Guideline

Subject: Capital Adequacy Requirements (CAR)

Chapter 7 - Settlement and Counterparty Risk

Effective Date: November 2023 / January 2024

Note: For institutions with a fiscal year ending October 31 or December 31, respectively.

The Capital Adequacy Requirements (CAR) for banks (including federal credit unions), bank holding companies, federally regulated trust companies, federally regulated loan companies and cooperative retail associations, collectively referred to as 'institutions', are set out in nine chapters, each of which has been issued as a separate document. This document, Chapter 7 – Settlement and Counterparty Risk, should be read in conjunction with the other CAR chapters. The complete list of CAR chapters is as follows:

Chapter 1	Overview
Chapter 2	Definition of Capital
Chapter 3	Operational Risk
Chapter 4	Credit Risk – Standardized Approach
Chapter 5	Credit Risk – Internal Ratings Based Approach
Chapter 6	Securitization
Chapter 7	Settlement and Counterparty Risk
Chapter 8	Credit Valuation Adjustment (CVA) Risk
Chapter 9	Market Risk

Please refer to OSFI's *Corporate Governance Guideline* for OSFI's expectations of institution Boards of Directors in regard to the management of capital and liquidity.

Table of Contents

7.1. Treatment of counterparty credit risk and cross-product netting 2

7.1. Treatment of counterparty credit risk and cross-product netting.....4

7.1.1 Definitions and general terminology 4

7.1.1.1 *General terms* 4

7.1.1.2 *Transaction types*.....6

7.1.1.3 *Netting sets, hedging sets, and related terms* 6

7.1.1.4 *Distributions* 7

7.1.1.5 *Exposure measures and adjustments*.....8

7.1.1.6 *CCR-related risks* 9

7.1.2 Scope of application.....9

7.1.3 Methods for Computing CCR Exposure.....10

7.1.4 Approval to adopt an internal modelling method to estimate EAD.....12

7.1.5 Internal Model Method: measuring exposure and minimum requirements 13

7.1.5.1 *Exposure amount or EAD under the internal model method* 13

7.1.5.2 *Own estimates for alpha*.....15

7.1.5.3 *Maturity* 15

7.1.5.4 *Margin agreements*.....16

7.1.5.5 *Model validation*.....17

7.1.5.6 *Operational requirements for EPE models* 21

7.1.6 *Cross-product netting rules* 29

7.1.6.1 *Legal Criteria* 29

7.1.6.2 *Operational Criteria*.....30

7.1.7 Standardized Approach for Counterparty Credit Risk.....30

7.1.7.1 *RC and NICA*.....31

7.1.7.2 *PFE Add-ons* 35

7.1.7.3 *Recognition of excess collateral and negative mark-to-market* 35

7.1.7.4 *Aggregation across asset classes* 36

7.1.7.5 *Allocation of derivative transactions to one or more asset classes*.....36

7.1.7.6 *General steps for calculating the add-on* 37

7.1.7.7 *Time Period Parameters Mi, Ei, Si, and Ti* 38

7.1.7.8 Trade-level Adjusted Notional (for trade I): di 39
7.1.7.9 Supervisory delta adjustments: δi 42
7.1.7.10 Supervisory Factors: SF_i 44
7.1.7.11 Hedging Sets 44
7.1.7.12 Maturity Factors 45
7.1.7.13 Supervisory correlation parameters: ρi(a) 47
7.1.7.14 Add-on for interest rate derivatives 47
7.1.7.15 Add-on for foreign exchange derivatives 48
7.1.7.16 Add-on for credit derivatives 49
7.1.7.17 Add-on for equity derivatives 50
7.1.7.18 Add-on for commodity derivatives 52
7.1.7.19 Treatment of multiple margin agreements and multiple netting sets 54
7.1.7.20 Treatment of trades subject to Specific Wrong-Way Risk and Specific Right-Way Risk 56
7.1.8 Central Counterparties 56
7.1.8.1 Exposures to Qualifying CCPs 57
7.1.8.2 Exposures to Non-qualifying CCPs 66
7.2. Capital treatment for failed trades and non-DvP transactions 66
7.2.1 Overarching principles 67
7.2.2 Capital requirements 68

Chapter 7 – Settlement and Counterparty Risk

1. This chapter is drawn from the Basel Committee on Banking Supervision (BCBS) Basel framework, published on the BIS website,[1] effective December 15, 2019. For reference, the Basel paragraph numbers that are associated with the text appearing in this chapter are indicated in square brackets at the end of each paragraph.[2]

7.1. Treatment of counterparty credit risk and cross-product netting

2. This rule identifies permissible methods for estimating the Exposure at Default (EAD) or the exposure amount for instruments with counterparty credit risk under this guideline.[3] Institutions may seek OSFI approval to make use of an Internal Modelling Method (IMM) meeting the requirements and specifications identified herein. As an alternative institutions may also use the Standardized Approach for Counterparty Credit Risk (SA-CCR). [Basel Framework, CRE 53.1]

