistently over time. Furthermore, where only limited data are available, or where technical limitations are such that estimates from any single method will be of uncertain quality, banks must add appropriate margins of conservatism in order to avoid over-optimism;
- (c) No particular type of VaR model (e.g. variance-covariance, historical simulation, or Monte Carlo) is prescribed. However, the model used must be able to capture adequately all of the material risks embodied in equity returns including both the general market risk and specific risk exposure of the institution's equity portfolio. Internal models must adequately explain historical price variation, capture both the magnitude and changes in the composition of potential concentrations, and be robust to adverse market environments. The population of risk exposures represented in the data used for estimation must be closely matched to or at least comparable with those of the bank's equity exposures;



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- (d) Banks may also use modelling techniques such as historical scenario analysis to determine minimum capital requirements for banking book equity holdings. The use of such models is conditioned upon the institution demonstrating to CBB that the methodology and its output can be quantified in the form of the loss percentile specified under (a);
- (e) Banks must use an internal model that is appropriate for the risk profile and complexity of their equity portfolio. Banks with material holdings with values that are highly non-linear in nature (e.g. equity derivatives, convertibles) must employ an internal model designed to capture appropriately the risks associated with such instruments;
- (f) Subject to CBB's review, equity portfolio correlations can be integrated into a bank's internal risk measures. The use of explicit correlations (e.g. utilisation of a variance/covariance VaR model) must be fully documented and supported using empirical analysis. The appropriateness of implicit correlation assumptions will be evaluated by CBB in its review of model documentation and estimation techniques;
- (g) Mapping of individual positions to proxies, market indices, and risk factors should be plausible, intuitive, and conceptually sound. Mapping techniques and processes should be fully documented, and demonstrated with both theoretical and empirical evidence to be appropriate for the specific holdings. Where professional judgement is combined with quantitative techniques in estimating a holding's return volatility, the judgement must take into account the relevant and material information not considered by the other techniques utilised;
- (h) Where factor models are used, either single or multi-factor models are acceptable depending upon the nature of an institution's holdings. Banks are expected to ensure that the factors are sufficient to capture the risks inherent in the equity portfolio. Risk factors should correspond to the appropriate equity market characteristics (for example, public, private, market capitalisation industry sectors and sub-sectors, operational characteristics) in which the bank holds significant positions. While banks will have discretion in choosing the factors, they must demonstrate through empirical analyses the appropriateness of those factors, including their ability to cover both general and specific risk;



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- (i) Estimates of the return volatility of equity investments must incorporate relevant and material available data, information, and methods. A bank may utilise independently reviewed internal data or data from external sources (including pooled data). The number of risk exposures in the sample, and the data period used for quantification must be sufficient to provide the bank with confidence in the accuracy and robustness of its estimates. Institutions should take appropriate measures to limit the potential of both sampling bias and survivorship bias in estimating return volatilities; and
- (j) A rigorous and comprehensive stress-testing programme must be in place. Banks are expected to subject their internal model and estimation procedures, including volatility computations, to either hypothetical or historical scenarios that reflect worst-case losses given underlying positions in both public and private equities. At a minimum, stress tests should be employed to provide information about the effect of tail events beyond the level of confidence assumed in the internal models approach.

(iii) *Risk Management Process and Controls*

CA-5.8.138 Banks' overall risk management practices used to manage their banking book equity investments are expected to be consistent with the evolving sound practice guidelines issued by the Basel Committee and CBB. With regard to the development and use of internal models for capital purposes, institutions must have established policies, procedures, and controls to ensure the integrity of the model and modelling process used to derive regulatory capital standards. These policies, procedures, and controls should include the following:

- (a) Full integration of the internal model into the overall management information systems of the institution and in the management of the banking book equity portfolio. Internal models should be fully integrated into the institution's risk management infrastructure including use in: (i) establishing investment hurdle rates and evaluating alternative investments; (ii) measuring and assessing equity portfolio performance (including the risk-adjusted performance); and (iii) allocating economic capital to equity holdings and evaluating overall capital adequacy. The institution should be able to demonstrate, through for example, investment committee minutes, that internal model output plays an essential role in the investment management process;



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CA-5.8 Minimum Requirements for IRB Approach (continued)

- (b) Established management systems, procedures, and control functions for ensuring the periodic and independent review of all elements of the internal modelling process, including approval of model revisions, vetting of model inputs, and review of model results, such as direct verification of risk computations. Proxy and mapping techniques and other critical model components should receive special attention. These reviews should assess the accuracy, completeness, and appropriateness of model inputs and results and focus on both finding and limiting potential errors associated with known weaknesses and identifying unknown model weaknesses. Such reviews may be conducted as part of internal or external audit programmes, by an independent risk control unit, or by an external third party;
- (c) Adequate systems and procedures for monitoring investment limits and the risk exposures of equity investments;
- (d) The units responsible for the design and application of the model must be functionally independent from the units responsible for managing individual investments; and
- (e) Parties responsible for any aspect of the modelling process must be adequately qualified. Management must allocate sufficient skilled and competent resources to the modelling function.

(iv) *Validation and Documentation*

CA-5.8.139

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

Validation

CA-5.8.140

Banks must have a robust system in place to validate the accuracy and consistency of their internal models and modelling processes. A bank must demonstrate to CBB that the internal validation process enables it to assess the performance of its internal model and processes consistently and meaningfully.



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.141 Banks must regularly compare actual return performance (computed using realised and unrealised gains and losses) with modelled estimates and be able to demonstrate that such returns are within the expected range for the portfolio and individual holdings. Such comparisons must make use of historical data that are over as long a period as possible. The methods and data used in such comparisons must be clearly documented by the bank. This analysis and documentation should be updated at least annually.

CA-5.8.142 Banks should make use of other quantitative validation tools and comparisons with external data sources. The analysis must be based on data that are appropriate to the portfolio, are updated regularly, and cover a relevant observation period. Banks' internal assessments of the performance of their own model must be based on long data histories, covering a range of economic conditions, and ideally one or more complete business cycles.

CA-5.8.143 Banks must demonstrate that quantitative validation methods and data are consistent through time. Changes in estimation methods and data (both data sources and periods covered) must be clearly and thoroughly documented.

CA-5.8.144 Since the evaluation of actual performance to expected performance over time provides a basis for banks to refine and adjust internal models on an ongoing basis, it is expected that banks using internal models will have established well-articulated model review standards. These standards are especially important for situations where actual results significantly deviate from expectations and where the validity of the internal model is called into question. These standards must take account of business cycles and similar systematic variability in equity returns. All adjustments made to internal models in response to model reviews must be well documented and consistent with the bank's model review standards.



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CA-5.8 Minimum Requirements for IRB Approach (continued)

CA-5.8.145

To facilitate model validation through backtesting on an ongoing basis, institutions using the internal model approach must construct and maintain appropriate databases on the actual quarterly performance of their equity investments as well on the estimates derived using their internal models. Institutions should also backtest the volatility estimates used within their internal models and the appropriateness of the proxies used in the model. CBB may ask banks to scale their quarterly forecasts to a different, in particular shorter, time horizon, store performance data for this time horizon and perform backtests on this basis.

Documentation

CA-5.8.146

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

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



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CHAPTER	CA-5 Credit Risk – The Internal Ratings-Based Approach

CA-5.8 Minimum Requirements for IRB Approach (continued)

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

12. Disclosure Requirements

CA-5.8.147

In order to be eligible for the IRB approach, banks must meet the disclosure requirements that the CBB may set periodically. Failure to meet those requirements will render banks ineligible to use the relevant IRB approach.