7.1.1 Definitions and general terminology

3. This section defines terms that will be used throughout this chapter.

7.1.1.1 General terms

- **Counterparty Credit Risk (CCR)** is the risk that the counterparty to a transaction could default before the final settlement of the transaction's cash flows. An economic loss would occur if the transactions or portfolio of transactions with the counterparty has a positive economic value at the time of default. Unlike an institution's exposure to credit risk through a loan, where the exposure to credit risk is unilateral and only the lending institution faces the risk of loss, CCR creates a bilateral risk of loss: the market value of the transaction can be positive or negative to either counterparty to the transaction. The market value is uncertain and can vary over time with the movement of underlying market factors.
- A **central counterparty** (CCP) is a clearing house that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the future performance of open contracts. A CCP becomes a counterparty to trades with market participants through novation, an open offer system, or another legally binding arrangement. For the purposes of the capital framework, a CCP is a financial institution.
- A **qualifying central counterparty** (QCCP) is an entity that is licensed to operate as a CCP (including a license granted by way of confirming an exemption), and is permitted by the appropriate regulator/overseer to operate as such with respect to the products

[1] The Basel Framework
[2] Following the format: [Basel Framework XXX yy.zz].
[3] In this document, the terms "exposure at default" and "exposure amount" are used together in order to identify measures of exposure under both an internal ratings-based (IRB) and a standardized approach for credit risk.

offered. This is subject to the provision that the CCP is based and prudentially supervised in a jurisdiction where the relevant regulator/overseer has established, and publicly indicated that it applies to the CCP on an ongoing basis, domestic rules and regulations that are consistent with the CPSS-IOSCO Principles for Financial Market Infrastructures.

Where the CCP is in a jurisdiction that does not have a CCP regulator applying the Principles to the CCP, then OSFI may make the determination of whether the CCP meets this definition.

In addition, for a CCP to be considered as a QCCP, the requirements in paragraph 204 must be met to permit each clearing member institution to calculate its capital requirement for its default fund contributions.

- A **clearing member** is a member of, or a direct participant in, a CCP that is entitled to enter into a transaction with the CCP, regardless of whether it enters into trades with a CCP for its own hedging, investment or speculative purposes or whether it also enters into trades as a financial intermediary between the CCP and other market participants.[4]
- A **client** is a party to a transaction with a CCP through either a clearing member acting as a financial intermediary, or a clearing member guaranteeing the performance of the client to the CCP.
- **Initial margin** means a clearing member's or client's funded collateral posted to the CCP to mitigate the potential future exposure of the CCP to the clearing member arising from the possible future change in the value of their transactions. For the purposes of the calculation of counterparty credit risk capital requirements, initial margin does not include contributions to a CCP for mutualized loss sharing arrangements (i.e., in case a CCP uses initial margin to mutualize losses among the clearing members, it will be treated as a default fund exposure). Initial margin may include excess collateral, in cases where the CCP may prevent the clearing member and the clearing member may prevent the client from withdrawing the excess.
- **Variation margin** means a clearing member's or client's funded collateral posted on a daily or intraday basis to a CCP based upon price movements of their transactions.
- **Trade exposures** (in section 7.1.8) include the current[5] and potential future exposure of a clearing member or a client to a CCP arising from OTC derivatives, exchange traded derivatives transactions or securities financing transactions (SFTs), as well as initial margin.
- **Default funds**, also known as clearing deposits or guaranty fund contributions (or any other names), are clearing members' funded or unfunded contributions towards, or underwriting of, a CCP's mutualized loss sharing arrangements. The description given by

[4] For the purposes of this chapter, where a CCP has a link to a second CCP, that second CCP is to be treated as a clearing member of the first CCP. Whether the second CCP's collateral contribution to the first CCP is treated as initial margin or a default fund contribution will depend upon the legal arrangement between the CCPs. OSFI should be consulted to determine the treatment of this initial margin and default fund contributions.

[5] For the purposes of this definition, the current exposure of a clearing member includes the variation margin due to the clearing member but not yet received.

a CCP to its mutualized loss sharing arrangements is not determinative of its status as a default fund; rather, the substance of such arrangements will govern its status.

- **Offsetting transaction** means the transaction leg between the clearing member and the CCP when the clearing member acts on behalf of a client (e.g., when a clearing member clears or novates a client's trade).
- A **multi-level client structure** is one in which institutions can centrally clear as indirect clients; that is, when clearing services are provided to the institution by an institution which is not a direct clearing member, but is itself a client of a clearing member or another clearing client. For exposures between clients and clients of clients, we use the term "**higher-level client**" for the institution providing clearing services; and the term "**lower level client**" for the institution clearing through that client.