MODULE	CA: Capital Adequacy
CHAPTER	CA-6: Credit Risk - Securitisation Framework

CA-6.1 Scope and Definitions of Transactions Covered under the Securitisation Framework

CA-6.1.1

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.

CA-6.1.1A

A bank must meet all the requirements listed in the paragraph CA-6.1.1.B below, to use any of the approaches specified in the securitisation framework. If a bank does not perform the level of the due diligence specified, it must deduct the amount of the securitisation (or re-securitisation) exposure from its regulatory capital using the approach outlined in the paragraphs CA-6.4.2 to CA-6.4.4.

CA-6.1.1B

In order for a bank to use the securitisation framework, a bank must have the information specified below or deduct the exposure from regulatory capital:

- (a) A bank must have a comprehensive understanding of the risk characteristics of its individual securitisation exposures, whether on-balance sheet or off-balance sheet, as well as the risk characteristics of the pools underlying its securitisation exposures;
- (b) A bank must be able to access performance information on the underlying pools on an on-going basis in a timely manner. Such information should include: exposure type, percentage of loans more than 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 geographic diversification. For re-securitisations, a bank must have not only information on the underlying securitisation tranches, such as the issuer name and credit quality, but also the characteristics and performance of the pools underlying the securitisation tranches; and
- (c) 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.



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CHAPTER	CA-6: Credit Risk - Securitisation Framework

CA-6.1 Scope and Definitions of Transactions Covered under the Securitisation Framework (continued)

CA-6.1.2

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, CBB 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 the CBB when there is uncertainty about whether a given transaction should be considered a securitisation. For example, transactions involving cash flows from real estate (e.g. rents) may be considered specialised lending exposures, if warranted.

CA-6.1.3

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.

CA-6.1.4

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 (e.g. credit-linked notes) or unfunded (e.g. 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.



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CHAPTER	CA-6: Credit Risk - Securitisation Framework

CA-6.1 Scope and Definitions of Transactions Covered under the Securitisation Framework (continued)

- CA-6.1.5 Banks' exposures to a securitisation are hereafter referred to as "securitisation exposures". Securitisation exposures can include but are not restricted to the following: asset-backed securities, mortgage-backed securities, credit enhancements, liquidity facilities, interest rate or currency swaps, credit derivatives and tranching cover as described in paragraph CA-4.5.11. Reserve accounts, such as cash collateral accounts, recorded as an asset by the originating bank must also be treated as securitisation exposures.
- CA-6.1.5A A *re-securitisation exposure* is a securitisation exposure in which the risk associated with an underlying pool of exposures is tranching and at least one of the underlying exposures is a securitisation exposure. In addition, an exposure to one or more *re-securitisation exposures* is a *re-securitisation exposure*.
- CA-6.1.5B Given the complexity of many securitisation transactions, licensees are encouraged to consult with the CBB when there is uncertainty about whether a particular structured credit position should be considered a *re-securitisation exposure*. The CBB will consider the exposure's economic substance when making a determination on whether a structured credit position is a *re-securitisation exposure*.
- CA-6.1.5C *Re-securitisation exposures* include collateralised debt obligations (CDOs) of asset-backed securities (ABS) including, for example, a CDO backed by residential mortgage-backed securities (RMBS). Moreover, it also captures a securitisation exposure where the pool contains many individual mortgage loans and a single RMBS. This means that even if only one of the underlying exposures is a securitisation exposure, then any tranching position (such as senior or subordinated ABS) exposed to that pool is considered a *re-securitisation exposure*.
- CA-6.1.5D Furthermore, when an instrument's performance is linked to one or more *re-securitisation exposures*, generally that instrument is a *re-securitisation exposure*. Thus a credit derivative providing credit protection for a CDO squared tranche is a *re-securitisation exposure*.
- CA-6.1.5E The definition of *re-securitisation* also applies to ABCP programmes. The ratings based risk approach tables include weightings for both securitisation and *re-securitisation exposures* (see CA-6.4.8 onward).
- CA-6.1.6 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.



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CA-6.2 Definitions and General Terminology

Originating Bank

CA-6.2.1

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:

- (a) The bank originates directly or indirectly underlying exposures included in the securitisation; or
- (b) 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.

Asset Backed Commercial Paper (ABCP) Programme

CA-6.2.2

An asset-backed commercial paper (ABCP) programme predominately issues commercial paper with an original maturity of one year or less that is backed by assets or other exposures held in a bankruptcy-remote, Special Purpose Securitisation Vehicle (SPSV).

Clean-up Call

CA-6.2.3

A clean-up call is an option that permits the securitisation exposures (e.g. 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.

Credit Enhancement

CA-6.2.4

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



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CA-6.2 Definitions and General Terminology (continued)

Credit Enhancing Interest-Only strip

CA-6.2.5

A credit-enhancing interest-only strip (I/O) is an on-balance sheet asset that (i) represents a valuation of cash flows related to future margin income, and (ii) is subordinated.

Early Amortization

CA-6.2.6

Early amortisation provisions are mechanisms that, once triggered, allow investors to be paid out prior to the originally stated maturity of the securities issued. For risk-based capital purposes, an early amortisation provision will be considered either controlled or non-controlled. A controlled early amortisation provision must meet all of the following conditions:

- (a) The bank must have an appropriate capital/liquidity plan in place to ensure that it has sufficient capital and liquidity available in the event of an early amortisation;
- (b) Throughout the duration of the transaction, including the amortisation period, there is the same pro-rata sharing of interest, principal, expenses, losses and recoveries based on the bank's and investors' relative shares of the receivables outstanding at the beginning of each month;
- (c) The bank must set a period for amortisation that would be sufficient for at least 90% of the total debt outstanding at the beginning of the early amortisation period to have been repaid or recognised as in default; and
- (d) The pace of repayment should not be any more rapid than would be allowed by straight-line amortisation over the period set out in criterion (c).

CA-6.2.7

An early amortisation provision that does not satisfy the conditions for a controlled early amortisation provision must be treated as a non-controlled early amortisation provision.



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CA-6.2 Definitions and General Terminology (continued)

Excess Spread

CA-6.2.8

Excess spread is generally defined as gross finance charge collections and other income received by the trust or SPSV (specified in paragraph CA-6.2.10) minus certificate interest, servicing fees, charge-offs, and other senior trust or SPSV expenses.

Implicit Support

CA-6.2.9

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

SPSV

CA-6.2.10

An SPSV 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 SPSV, and the structure of which is intended to isolate the SPSV from the credit risk of an originator or seller of exposures. SPSVs are commonly used as financing vehicles in which exposures are sold to a trust or similar entity in exchange for cash or other assets funded by debt issued by the trust.



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CA-6.3 Operational Requirements for the Recognition of Risk Transference

CA-6.3.1

The following operational requirements are applicable to both the standardised and IRB approaches of the securitisation framework.

Operational Requirements for Traditional Securitisations

CA-6.3.2

An originating bank may exclude securitised exposures from the calculation of risk weighted assets under paragraph CA-6.4.1, 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:

- (a) Significant credit risk associated with the securitised exposures has been transferred to third parties;
- (b) The transferor does not maintain effective or indirect control⁵⁶ over the transferred exposures. The assets are legally isolated from the transferor in such a way (e.g. through the sale of assets or through sub-participation) that the exposures are put beyond the reach of the transferor and its creditors, even in bankruptcy or receivership. These conditions must be supported by an opinion provided by a qualified legal counsel;
- (c) The securities issued are not obligations of the transferor. Thus, investors who purchase the securities only have claim to the underlying pool of exposures;
- (d) The transferee is an SPSV and the holders of the beneficial interests in that entity have the right to pledge or exchange them without restriction;
- (e) Clean-up calls must satisfy the conditions set out in paragraph CA-6.3.5; and
- (f) The securitisation does not contain clauses that (i) require the originating bank to alter systematically the underlying exposures such that the pool's weighted average credit quality is improved unless this is achieved by selling assets to independent and unaffiliated third parties at market prices; (ii) allow for increases in a retained first loss position or credit enhancement provided by the originating bank after the transaction's inception; or (iii) 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.

⁵⁶ The transferor is deemed to have maintained effective control over the transferred credit risk exposures if it: (i) is able to repurchase from the transferee the previously transferred exposures in order to realise their benefits; or (ii) is obligated to retain the risk of the transferred exposures. The transferor's retention of servicing rights to the exposures will not necessarily constitute indirect control of the exposures.



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CHAPTER	CA-6: Credit Risk - Securitisation Framework

CA-6.3 Operational Requirements for the Recognition of Risk Transference (continued)

Operational Requirements for Synthetic Securitisations

CA-6.3.3

For synthetic securitisations, the use of CRM techniques (i.e. 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:

- (a) Credit risk mitigants must comply with the requirements as set out in Chapter CA-4 of this Module;
- (b) Eligible collateral is limited to that specified in paragraphs CA-4.3.1 and CA-4.3.2. Eligible collateral pledged by SPSVs may be recognised;
- (c) Eligible guarantors are defined in paragraph CA-4.5.7. Banks may not recognise SPSVs as eligible guarantors in the securitisation framework;
- (d) Banks must transfer significant credit risk associated with the underlying exposure to third parties;
- (e) 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:
 - Clauses that materially limit the credit protection or credit risk transference (e.g. significant materiality thresholds below which credit protection is deemed not to be triggered even if a credit event occurs or those that allow for the termination of the protection due to deterioration in the credit quality of the underlying exposures);
 - Clauses that require the originating bank to alter the underlying exposures to improve the pool's weighted average credit quality;
 - Clauses that increase the banks' cost of credit protection in response to deterioration in the pool's quality;
 - 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
 - Clauses that provide for increases in a retained first loss position or credit enhancement provided by the originating bank after the transaction's inception.



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CA-6.3 Operational Requirements for the Recognition of Risk Transference (continued)

- (f) An opinion must be obtained from a qualified legal counsel that confirms the enforceability of the contracts in all relevant jurisdictions; and
- (g) Clean-up calls must satisfy the conditions set out in paragraph CA-6.3.5.

CA-6.3.4

For synthetic securitisations, the effect of applying CRM techniques for hedging the underlying exposure are treated according to chapter CA-4. In case there is a maturity mismatch, the capital requirement will be determined in accordance with paragraphs CA-4.6.1 to CA-4.6.4. When the exposures in the underlying pool have different maturities, the longest maturity must be taken as the maturity of the pool. 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 the tranches of the synthetic securitisation may differ from that of the underlying exposures. Originating banks of synthetic securitisations must treat such maturity mismatches in the following manner. A bank applying the standardised approach for securitisation must deduct all retained positions that are unrated or rated below investment grade. A bank applying the IRB approach must deduct unrated, retained positions if the treatment of the position is deduction specified in paragraphs CA-6.4.51 to CA-6.4.88. Accordingly, when deduction is required, maturity mismatches are not taken into account. For all other securitisation exposures, the bank must apply the maturity mismatch treatment set forth in paragraphs CA-4.6.1 to CA-4.6.4.

Operational Requirements and Treatment of Clean-up Calls

CA-6.3.5

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:

- (a) 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;



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CA-6.3 Operational Requirements for the Recognition of Risk Transference (continued)

- (b) 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
- (c) The clean-up call must only be exercisable when 10% or less of the original underlying portfolio, or securities issued remain, or, for synthetic securitisations, when 10% or less of the original reference portfolio value remains.

CA-6.3.6

Securitisation transactions that include a clean-up call that does not meet all of the criteria stated in paragraph CA-6.3.5 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, as defined in paragraph CA-6.4.3. 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 cleanup call) that effectively terminates the transaction and the purchased credit protection on a specific date, the bank must treat the transaction in accordance with paragraph CA-6.3.4 and paragraphs CA-4.6.1 to CA-4.6.4.

CA-6.3.7

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.



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CA-6.4 Treatment of Securitisation Exposures

Calculation of Capital Requirements

CA-6.4.1

Except as stated in paragraph CA-6.3.2, banks are required to hold regulatory capital against all of their securitisation exposures and *re-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.

(i) Deduction

CA-6.4.2

When a bank is required to deduct a securitisation exposure from regulatory capital, the deduction must be taken 50% from Tier 1 and 50% from Tier 2 with the one exception noted in paragraph CA-6.4.3. Credit enhancing I/Os (net of the amount that must be deducted from Tier 1 as in paragraph CA-6.4.3) are deducted 50% from Tier 1 and 50% from Tier 2. Deductions from capital may be calculated net of any specific provisions taken against the relevant securitisation exposures.

CA-6.4.3

Banks must deduct from Tier 1 any increase in equity capital resulting from a securitisation transaction, such as that associated with expected future margin income (FMI) resulting in a gain-on-sale that is recognised in regulatory capital. Such an increase in capital is referred to as a “gain-on-sale” for the purposes of the securitisation framework.

CA-6.4.4

For the purposes of the EL-provision calculation as set out in Section CA-5.7, securitisation exposures do not contribute to the EL amount. Similarly, any specific provisions against securitisation exposures are not to be included in the measurement of eligible provisions.

(ii) Implicit Support

CA-6.4.5

When a bank provides implicit support to a securitisation, it must, at a minimum, hold capital against all of the 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, as defined in paragraph CA-6.4.3. Furthermore, the bank is required to disclose publicly that (a) it has provided non-contractual support and (b) the capital impact of doing so.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Operational Requirements for use of External Credit Assessments

CA-6.4.6

The following operational criteria concerning the use of external credit assessments apply in the standardised and IRB approaches of the securitisation framework:

- (a) 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;
- (b) The external credit assessments must be from an eligible ECAI as recognised by the CBB in accordance with section CA-3.4 with the following exception. In contrast with (c) of paragraph CA-3.4.1, an eligible credit assessment must be publicly available. In other words, a rating must be published in an accessible form and included in the ECAI's transition matrix. Consequently, ratings that are made available only to the parties to a transaction do not satisfy this requirement;
- (c) Eligible ECAIs must have a demonstrated expertise in assessing securitisations, which may be evidenced by strong market acceptance;
- (d) A bank must apply external credit assessments from eligible ECAIs consistently across a given type of securitisation exposure. Furthermore, a bank cannot use the credit assessments issued by one ECAI for one or more tranches and those of another ECAI for other positions (whether retained or purchased) within the same securitisation structure that may or may not be rated by the first ECAI. Where two or more eligible ECAIs can be used and these assess the credit risk of the same securitisation exposure differently, paragraphs CA-3.4.5 and CA-3.4.6 will apply;
- (e) Where CRM is provided directly to an SPSV by an eligible guarantor defined in paragraph CA-4.5.7 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 in paragraph CA-4.5.7, the covered securitisation exposures should be treated as unrated; and



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CA-6.4 Treatment of securitisation exposures (continued)

- (f) In the situation where a credit risk mitigant is not obtained by the SPSV but rather applied to a specific securitisation exposure within a given structure (e.g. ABS tranche), the bank must treat the exposure as if it is unrated and then use the CRM treatment outlined in chapter CA-4 or in the foundation IRB approach of chapter CA-5, to recognise the hedge.