[Basel Framework, CRE 50.6]

7.1.1.2 Transaction types

- **Long Settlement Transactions** are transactions where a counterparty undertakes to deliver a security, a commodity, or a foreign exchange amount against cash, other financial instruments, or commodities, or vice versa, at a settlement or delivery date that is contractually specified as more than the lower of the market standard for this particular instrument and five business days after the date on which the institution enters into the transaction.
- **Securities Financing Transactions (SFTs)** are transactions such as repurchase agreements, reverse repurchase agreements, security lending and borrowing, and margin lending transactions, where the value of the transactions depends on market valuations and the transactions are often subject to margin agreements.
- **Margin Lending Transactions** are transactions in which an institution extends credit in connection with the purchase, sale, carrying or trading of securities. Margin lending transactions do not include other loans that happen to be secured by securities collateral. Generally, in margin lending transactions, the loan amount is collateralized by securities whose value is greater than the amount of the loan.

[Basel Framework, CRE 50.14]

7.1.1.3 Netting sets, hedging sets, and related terms

- **Netting Set** is a group of transactions with a single counterparty that are subject to a legally enforceable bilateral netting arrangement and for which netting is recognized for regulatory capital purposes under Chapter 4 or the Cross-Product Netting Rules set forth in this chapter. Each transaction that is not subject to a legally enforceable bilateral netting arrangement that is recognized for regulatory capital purposes should be interpreted as its own netting set for the purpose of these rules.
- **Hedging Set** is a set of transactions within a single netting set within which full or partial offsetting is recognized for purposes of calculating the potential future exposure (PFE) add-on of the SA-CCR. .

- **Margin Agreement** is a contractual agreement or provisions to an agreement under which one counterparty must supply collateral to a second counterparty when an exposure of that second counterparty to the first counterparty exceeds a specified level.
- **Margin Threshold** is the largest amount of an exposure that remains outstanding until one party has the right to call for collateral.
- **Margin Period of Risk** is the time period from the last exchange of collateral covering a netting set of transactions with a defaulting counterpart until that counterpart is closed out and the resulting market risk is re-hedged.
- **Effective Maturity under the Internal Model Method** for a netting set with maturity greater than one year is the ratio of the sum of expected exposure over the life of the transactions in a netting set discounted at the risk-free rate of return divided by the sum of expected exposure over one year in a netting set discounted at the risk-free rate. This effective maturity may be adjusted to reflect rollover risk by replacing expected exposure with effective expected exposure for forecasting horizons under one year. The formula is given in paragraph 35.
- **Cross-Product Netting** refers to the inclusion of transactions of different product categories within the same netting set pursuant to the Cross-Product Netting Rules set out in this chapter.
- **Current Market Value (CMV)** refers to the net market value of the portfolio of transactions within the netting set with the counterparty. Both positive and negative market values are used in computing CMV.

[Basel Framework, CRE 50.15]

7.1.1.4 Distributions

- **Distribution of Market Values** is the forecast of the probability distribution of net market values of transactions within a netting set for some future date (the forecasting horizon) given the realized market value of those transactions up to the present time.
- **Distribution of Exposures** is the forecast of the probability distribution of market values that is generated by setting forecast instances of negative net market values equal to zero (this takes account of the fact that, when the institution owes the counterparty money, the institution does not have an exposure to the counterparty).
- **Risk-Neutral Distribution** is a distribution of market values or exposures at a future time period where the distribution is calculated using market implied values such as implied volatilities.
- **Actual Distribution** is a distribution of market values or exposures at a future time period where the distribution is calculated using historic or realized values such as volatilities calculated using past price or rate changes.

[Basel Framework, CRE 50.22 to 50.25]

7.1.1.5 Exposure measures and adjustments

- **Current Exposure** is the larger of zero, or the market value of a transaction or portfolio of transactions within a netting set with a counterparty that would be lost upon the default of the counterparty, assuming no recovery on the value of those transactions in bankruptcy. Current exposure is often also called Replacement Cost.
- **Peak Exposure** is a high percentile (typically 95% or 99%) of the distribution of exposures at any particular future date before the maturity date of the longest transaction in the netting set. A peak exposure value is typically generated for many future dates up until the longest maturity date of transactions in the netting set.
- **Expected Exposure** is the mean (average) of the distribution of exposures at any particular future date before the longest-maturity transaction in the netting set matures. An expected exposure value is typically generated for many future dates up until the longest maturity date of transactions in the netting set.
- **Effective Expected Exposure** at a specific date is the maximum expected exposure that occurs at that date or any prior date. Alternatively, it may be defined for a specific date as the greater of the expected exposure at that date, or the effective exposure at the previous date. In effect, the Effective Expected Exposure is the Expected Exposure that is constrained to be non-decreasing over time.
- **Expected Positive Exposure (EPE)** is the weighted average over time of expected exposures where the weights are the proportion that an individual expected exposure represents of the entire time interval. When calculating the minimum capital requirement, the average is taken over the first year or, if all the contracts in the netting set mature before one year, over the time period of the longest-maturity contract in the netting set.
- **Effective Expected Positive Exposure (Effective EPE)** is the weighted average over time of effective expected exposure over the first year, or, if all the contracts in the netting set mature before one year, over the time period of the longest-maturity contract in the netting set where the weights are the proportion that an individual expected exposure represents of the entire time interval.
- **Credit Valuation Adjustment** is an adjustment to the mid-market valuation of the portfolio of trades with a counterparty. This adjustment reflects the market value of the credit risk due to any failure to perform on contractual agreements with a counterparty. This adjustment may reflect the market value of the credit risk of the counterparty or the market value of the credit risk of both the institution and the counterparty.
- **One-Sided Credit Valuation Adjustment** is a credit valuation adjustment that reflects the market value of the credit risk of the counterparty to the firm, but does not reflect the market value of the credit risk of the institution to the counterparty.
- **Debit Valuation Adjustment** is a valuation adjustment that reflects the market value of the credit risk of the institution to the counterparty (i.e. changes in the reporting institution's own credit risk), but does not reflect the market value of the credit risk of the counterparty to the institution. [Added by OSFI]

[Basel Framework, CRE 50.26 to 50.33]

7.1.1.6 CCR-related risks

- **Rollover Risk** is the amount by which expected positive exposure is understated when future transactions with a counterpart are expected to be conducted on an ongoing basis, but the additional exposure generated by those future transactions is not included in calculation of expected positive exposure.
- **General Wrong-Way Risk** arises when the probability of default of counterparties is positively correlated with general market risk factors.
- **Specific Wrong-Way Risk** arises when the exposure to a particular counterpart is positively correlated with the probability of default of the counterparty due to the nature of the transactions with the counterparty.

[Basel Framework, CRE 50.34 to 50.36]

7.1.2 Scope of application

4. Banks must calculate a counterparty credit risk charge for all exposures that give rise to counterparty credit risk, with the exception of those transactions listed in paragraphs 10 and 11 below. The categories of transaction that give rise to counterparty credit risk are:

- OTC Derivatives;
- Exchange-traded derivatives (ETDs)
- Long Settlement transactions; and
- Securities Financing Transactions (SFTs)

[Basel Framework, CRE 51.4]

5. Such instruments generally exhibit the following abstract characteristics:

- the transactions generate a current exposure or market value;
- the transactions have an associated random future market value based on market variables;
- the transactions generate an exchange of future payments or an exchange of a financial instrument (including commodities) against payment;
- the transactions are undertaken with an identified counterparty against which a unique probability of default can be determined.[6]

[Basel Framework, CRE 51.5]

[6] Transactions for which the probability of default is defined on a pooled basis are not included in this treatment of CCR.

6. Other common characteristics of the transactions to be covered may include the following:

- collateral may be used to mitigate risk exposure and is inherent in the nature of some transactions;
- short-term financing may be a primary objective in that the transactions mostly consist of an exchange of one asset for another (cash or securities) for a relatively short period of time, usually for the business purpose of financing. The two sides of the transactions are not the result of separate decisions but form an indivisible whole to accomplish a defined objective;
- netting may be used to mitigate the risk;
- positions are frequently valued (most commonly on a daily basis), according to market variables.
- remargining may be employed.

[Basel Framework, CRE 51.6]

7.1.3 Methods for Computing CCR Exposure

7. For the transaction types listed in paragraph 4 above, banks must calculate their counterparty credit risk exposure, or exposure at default (EAD),[7] using one of the methods set out in paragraphs 8 to 9 below. The methods vary according to the type of the transaction, the counterparty to the transaction, and whether the bank has received supervisory approval to use the method (if such approval is required). [Basel Framework, CRE 51.7]

8. For exposures that are not cleared through a central counterparty (CCP) the following methods must be used to calculate the counterparty credit risk exposure:

(1) The standardized approach for measuring counterparty credit risk exposures (SA-CCR), which is set out in section 7.1.7. This method is to be used for exposures arising from OTC derivatives, exchange-traded derivatives and long settlement transactions. This method must be used if the bank does not have approval to use the internal model method (IMM).

(2) The simple approach or comprehensive approach to the recognition of collateral, which are both set out in the credit risk mitigation section of the standardized approach to credit risk (see Chapter 4, section 4.3). These methods are to be used for securities financing transactions (SFTs) and must be used if the bank does not have approval to use the value-at-risk (VaR) models or the IMM.

[7] The terms "exposure" and "EAD" are used interchangably in the counterparty credit risk chapters of the credit risk standard. This reflects the fact that the amounts calculated under the counterparty credit risk rules must typically be used as either the "exposure" within the standardized approach to credit risk, or the EAD within the internal ratings-based (IRB) approach to credit risk, as described in paragraph 13.

(3) The VaR models approach, which is set out in Chapter 4, section 4.3. The VaR models approach may be used to calculate EAD for SFTs, subject to supervisory approval, as an alternative to the method set out in (2) above.