CA-6.4.6A 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 ABCP where it provides an unfunded securitisation exposure extended to the ABCP programme (e.g. 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 (e.g. against the liquidity facility and/or credit enhancement). The treatment described above is also applicable to exposures held in the trading book. A bank's capital requirement for such exposures held in the trading book can be no less than the amount required under the banking book treatment. Banks are permitted to recognise overlap in their exposures, consistent with CA-6.4.23. For example, a bank providing a liquidity facility supporting 100% of the ABCP issued by an ABCP programme and purchasing (for its own account) 20% of the outstanding ABCP of that programme could recognise an overlap of 20% ($100\% \text{ liquidity facility} + 20\% \text{ CP held} - 100\% \text{ CP issued} = 20\%$). If a bank provided a liquidity facility that covered 90% of the outstanding ABCP and purchased 20% of the ABCP, the two exposures would be treated as if 10% of the two exposures overlapped ($90\% \text{ liquidity facility} + 20\% \text{ CP held} - 100\% \text{ CP issued} = 10\%$). If a bank provided a liquidity facility that covered 50% of the outstanding ABCP and purchased 20% of the ABCP, the two exposures would be treated as if there were no overlap.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Standardised Approach for Securitisation Exposures

(i) Scope

CA-6.4.7

Banks that apply the standardised approach to credit risk for the type of underlying exposure(s) securitised must use the standardised approach under the securitisation framework.

(ii) Risk Weights

CA-6.4.8

The risk-weighted asset amount of a securitisation exposure is computed by multiplying the amount of the position by the appropriate risk weight determined in accordance with the following tables. For off-balance sheet exposures, banks must apply a CCF and then risk weight the resultant credit equivalent amount. If such an exposure is rated, a CCF of 100% must be applied. For positions with long-term ratings of B+ and below and short-term ratings other than A-1/P-1, A-2/P-2, A-3/P-3, deduction from capital as defined in paragraph CA-6.4.2 is required. Deduction is also required for unrated positions with the exception of the circumstances described in paragraphs CA-6.4.12 to CA-6.4.16.

The following risk weights are applied in the standardised approach.

Long term rating ⁵⁷	Securitisation Exposure	Re-securitisation Exposure
AAA to AA-	20%	40%
A+ to A-	50%	100%
BBB+ to BBB-	100%	225%
BB+ to BB-	350%	650%
B+ and below or unrated	Deduction	Deduction

Short term rating	Securitisation Exposure	Re-securitisation Exposure
A-1/P-1	20%	40%
A-2/P-2	50%	100%
A-3/P-3	100%	225%
All other ratings or unrated	Deduction	Deduction

⁵⁷ The rating designations used in the following tables are for illustrative purposes only and do not indicate any preference for, or endorsement of, any particular external assessment system.



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CA-6.4 Treatment of Securitisation Exposures (continued)

CA-6.4.9 The capital treatment of positions retained by originators, liquidity facilities, credit risk mitigants, and securitisations of revolving exposures are identified separately. The treatment of clean-up calls is provided in paragraphs CA-6.3.5 to CA-6.3.7.

Recognition of Ratings on Below-investment Grade Exposures

CA-6.4.10 Only third-party investors, as opposed to banks that serve as originators, may recognise external credit assessments that are equivalent to BB+ to BB- for risk weighting purposes of securitisation exposures.

Originators to Deduct Below-investment Grade Exposures

CA-6.4.11 Originating banks as defined in paragraph CA-6.2.1 must deduct all retained securitisation exposures rated below investment grade (i.e. BBB-).

(iii) Exceptions to General Treatment of Unrated Securitisation Exposures

CA-6.4.12 As noted in the tables above, unrated securitisation exposures must be deducted with the following exceptions: (i) the most senior exposure in a securitisation, (ii) exposures that are in a second loss position or better in ABCP programmes and meet the requirements outlined in paragraph CA-6.4.15, and (iii) eligible liquidity facilities.

Treatment of Unrated Most Senior Securitisation Exposures

CA-6.4.13 If the most senior exposure in a securitisation of a traditional or synthetic securitisation is unrated, a bank that holds or guarantees such an exposure may determine the risk weight by applying the “look-through” treatment, provided the composition of the underlying pool is known at all times. Banks are not required to consider interest rate or currency swaps when determining whether an exposure is the most senior in a securitisation for the purpose of applying the “look-through” approach.

CA-6.4.14 In the look-through treatment, the unrated most senior position receives the average risk weight of the underlying exposures subject to CBB review. Where the bank is unable to determine the risk weights assigned to the underlying credit risk exposures, the unrated position must be deducted.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Treatment of Exposures in a Second Loss Position or Better in ABCP Programmes

CA-6.4.15

Deduction is not required for those unrated securitisation exposures provided by sponsoring banks to ABCP programmes that satisfy the following requirements:

- (a) The exposure is economically in a second loss position or better and the first loss position provides significant credit protection to the second loss position;
- (b) The associated credit risk is the equivalent of investment grade or better; and
- (c) The bank holding the unrated securitisation exposure does not retain or provide the first loss position.

CA-6.4.16

Where these conditions are satisfied, the risk weight is the greater of (i) 100% or (ii) the highest risk weight assigned to any of the underlying individual exposures covered by the facility.

Risk Weights for Eligible Liquidity Facilities

CA-6.4.17

For eligible liquidity facilities as defined in paragraph CA-6.4.19 and where the conditions for use of external credit assessments in paragraph CA-6.4.6 are not met, the risk weight applied to the exposure's credit equivalent amount is equal to the highest risk weight assigned to any of the underlying individual exposures covered by the facility.

(iv) Credit Conversion Factors for Off-balance Sheet Exposures

CA-6.4.18

For risk-based capital purposes, banks must determine whether, according to the criteria outlined below, an off-balance sheet securitisation exposure qualifies as an 'eligible liquidity facility' or an 'eligible servicer cash advance facility'. All other off-balance sheet securitisation exposures will receive a 100% CCF.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Eligible Liquidity Facilities

CA-6.4.19

Banks are permitted to treat off-balance sheet securitisation exposures as eligible liquidity facilities if the following minimum requirements are satisfied:

- (a) The facility documentation must clearly identify and limit the circumstances under which it may be drawn. Draws under the facility must be limited to the amount that is likely to be repaid fully from the liquidation of the underlying exposures and any seller-provided credit enhancements. In addition, the facility must not cover any losses incurred in the underlying pool of exposures prior to a draw, or be structured such that draw-down is certain (as indicated by regular or continuous draws);
- (b) The facility must be subject to an asset quality test that precludes it from being drawn to cover credit risk exposures that are in default as defined in paragraphs CA-5.8.63 to CA-5.8.70. In addition, if the exposures that a liquidity facility is required to fund are externally rated securities, the facility can only be used to fund securities that are externally rated investment grade at the time of funding;
- (c) The facility cannot be drawn after all applicable (e.g. transaction-specific and programme-wide) credit enhancements from which the liquidity would benefit have been exhausted; and
- (d) Repayment of draws on the facility (i.e. assets acquired under a purchase agreement or loans made under a lending agreement) must not be subordinated to any interests of any note holder in the programme (e.g. ABCP programme) or subject to deferral or waiver.