(4) The IMM, which is set out in 7.1.5. This method may be used, subject to supervisory approval, as an alternative to the methods to calculate counterparty credit risk exposures set out in (1) and (2) above (for all of the exposures referenced in those bullets).
[Basel Framework, CRE 51.8]

9. For exposures that are cleared through a CCP, banks must apply the method set out in section 7.1.8. This method covers:

(1) the exposures of a bank to a CCP when the bank is a clearing member of the CCP;

(2) the exposures of a bank to its clients, when the bank is a clearing member and acts as an intermediary between the client and the CCP; and

(3) the exposures of a bank to a clearing member of a CCP, when the bank is a client of the clearing member and the clearing member is acting as an intermediary between the bank and the CCP. [Basel Framework, CRE 51.8]

10. Exposures arising from the settlement of cash transactions (equities, fixed income, spot FX and spot commodities) are not subject to this treatment.[8] The settlement of cash transactions remains subject to the treatment described in section 7.2. [Basel Framework, CRE 51.10]

11. As an exception to the requirements of paragraph 4 above, banks are not required to calculate a counterparty credit risk charge for the following types of transactions (i.e. the exposure amount or EAD for counterparty credit risk for the transaction will be zero):

(1) Credit derivative protection purchased by the bank against a banking book exposure, or against a counterparty credit risk exposure. In such cases, the bank will determine its capital requirement for the hedged exposure according to the criteria and general rules for the recognition of credit derivatives within the standardized approach or IRB approach to credit risk (i.e. substitution approach).

(2) Sold credit default swaps in the banking book where they are treated in the framework as a guarantee provided by the bank and subject to a credit risk charge for the full notional amount. [Basel Framework, CRE 51.16]

12. Under the methods outlined above, the exposure amount or EAD for a given counterparty is equal to the sum of the exposure amounts or EADs calculated for each netting set

[8] For contributions to prepaid default funds covering settlement-risk-only products, the applicable risk weight is 0%.

with that counterparty,[9] subject to the exception outlined in paragraph 13. [Basel Framework, CRE 51.11]

13. The exposure or EAD for a given OTC derivative counterparty is defined as the greater of zero, and the difference between the following: the sum of EADs across all netting sets with the counterparty, and the credit valuation adjustment (CVA) for that counterparty which has already been recognized by the bank as an incurred write-down (i.e., a CVA loss). This CVA loss is calculated without taking into account any offsetting debit valuation adjustments or funding valuation adjustments deducted from capital under Chapter 2 of this guideline. This reduction of EAD by incurred CVA losses does not apply to the determination of the CVA risk capital requirement. [Basel Framework, CRE 51.13]

14. RWAs for a given OTC derivative counterparty may be calculated as the applicable risk weight under the standardized or IRB approach multiplied by the outstanding EAD of the counterparty. [Basel Framework, CRE 51.12]

7.1.4 Approval to adopt an internal modelling method to estimate EAD

15. An institution (meaning the individual legal entity or a group) that wishes to adopt an internal modelling method to measure exposure or EAD for regulatory capital purposes must seek OSFI approval. IMM is available both for institutions that adopt the internal ratings-based approach to credit risk and for institutions for which the standardized approach to credit risk applies to all of their credit risk exposures. Only institutions subject to the market risk rules of Chapter 9 of this guideline are permitted to apply for the use of the IMM. The institution must meet all of the requirements given in section 7.1.5. [Basel Framework, CRE 53.1]

16. An institution may also choose to adopt an internal modelling method to measure CCR for regulatory capital purposes for its exposures or EAD to only OTC derivatives, to only SFTs, or to both, subject to the appropriate recognition of netting specified below in section 7.1.6. The institution must apply the method to all relevant exposures within that category, except for those that are immaterial in size and risk. During the initial implementation of the internal models method, an institution may use the SACCR for a portion of its business. The institution must submit a plan to OSFI to bring all material exposures for that category of transactions under the IMM. [Basel Framework, CRE 53.2]

17. For all OTC derivative transactions and for all long settlement transactions for which an institution has not received OSFI approval to use the internal models method, the institution must use the SA-CCR. [Basel Framework, CRE 53.3]

18. Exposures or EAD arising from long settlement transactions can be determined using either of the methods identified in this guideline regardless of the methods chosen for treating OTC derivatives and SFTs. In computing capital requirements for long settlement transactions, institutions that hold permission to use the internal ratings-based approach may opt to apply the

[9] Where a single margin agreement applies to multiple netting sets and the SA-CCR is used, refer to paragraphs 166 to 167.

risk weights under the standardized approach for credit risk on a permanent basis and irrespective to the materiality of such positions. [Basel Framework, CRE 53.4]

19. After adoption of the internal model method, the institution must comply with the above requirements on a permanent basis. Only under exceptional circumstances or for immaterial exposures can an institution revert to the SA-CCR for all or part of its exposure. In all cases, the institution must obtain approval from OSFI to do so and demonstrate that reversion to a less sophisticated method does not lead to an arbitrage of the regulatory capital rules. [Basel Framework, CRE 53.5]

7.1.5 Internal Model Method: measuring exposure and minimum requirements

7.1.5.1 Exposure amount or EAD under the internal model method

20. CCR exposure or EAD is measured at the level of the netting set as defined in sections 7.1.1 and 7.1.6. A qualifying internal model for measuring counterparty credit exposure must specify the forecasting distribution for changes in the market value of the netting set attributable to changes in market variables, such as interest rates, foreign exchange rates, etc. The model then computes the firm's CCR exposure for the netting set at each future date given the changes in the market variables. For margined counterparties, the model may also capture future collateral movements. Institutions may include eligible financial collateral as defined in section 4.3.3 and Chapter 9 in their forecasting distributions for changes in the market value of the netting set, if the quantitative, qualitative and data requirements for internal model method are met for the collateral. [Basel Framework, CRE 53.6]

21. To determine the default risk capital charge for counterparty credit risk for exposures subject to the IMM, institutions must use the greater of the portfolio-level capital charge (not including the CVA charge in Chapter 8) based on Effective EPE using current market data and the portfolio-level capital charge based on Effective EPE using a stress calibration. The stress calibration should be a single consistent stress calibration for the whole portfolio of counterparties. The greater of Effective EPE using current market data and the stress calibration should be applied on a total portfolio level and not on a counterparty by counterparty basis. [Basel Framework, CRE 53.7]

22. OSFI expects institutions to have in place a policy for verifying the adequacy of, and updating, their choice of stress period. This policy would have to be approved in advance by OSFI as part of the IMM model approval process. Changes to this policy would constitute a major modification of the IMM model.

23. To the extent that an institution recognizes collateral in exposure amount or EAD via current exposure, an institution would not be permitted to recognize the benefits in its estimates of LGD. As a result, the institution would be required to use an LGD of an otherwise similar uncollateralized facility. In other words, it would be required to use an LGD that does not include collateral that is already included in EAD. [Basel Framework, CRE 53.8]

24. Under the IMM, the institution need not employ a single model. Although the following text describes an internal model as a simulation model, no particular form of model is required.

Analytical models are acceptable so long as they are subject to OSFI review, meet all of the requirements set forth in this section and are applied to all material exposures subject to a CCR-related capital charge as noted above, with the exception of long settlement transactions, which are treated separately, and with the exception of those exposures that are immaterial in size and risk. [Basel Framework, CRE 53.9]

25. Expected exposure or peak exposure measures should be calculated based on a distribution of exposures that accounts for the possible non-normality of the distribution of exposures, including the existence of leptokurtosis ("fat tails"), where appropriate. [Basel Framework, CRE 53.10]

26. When using an internal model, exposure amount or EAD is calculated as the product of alpha times Effective EPE, as specified below (except for counterparties that have been identified as having explicit specific wrong-way risk or specific right-way risk – see paragraph 65):

$$\text{EAD} = \alpha \times \text{Effective EPE} \qquad (1)$$

[Basel Framework, CRE 53.11]

27. Effective EPE ("Expected Positive Exposure") is computed by estimating expected exposure (EE_t) as the average exposure at future date t, where the average is taken across possible future values of relevant market risk factors, such as interest rates, foreign exchange rates, etc. The internal model estimates EE as a series of future dates t_1, t_2, t_3…[10]. Specifically, "Effective EE" is computed recursively, where the current date is denoted as t_0 and Effective EE_{t0} equals current exposure:

$$\text{Effective } EE_{tk} = \max(\text{Effective } EE_{tk-1}, EE_{tk}) \qquad (2)$$

where the current date is denoted as t_0 and Effective EE_{t0} equals current exposure. [Basel Framework, CRE 53.12]

28. In this regard, "Effective EPE" is the average Effective EE during the first year of future exposure. If all contracts in the netting set mature before one year, EPE is the average of expected exposure until all contracts in the netting set mature. Effective EPE is computed as a weighted average of Effective EE:

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

where the weights $\Delta t_k = t_k - t_{k-1}$ allows for the case when future exposure is calculated at dates that are not equally spaced over time.

[10] In theory, the expectations should be taken with respect to the actual probability distribution of future exposure and not the risk-neutral one. OSFI recognizes that practical considerations may make it more feasible to use the risk-neutral one. As a result, OSFI will not mandate which kind of forecasting distribution to employ.

[Basel Framework, CRE 53.13]

29. Alpha (α) is set equal to 1.4. [Basel Framework, CRE 53.14]

30. OSFI retains discretion to require a higher alpha based on a firm's CCR exposures. Factors that may require a higher alpha include the low granularity of counterparties; particularly high exposures to general wrong-way risk; particularly high correlation of market values across counterparties; and other institution-specific characteristics of CCR exposures. [Basel Framework, CRE 53.15]

7.1.5.2 *Own estimates for alpha*

31. Institutions may seek OSFI approval to compute internal estimates of alpha subject to a floor of 1.2, where alpha equals the ratio of economic capital from a full simulation of counterparty exposure across counterparties (numerator) and economic capital based on EPE (denominator), assuming they meet certain operating requirements. Eligible institutions must meet all the operating requirements for internal estimates of EPE and must demonstrate that their internal estimates of alpha capture in the numerator the material sources of stochastic dependency of distributions of market values of transactions or of portfolios of transactions across counterparties (e.g. the correlation of defaults across counterparties and between market risk and default). [Basel Framework, CRE 53.16]