CA-6.4.20

Where these conditions are met, the bank may apply a 50% CCF to the eligible facility regardless of the maturity of the facility. However, if an external rating of the facility itself is used for risk-weighting the facility, a 100% CCF must be applied.

CA-6.4.21

[This Paragraph has been deleted in January 2012].



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CA-6.4 Treatment of Securitisation Exposures (continued)

CA-6.4.22 [This Paragraph has been deleted in January 2012].

Treatment of Overlapping Exposures

CA-6.4.23 A bank may provide several types of facilities that can be drawn under various conditions. The same bank may be providing two or more of these facilities. Given the different triggers found in these facilities, it may be the case that a bank provides duplicative coverage to the underlying exposures. In other words, the facilities provided by a bank may overlap since a draw on one facility may preclude (in part) a draw under the other facility. In the case of overlapping facilities provided by the same bank, the bank does not need to hold additional capital for the overlap. Rather, it is only required to hold capital once for the position covered by the overlapping facilities (whether they are liquidity facilities or credit enhancements). Where the overlapping facilities are subject to different conversion factors, the bank must attribute the overlapping part to the facility with the highest conversion factor. However, if overlapping facilities are provided by different banks, each bank must hold capital for the maximum amount of the facility (see also Paragraph CA-6.4.6A).

Eligible Servicer Cash Advance Facilities

CA-6.4.24 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. A 0% CCF must be applied to such un-drawn servicer cash advances or facilities provided that these are unconditionally cancellable without prior notice.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Treatment of Credit Risk Mitigation for Securitisation Exposures

CA-6.4.25 The treatment below applies to a bank that has obtained a credit risk mitigant on a securitisation exposure. Credit risk mitigants include guarantees, credit derivatives, collateral and on-balance sheet netting. Collateral in this context refers to that used to hedge the credit risk of a securitisation exposure rather than the underlying exposures of the securitisation transaction.

CA-6.4.26 When a bank other than the originator provides credit protection to a securitisation exposure, it must calculate a capital requirement on the covered exposure as if it were an investor in that securitisation. If a bank provides protection to an unrated credit enhancement, it must treat the credit protection provided as if it were directly holding the unrated credit enhancement.

Collateral

CA-6.4.27 Eligible collateral is limited to that recognised under the standardised approach for CRM (paragraphs CA-4.3.1 and CA-4.3.2). Collateral pledged by SPSVs may be recognised.

Guarantees and Credit Derivatives

CA-6.4.28 Credit protection provided by the entities listed in paragraph CA-4.5.7 may be recognised. SPSVs cannot be recognised as eligible guarantors. A bank must not recognise any support provided by itself (see also Paragraph CA-6.4.6).

CA-6.4.29 Where guarantees or credit derivatives fulfil the minimum operational conditions as specified in paragraphs CA-4.5.1 to CA-4.5.6, banks can take account of such credit protection in calculating capital requirements for securitisation exposures.

CA-6.4.30 Capital requirements for the guaranteed/protected portion will be calculated according to CRM for the standardised approach as specified in paragraphs CA-4.5.8 to CA-4.5.13.

Maturity Mismatches

CA-6.4.31 For the purpose of setting regulatory capital against a maturity mismatch, the capital requirement will be determined in accordance with paragraphs CA-4.6.1 to CA-4.6.4. When the exposures being hedged have different maturities, the longest maturity must be used.



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CA-6.4 Treatment of Securitisation Exposures (continued)

(vi) Capital Requirement for Early Amortisation Provisions

Scope

CA-6.4.32

As described below, an originating bank is required to hold capital against all or a portion of the investors' interest (i.e. against both the drawn and un-drawn balances related to the securitised exposures) when:

- (a) It sells exposures into a structure that contains an early amortisation feature; and
- (b) The exposures sold are of a revolving nature. These involve exposures where the borrower is permitted to vary the drawn amount and repayments within an agreed limit under a line of credit (e.g. credit card receivables and corporate loan commitments).

CA-6.4.33

The capital requirement should reflect the type of mechanism through which an early amortisation is triggered.

CA-6.4.34

For securitisation structures wherein the underlying pool comprises revolving and term exposures, a bank must apply the relevant early amortisation treatment (outlined below in paragraphs CA-6.4.36 to CA-6.4.47) to that portion of the underlying pool containing revolving exposures.

CA-6.4.35

Banks are not required to calculate a capital requirement for early amortisations in the following situations:

- (a) Replenishment structures where the underlying exposures do not revolve and the early amortisation ends the ability of the bank to add new exposures;
- (b) Transactions of revolving assets containing early amortisation features that mimic term structures (i.e. where the risk on the underlying facilities does not return to the originating bank);
- (c) Structures where a bank securitises one or more credit line(s) and where investors remain fully exposed to future draws by borrowers even after an early amortisation event has occurred;
- (d) The early amortisation clause is solely triggered by events not related to the performance of the securitised assets or the selling bank, such as material changes in tax laws or regulations.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Maximum Capital Requirement

CA-6.4.36

For a bank subject to the early amortisation treatment, the total capital charge for all of its positions will be subject to a maximum capital requirement (i.e. a 'cap') equal to the greater of (i) that required for retained securitisation exposures, or (ii) the capital requirement that would apply had the exposures not been securitised. In addition, banks must deduct the entire amount of any gain-on-sale and credit enhancing I/Os arising from the securitisation transaction in accordance with paragraphs CA-6.4.2 to CA-6.4.4.

Mechanics

CA-6.4.37

The originator's capital charge for the investors' interest is determined as the product of (a) the investors' interest, (b) the appropriate CCF (as discussed below), and (c) the risk weight appropriate to the underlying exposure type, as if the exposures had not been securitised. As described below, the CCFs depend upon whether the early amortisation repays investors through a controlled or non-controlled mechanism. They also differ according to whether the securitised exposures are uncommitted retail credit lines (e.g. credit card receivables) or other credit lines (e.g. revolving corporate facilities). A line is considered uncommitted if it is unconditionally cancellable without prior notice.

(vii) Determination of CCFs for Controlled Early Amortisation Features

CA-6.4.38

An early amortisation feature is considered controlled when the definition as specified in paragraph CA-6.2.6 is satisfied.

Uncommitted Retail Exposures

CA-6.4.39

For uncommitted retail credit lines (e.g. credit card receivables) in securitisations containing controlled early amortisation features, banks must compare the three-month average excess spread defined in paragraph CA-6.2.8 to the point at which the bank is required to trap excess spread as economically required by the structure (i.e. excess spread trapping point).

CA-6.4.40

In cases where such a transaction does not require excess spread to be trapped, the trapping point is deemed to be 4.5 percentage points.

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CA-6.4 Treatment of Securitisation Exposures (continued)

CA-6.4.41

The bank must divide the excess spread level by the transaction's excess spread trapping point to determine the appropriate segments and apply the corresponding conversion factors, as outlined in the following table.

Controlled Early Amortisation Features

	Uncommitted	Committed
Retail credit lines	3-month average excess spread Credit Conversion Factor (CCF) 133.33% of trapping point or more 0% CCF less than 133.33% to 100% of trapping point 1% CCF less than 100% to 75% of trapping point 2% CCF less than 75% to 50% of trapping point 10% CCF less than 50% to 25% of trapping point 20% CCF less than 25% 40% CCF	90% CCF
Non-retail credit lines	90% CCF	90% CCF

CA-6.4.42

Banks are required to apply the conversion factors set out above for controlled mechanisms to the investors' interest referred to in paragraph CA-6.4.37.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Other Exposures

CA-6.4.43

All other securitised revolving exposures (i.e. those that are committed and all non-retail exposures) with controlled early amortisation features will be subject to a CCF of 90% against the off-balance sheet exposures.