32. In the denominator, EPE must be used as if it were a fixed outstanding loan amount. [Basel Framework, CRE 53.17]

33. To this end, institutions must ensure that the numerator and denominator of alpha are computed in a consistent fashion with respect to the modelling methodology, parameter specifications and portfolio composition. The approach used must be based on the firm's internal economic capital approach, be well-documented and be subject to independent validation. In addition, institutions must review their estimates on at least a quarterly basis, and more frequently when the composition of the portfolio varies over time. Institutions must assess the model risk given the significant variation in estimates of alpha can arise from the possibility for mis-specification in the models used for the numerator, especially where convexity is present. The assessment of model risk must be part of the independent model validation and approval process and model performance monitoring. [Basel Framework, CRE 53.18]

34. Where appropriate, volatilities and correlations of market risk factors used in the joint simulation of market and credit risk should be conditioned on the credit risk factor to reflect potential increases in volatility or correlation in an economic downturn. Internal estimates of alpha should take account of the granularity of exposures. [Basel Framework, CRE 53.19]

7.1.5.3 *Maturity*

35. If the original maturity of the longest-dated contract contained in the set is greater than one year, the formula for effective maturity (M) in Chapter 5 is replaced with the following:

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

where df_k is the risk-free discount factor for future time period t_k and the remaining symbols are defined above. Similar to the treatment under corporate exposures, M has a cap of five years.[11]
[Basel Framework, CRE 53.20]

36. For netting sets in which all contracts have an original maturity of less than one year, the formula for effective maturity (M) in Chapter 5 is unchanged and a floor of one year applies, with the exception of short-term exposures as described in Chapter 5 - Internal Ratings Based Approach, section 5.4.1 (iv). [Basel Framework, CRE 53.21]

37. For derivative contracts subject to paragraph 65 (SWWR) and structured such that on specified dates any outstanding exposure is settled and the terms are reset so that the fair value of the contract is zero, the remaining maturity equals the time until the next reset date.

7.1.5.4 Margin agreements

38. If the netting set is subject to a margin agreement and the internal model captures the effects of margining when estimating EE, the model's EE measure may be used directly in equation (2). Such models are noticeably more complicated than models of EPE for unmargined counterparties. As such, they are subject to a higher degree of supervisory scrutiny before they are approved, as discussed below. [Basel Framework, CRE 53.22]

39. An EPE model must also include transaction-specific information in order to capture the effects of margining. It must take into account both the current amount of margin and margin that would be passed between counterparties in the future. Such a model must account for the nature of margin agreements (unilateral or bilateral), the frequency of margin calls, the margin period of risk, the thresholds of unmargined exposure the institution is willing to accept, and the minimum transfer amount. Such a model must either model the mark-to-market change in the value of collateral posted or apply this guideline's rules for collateral. [Basel Framework, CRE 53.23]

40. For transactions subject to daily re-margining and mark-to-market valuation, a supervisory floor of five business days for netting sets consisting only of repo-style transactions, and 10 business days for all other netting sets is imposed on the margin period of risk used for the purpose of modelling EAD with margin agreements. In the following cases a higher supervisory floor is imposed:

[11] Conceptually, M equals the effective credit duration of the counterparty exposure. A bank that uses an internal model to calculate a one-sided credit valuation adjustment (CVA) can use the effective credit duration estimated by such a model in place of the above formula with prior approval of OSIF.

- for all netting sets where the number of trades exceeds 5,000 at any point during a quarter, a supervisory floor of 20 business days is imposed for the margin period of risk for the following quarter;
- for netting sets containing one or more trades involving either illiquid collateral, or an OTC derivative that cannot be easily replaced, a supervisory floor of 20 business days is imposed for the margin period of risk. For these purposes, "Illiquid collateral" and "OTC derivatives that cannot be easily replaced" must be determined in the context of stressed market conditions and will be characterized by the absence of continuously active markets where a counterparty would, within two or fewer days, obtain multiple price quotations that would not move the market or represent a price reflecting a market discount (in the case of collateral) or premium (in the case of an OTC derivative). Examples of situations where trades are deemed illiquid for this purpose include, but are not limited to, trades that are not marked daily and trades that are subject to specific accounting treatment for valuation purposes (e.g., OTC derivatives or repo-style transactions referencing securities whose fair value is determined by models with inputs that are not observed in the market).
- in addition, an institution must consider whether trades or securities it holds as collateral are concentrated in a particular counterparty and if that counterparty exited the market precipitously whether the institution would be able to replace its trades.