(viii) Determination of CCFs for Non-controlled Early Amortisation Features

CA-6.4.44

Early amortisation features that do not satisfy the definition of a controlled early amortisation as specified in paragraph CA-6.2.6 will be considered non-controlled and treated as follows.

Uncommitted Retail Exposures

CA-6.4.45

For uncommitted retail credit lines (e.g. credit card receivables) in securitisations containing non-controlled early amortisation features, banks must make the comparison described in paragraphs CA-6.4.38 and CA-6.4.40:

CA-6.4.46

The bank must divide the excess spread level by the transaction's excess spread trapping point to determine the appropriate segments and apply the corresponding conversion factors, as outlined in the following table.

Non-controlled Early Amortisation Features

	Uncommitted	Committed
Retail credit lines	3-month average excess spread Credit Conversion Factor (CCF) 133.33% or more of trapping point 0% CCF less than 133.33% to 100% of trapping point 5% CCF less than 100% to 75% of trapping point 15% CCF less than 75% to 50% of trapping point 50% CCF less than 50% of trapping point 100% CCF	100% CCF
Non-retail credit lines	100% CCF	100% CCF



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CA-6.4 Treatment of Securitisation Exposures (continued)

Other Exposures

CA-6.4.47 All other securitised revolving exposures (i.e. those that are committed and all non-retail exposures) with non-controlled early amortisation features will be subject to a CCF of 100% against the off-balance sheet exposures.

Internal Ratings-based Approach for Securitisation Exposures

(i) Scope

CA-6.4.48 Banks that have received approval from CBB to use the IRB approach for the type of underlying exposures securitised (e.g. for their corporate or retail portfolio) must use the IRB approach for securitisations. Conversely, banks may not use the IRB approach to securitisation unless they receive approval to use the IRB approach for the underlying exposures from CBB.

CA-6.4.49 If the bank is applying the IRB approach for some exposures and the standardised approach for other exposures in the underlying pool, it should generally use the approach corresponding to the predominant share of exposures within the pool. The bank must consult with the CBB on which approach to apply to its securitisation exposures. To ensure appropriate capital levels, there may be instances where the CBB requires a treatment other than this general rule.

CA-6.4.50 Where there is no specific IRB treatment for the underlying asset type, originating banks that have received approval to use the IRB approach must calculate capital charges on their securitisation exposures applying the standardised approach in the securitisation framework, and investing banks with approval to use the IRB approach must apply the RBA.



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CA-6.4 Treatment of Securitisation Exposures (continued)

(ii) Hierarchy of Approaches

CA-6.4.51

The Ratings-Based Approach (RBA) must be applied to securitisation exposures that are rated, or where a rating can be inferred as described in paragraph CA-6.4.60. Where an external or an inferred rating is not available, either the Supervisory Formula (SF) or the Internal Assessment Approach (IAA) must be applied. The IAA is only available to exposures (e.g. liquidity facilities and credit enhancements) that banks (including third-party banks) extend to ABCP programmes. Such exposures must satisfy the conditions of paragraphs CA-6.4.62 and CA-6.4.63. For liquidity facilities to which none of these approaches can be applied, banks may apply the treatment specified in paragraph CA-6.4.84. Exceptional treatment for eligible servicer cash advance facilities is specified in paragraph CA-6.4.86. Securitisation exposures to which none of these approaches can be applied must be deducted.

(iii) Maximum Capital Requirement

CA-6.4.52

For a bank applying the IRB approach to securitisation, the maximum capital requirement for the securitisation exposures it holds is equal to the IRB capital requirement that would have been assessed against the underlying exposures had they not been securitised and treated under the appropriate sections of the IRB framework including section CA-5.7. In addition, banks must deduct the entire amount of any gain-on-sale and credit enhancing I/Os arising from the securitisation transaction in accordance with paragraphs CA-6.4.2 to CA-6.4.4.

(iv) Ratings-Based Approach (RBA)

CA-6.4.53

Under the RBA, the risk-weighted assets are determined by multiplying the amount of the exposure by the appropriate risk weights, provided in the tables in paragraph CA-6.4.58 and CA-6.4.59.

CA-6.4.54

The risk weights depend on (i) the external rating grade or an available inferred rating, (ii) whether the credit rating (external or inferred) represents a long-term or a short term credit rating, (iii) the granularity of the underlying pool and (iv) the seniority of the position.



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CA-6.4 Treatment of Securitisation Exposures (continued)

CA-6.4.55

For purposes of the RBA, a securitisation exposure is treated as a senior 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 some other claim that, in a technical sense, may be more senior in the waterfall (e.g. a swap claim) but may be disregarded for the purpose of determining which positions are subject to the “senior tranches” column.

CA-6.4.56

Examples:

- (a) In a typical synthetic securitisation, the “super-senior” tranche would be treated as a senior tranche, provided that all of the conditions for inferring a rating from a lower tranche are fulfilled;
- (b) 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. However, when there are several tranches that share the same rating, only the most senior one in the waterfall would be treated as senior; and
- (c) 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 overcollateralization or reserves provided by the seller and as being most senior only 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 other creditors until any liquidity draws were repaid in full. In such a case, the RBA risk weights in the left-most column can be used. If these conditions are not satisfied or for other reasons the liquidity facility constitutes a mezzanine position in economic substance rather than a senior position in the underlying pool, then the “Base risk weights” column is applicable.

CA-6.4.57

The risk weights provided in the table in paragraph CA-6.4.58 apply when the external assessment represents a long-term credit rating, as well as when an inferred rating based on a long-term rating is available.



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CA-6.4 Treatment of Securitisation Exposures (continued)

CA-6.4.58

Banks may apply the risk weights for senior positions if the effective number of underlying exposures (N, as defined in paragraph CA-6.4.77) is 6 or more and the position is senior as defined above. When N is less than 6, the risk weights in column 4 of the first table below apply. In all other cases, the risk weights in column 3 of the first table below apply.

RBA risk weights when the external assessment represents a long-term credit rating and/or an inferred rating derived from a long-term assessment

External Rating (Illustrative)	Risk weights for senior positions and eligible senior IAA exposures	Base risk weights	Risk weights for tranches backed by non-granular pools
AAA	7%	12%	20%
AA	8%	15%	25%
A+	10%	18%	35%
A	12%	20%	
A-	20%	35%	
BBB+	35%	50%	
BBB	60%	75%	
BBB-	100%		
BB+	250%		
BB	425%		
BB-	650%		
Below BB- and unrated	Deduction		



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CA-6.4 Treatment of Securitisation Exposures (continued)

CA-6.4.59

The risk weights in the table below apply when the external assessment represents a short-term credit rating, as well as when an inferred rating based on a short-term rating is available. The decision rules outlined in paragraph CA-6.4.58 also apply for short-term credit ratings.

RBA risk weights when the external assessment represents a short-term credit rating and/or an inferred rating derived from a short-term assessment

External Rating (Illustrative)	Risk weights for senior positions and eligible senior IAA exposures	Base risk weights	Risk weights for tranches backed by non-granular
A-1/P-	7%	12%	2
A-2/P-	12%	20%	3
A-3/P-	60%	75%	7
All other ratings/unrated	Deduction	Deduction	Deduction



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CA-6.4 Treatment of Securitisation Exposures (continued)

Use of Inferred Ratings

CA-6.4.60

When the following minimum operational requirements are satisfied a bank must attribute an inferred rating to an unrated position. These requirements are intended to ensure that the unrated position is senior in all respects to an externally rated securitisation exposure termed the 'reference securitisation exposure'.

Operational Requirements for Inferred Ratings

CA-6.4.61

The following operational requirements must be satisfied to recognise inferred ratings:

- (a) The reference securitisation exposure (e.g. ABS) must 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;
- (b) The maturity of the reference securitisation exposure must be equal to or longer than that of the unrated exposure;
- (c) On an ongoing basis, any inferred rating must be updated continuously to reflect any changes in the external rating of the reference securitisation exposure; and
- (d) The external rating of the reference securitisation exposure must satisfy the general requirements for recognition of external ratings as delineated in paragraph CA-6.4.6.

(v) Internal Assessment Approach (IAA)

CA-6.4.62

A bank may use its internal assessments of the credit quality of the securitisation exposures the bank extends to ABCP programmes (e.g. liquidity facilities and credit enhancements) if the bank's internal assessment process meets the operational requirements 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 RBA for purposes of assigning the notional amounts of the exposures.



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CA-6.4 Treatment of Securitisation Exposures (continued)

CA-6.4.63

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:

- (a) For the unrated exposure to qualify for the IAA, the ABCP must be externally rated. The ABCP itself is subject to the RBA;
- (b) The internal assessment of the credit quality of a securitisation exposure to the ABCP programme must be based on an 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;
- (c) In order for banks to use the IAA, the CBB must be satisfied (i) that the ECAI meets the ECAI eligibility criteria outlined in section CA-3.4 and (ii) with the ECAI rating methodologies used in the process. In addition, banks have the responsibility to demonstrate to the satisfaction of the CBB how these internal assessments correspond with the relevant ECAI's standards. For instance, when calculating the credit enhancement level in the context of the IAA, the CBB 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;
- (d) The bank's internal assessment process must identify gradations of risk. Internal assessments must correspond to the external ratings of ECAIs so that the CBB can determine which internal assessment corresponds to each external rating category of the ECAIs;
- (e) 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 must consider, to some extent, all publicly available ECAI ratings methodologies in developing their internal assessments:



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CA-6.4 Treatment of Securitisation Exposures (continued)

- In the case where (i) the commercial paper issued by an ABCP programme is externally rated by two or more ECAIs and (ii) 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 2 to 3 times historical losses, the bank must use the higher range of stress factors in determining the appropriate level of seller-provided credit enhancement.
- 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.
- A bank cannot utilise an ECAI's rating methodology to derive an internal assessment if the ECAI's process or rating criteria is not publicly available. However, banks must 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.
- 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 the CBB to determine whether the IAA may be applied to the related exposures.



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CA-6.4 Treatment of Securitisation Exposures (continued)

- (f) 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;
- (g) 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;
- (h) The ABCP programme must have credit and investment guidelines, i.e. underwriting standards, for the ABCP programme. In the consideration of an asset purchase, the ABCP programme (i.e. 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;
- (i) 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;
- (j) The ABCP programme's underwriting policy must establish minimum asset eligibility criteria that, among other things:
 - exclude the purchase of assets that are significantly past due or defaulted;
 - limit excess concentration to individual obligor or geographic area; and
 - limit the tenor of the assets to be purchased.



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CA-6.4 Treatment of Securitisation Exposures (continued)

(v) Internal Assessment Approach (IAA) (continued)

- (k) The ABCP programme should have collections 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 co-mingling of funds and impose lockbox arrangements that would help ensure the continuity of payments to the ABCP programme;
- (l) 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 must review several years of historical information, including losses, delinquencies, dilutions, and the turnover rate of the receivables. Furthermore, the bank must evaluate the characteristics of the underlying asset pool, e.g. weighted average credit score, identify any concentrations to an individual obligor or geographic region, and the granularity of the asset pool; and
- (m) 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.

CA-6.4.64

The notional amount of the securitisation exposure to the ABCP programme must be assigned to the risk weight in the RBA appropriate to the credit rating equivalent assigned to the bank's exposure.

CA-6.4.65

If a bank's internal assessment process is no longer considered adequate, the CBB may preclude the bank from applying the internal assessment approach 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 SF or, if not available, to the method described in paragraph CA-6.4.84.



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CA-6.4 Treatment of Securitisation Exposures (continued)

(vi) Supervisory Formula (SF)

CA-6.4.66

As in the IRB approaches, risk-weighted assets generated through the use of the SF are calculated by multiplying the capital charge by 12.5. Under the SF, the capital charge for a securitisation tranche depends on five bank-supplied inputs: the IRB capital charge had the underlying exposures not been securitised (K_{IRB}); the tranche's credit enhancement level (L) and thickness (T); the pool's effective number of exposures (N); and the pool's exposure-weighted average loss-given-default (LGD). The inputs K_{IRB} , L , T and N are defined below.

CA-6.4.67

The capital charge is calculated as follows:

(1) Tranche's IRB capital charge = the amount of exposures that have been securitised times the greater of (a) $0.0056 \times T$, or (b) $(S[L+T] - S[L])$.

Where the function $S[.]$ (termed the 'Supervisory Formula') is defined in the following paragraph. When the bank holds only a proportional interest in the tranche, that position's capital charge equals the prorated share of the capital charge for the entire tranche.

CA-6.4.68

The Supervisory Formula is given by the following expression:
2.

$$S[L] = \begin{cases} L & \text{when } L \leq K_{IRB} \\ K_{IRB} + K[L] - K[K_{IRB}] + (d \cdot K_{IRB} / \omega) \left(1 - e^{-(K_{IRB} - L)/K_{IRB}} \right) & \text{when } K_{IRB} < L \end{cases}$$

Where

$$\begin{aligned} h &= (1 - K_{IRB} / LGD)^N \\ c &= K_{IRB} / (1 - h) \\ v &= \frac{(LGD - K_{IRB}) K_{IRB} + 0.25(1 - LGD) K_{IRB}}{N} \\ f &= \left(\frac{v + K_{IRB}^2}{1 - h} - c^2 \right) + \frac{(1 - K_{IRB}) K_{IRB} - v}{(1 - h) \tau} \\ g &= \frac{(1 - c)c}{f} - 1 \\ a &= g \cdot c \\ b &= g \cdot (1 - c) \\ d &= 1 - (1 - h) \cdot (1 - \text{Beta}[K_{IRB}; a, b]) \\ K[L] &= (1 - h) \cdot ((1 - \text{Beta}[L; a, b])L + \text{Beta}[L; a + 1, b]c). \end{aligned}$$



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CA-6.4 Treatment of Securitisation Exposures (continued)

CA-6.4.69 In these expressions, Beta[L; a, b] refers to the cumulative beta distribution with parameters a and b evaluated at L.⁵⁸

CA-6.4.70 The supervisory-determined parameters in the above expressions are as follows:
 $\tau = 1000$, and $\omega = 20$

Definition of K_{IRB}

CA-6.4.71 K_{IRB} is the ratio of (a) the IRB capital requirement including the EL portion for the underlying exposures in the pool to (b) the exposure amount of the pool (e.g. the sum of drawn amounts related to securitised exposures plus the EAD associated with un-drawn commitments related to securitised exposures). Quantity (a) above must be calculated in accordance with the applicable minimum IRB standards (as set out in Section CA-7.1.7 of this document) 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. K_{IRB} is expressed in decimal form (e.g. a capital charge equal to 15% of the pool would be expressed as 0.15). For structures involving an SPSV, all the assets of the SPSV that are related to the securitisations are to be treated as exposures in the pool, including assets in which the SPSV may have invested a reserve account, such as a cash collateral account.

CA-6.4.72 If the risk weight resulting from the SF is 1250%, banks must deduct the securitisation exposure subject to that risk weight in accordance with paragraphs CA-6.4.2 to CA-6.4.4.

CA-6.4.73 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, quantity (a) defined above and quantity (b) also defined above must be calculated applying the gross amount of the exposure without the specific provision and/or non-refundable purchase price discount. In this case, the amount of the non-refundable purchase price discount on a defaulted asset or the specific provision can be used to reduce the amount of any deduction from capital associated with the securitisation exposure.

⁵⁸ The cumulative beta distribution function is available, for example, in Excel as the function BETADIST.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Credit Enhancement Level (L)

CA-6.4.74

L is measured (in decimal form) as the ratio of (a) the amount of all securitisation exposures subordinate to the tranche in question to (b) the amount of exposures in the pool. Banks must determine L before considering the effects of any tranche-specific credit enhancements, such as third-party guarantees that benefit only a single tranche. Any gain-on-sale and/or credit enhancing I/Os associated with the securitisation are not to be included in the measurement of L. The size of interest rate or currency swaps that are more junior than the tranche in question may be measured at their current values (without the potential future exposures) in calculating the enhancement level. If the current value of the instrument cannot be measured, the instrument should be ignored in the calculation of L.

CA-6.4.75

If there is any reserve account funded by accumulated cash flows from the underlying exposures that is more junior than the tranche in question, this can be included in the calculation of L. Unfunded reserve accounts may not be included if they are to be funded from future receipts from the underlying exposures.

Thickness of Exposure (T)

CA-6.4.76

T is measured as the ratio of (a) the nominal size of the tranche of interest to (b) the notional amount of exposures in the pool. In the case of an exposure arising from an interest rate or currency swap, the bank must incorporate potential future exposure. If the current value of the instrument is non-negative, the exposure size should be measured by the current value plus the add-on as in the previous capital adequacy regulations issued by CBB dated July 2004. If the current value is negative, the exposure should be measured by applying the potential future exposure only.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Effective Number of Exposures (N)

CA-6.4.77

The effective number of exposures is calculated as:

3.

$$N = \frac{\left(\sum_i EAD_i \right)^2}{\sum_i EAD_i^2}$$

CA-6.4.78

where EAD_i represents the exposure-at-default associated with the i^{th} instrument in the pool. Multiple exposures to the same obligor must be consolidated (i.e. treated as a single instrument). In the case of re-securitisation (securitisation of securitisation exposures), the formula applies to the number of securitisation exposures in the pool and not the number of underlying exposures in the original pools. If the portfolio share associated with the largest exposure, C_1 , is available, the bank may compute N as $1/C_1$.

Exposure-weighted Average LGD

CA-6.4.79

The exposure-weighted average LGD is calculated as follows:

4,

$$LGD = \frac{\sum_i LGD_i \cdot EAD_i}{\sum_i EAD_i}$$

where LGD_i represents the average LGD associated with all exposures to the i^{th} obligor. In the case of re-securitisation, an LGD of 100% must be assumed for the underlying securitised exposures. When default and dilution risks for purchased receivables are treated in an aggregate manner (e.g. a single reserve or over-collateralisation 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.



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CA-6.4 Treatment of Securitisation Exposures (continued)

Simplified Method for Computing N and LGD

CA-6.4.80

For securitisations involving retail exposures, subject to CBB review, the SF may be implemented by applying the simplifications: $h = 0$ and $v = 0$.

CA-6.4.81

Under the conditions provided 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 (e.g. a 15% share corresponds to a value of 0.15). The level of m is set by each bank:

- (a) 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 SF, the bank may set $LGD=0.50$ and N equal to the following amount:

$$N = \left(C_1 C_m + \left(\frac{C_m - C_1}{m - 1} \right) \max \{1 - m C_1, 0\} \right)^{-1}$$

5.

- (b) Alternatively, if only C_1 is available and this amount is no more than 0.03, then the bank may set $LGD=0.50$ and $N=1/ C_1$.

(vii) Liquidity Facilities

CA-6.4.82

Liquidity facilities are treated as any other securitisation exposure and receive a CCF of 100% unless specified differently in paragraphs CA-6.4.83 to CA-6.4.86. If the facility is externally rated, the bank may rely on the external rating under the RBA. If the facility is not rated and an inferred rating is not available, the bank must apply the SF, unless the IAA can be applied.

CA-6.4.83

[This Paragraph was deleted in January 2012].



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CA-6.4 Treatment of Securitisation Exposures (continued)

CA-6.4.84 When it is not practical for the bank to use either the bottom-up approach or the top-down approach for calculating K_{IRB} , the bank may, on an exceptional basis and subject to CBB consent, temporarily be allowed to apply the following method. If the liquidity facility meets the definition in paragraph CA-6.4.19 or CA-6.4.22, the highest risk weight assigned under the standardised approach to any of the underlying individual exposures covered by the liquidity facility can be applied to the liquidity facility. If the liquidity facility meets the definition in paragraph CA-6.4.19, the CCF must be 50% for a facility with an original maturity of one year or less, or 100% if the facility has an original maturity of more than one year. If the liquidity facility meets the definition in paragraph CA-6.4.22, the CCF must be 20%. In all other cases, the notional amount of the liquidity facility must be deducted.

(viii) Treatment of Overlapping Exposures

CA-6.4.85 Overlapping exposures are treated as described in paragraph CA-6.4.23.

(ix) Eligible Servicer Cash Advance Facilities

CA-6.4.86 Eligible servicer cash advance facilities are treated as specified in paragraph CA-6.4.24.

(x) Treatment of Credit Risk Mitigation for Securitisation Exposures

CA-6.4.87 As with the RBA, banks are required to apply the CRM techniques as specified in the foundation IRB approach of Section CA-5.2 when applying the SF. The bank may reduce the capital charge proportionally when the credit risk mitigant covers first losses or losses on a proportional basis. For all other cases, the bank must assume that the credit risk mitigant covers the most senior portion of the securitisation exposure (i.e. that the most junior portion of the securitisation exposure is uncovered). Examples for recognising collateral and guarantees under the SF are provided in Appendix CA-8.



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CA-6.4 Treatment of Securitisation Exposures (continued)

(xi) Capital Requirement for Early Amortisation Provisions

CA-6.4.88

An originating bank must use the methodology and treatment described in paragraphs CA-6.4.32 to CA-6.4.47 for determining if any capital must be held against the investors' interest. For banks applying the IRB approach to securitisation, investors' interest is defined as investors' drawn balances related to securitisation exposures and EAD associated with investors' un-drawn lines related to securitisation exposures. For determining the EAD, the un-drawn balances of securitised exposures would be allocated between the seller's and investors' interests on a pro rata basis, based on the proportions of the seller's and investors' shares of the securitised drawn balances. For IRB purposes, the capital charge attributed to the investors' interest is determined by the product of (a) the investors' interest, (b) the appropriate CCF, and (c) K_{IRB} .