[Basel Framework, CRE 53.24]

41. If an institution has experienced more than two margin call disputes on a particular netting set over the previous two quarters that have lasted longer than the applicable margin period of risk (before consideration of this provision), then the institution must reflect this history appropriately by using a margin period of risk that is at least double the supervisory floor for that netting set for the subsequent two quarters. In the case of derivatives subject to Guideline E-22, this paragraph only applies to variation margin call disputes. [Basel Framework, CRE 53.25]

42. For re-margining with a periodicity of N-days, the margin period of risk should be at least equal to the supervisory floor, F, plus the N days minus one day. That is,

Margin Period of Risk = F + N - 1.

[Basel Framework, CRE 53.26]

43. Institutions using the IMM must not capture the effect of a reduction of EAD due to any clause in a collateral agreement that requires receipt of collateral when counterparty credit quality deteriorates. [Basel Framework, CRE 53.27]

7.1.5.5 *Model validation*

44. In order to assure itself that institutions using models have counterparty credit risk management systems that are conceptually sound and implemented with integrity, OSFI will specify a number of qualitative criteria that institutions would have to meet before they are

permitted to use a models-based approach. The extent to which institutions meet the qualitative criteria may influence the level at which OSFI will set the multiplication factor referred to in paragraph 29 (Alpha). Only those institutions in full compliance with the qualitative criteria will be eligible for application of the minimum multiplication factor. The qualitative criteria include:

- the institution must conduct a regular programme of backtesting, i.e., an ex-post comparison of the risk measures[12] generated by the model against realized risk measures, as well as comparing hypothetical changes based on static positions with realized measures;
- the institution must carry out an initial validation and an ongoing periodic review of its IMM model and the risk measures generated by it. The validation and review must be independent of the model developers;
- senior management should be actively involved in the risk control process and must regard credit and counterparty credit risk control as an essential aspect of the business to which significant resources need to be devoted. In this regard, the daily reports prepared by the independent risk control unit must be reviewed by a level of management with sufficient seniority and authority to enforce both reductions of positions taken by individual traders and reductions in the institution's overall risk exposure;
- the institution's internal risk measurement exposure model must be closely integrated into the day-to-day risk management process of the institution. Its output should accordingly be an integral part of the process of planning, monitoring and controlling its counterparty credit risk profile;
- the risk measurement system should be used in conjunction with internal trading and exposure limits. In this regard, exposure limits should be related to the institution's risk measurement model in a manner that is consistent over time and that is well understood by traders, the credit function and senior management;
- institutions should have a routine in place for ensuring compliance with a documented set of internal policies, controls and procedures concerning the operation of the risk measurement system. The institution's risk measurement system must be well documented, for example, through a risk management manual that describes the basic principles of the risk management system and that provides an explanation of the empirical techniques used to measure counterparty credit risk;
- an independent review of the risk measurement system should be carried out regularly in the institution's own internal auditing process. This review should include both the activities of the business trading units and of the independent risk control unit. A review of the overall risk management process should take place at regular intervals (ideally no less than once a year) and should specifically address, at a minimum:
    - the adequacy of the documentation of the risk management system and process;

[12] "Risk measures" refers not only to Effective EPE, the risk measure used to derive regulatory capital, but also to the other risk measures used in the calculation of Effective EPE such as the exposure distribution at a series of future dates, the positive exposure distribution at a series of future dates, the market risk factors used to derive those exposures and the values of the constituent trades of a portfolio.

- the organization of the risk control unit;
- the integration of counterparty credit risk measures into daily risk management;
- the approval process for counterparty credit risk models used in the calculation of counterparty credit risk used by front office and back office personnel;
- the validation of any significant change in the risk measurement process;
- the scope of counterparty credit risks captured by the risk measurement model;
- the integrity of the management information system;
- the accuracy and completeness of position data;
- the verification of the consistency, timeliness and reliability of data sources used to run internal models, including the independence of such data sources;
- the accuracy and appropriateness of volatility and correlation assumptions;
- the accuracy of valuation and risk transformation calculations; and
- the verification of the model's accuracy as described in paragraphs 45 to 48.

- the ongoing validation of counterparty credit risk models, including backtesting, must be reviewed periodically by a level of management with sufficient authority to decide the course of action that will be taken to address weaknesses in the models.

[Basel Framework, CRE 53.28]

45. Institutions must document the process for initial and ongoing validation of their IMM model to a level of detail that would enable a third party to recreate the analysis. Institutions must also document the calculation of the risk measures generated by the models to a level of detail that would allow a third party to re-create the risk measures. This documentation must set out the frequency with which backtesting analysis and any other ongoing validation will be conducted, how the validation is conducted with respect to data flows and portfolios and the analyses that are used. [Basel Framework, CRE 53.29]

46. Institutions must define criteria with which to assess their EPE models and the models that input into the calculation of EPE and have a written policy in place that describes the process by which unacceptable performance will be determined and remedied. [Basel Framework, CRE 53.30]

47. Institutions must define how representative counterparty portfolios are constructed for the purposes of validating an EPE model and its risk measures. [Basel Framework, CRE 53.31]

48. When validating EPE models and its risk measures that produce forecast distributions, validation must assess more than a single statistic of the model distribution. [Basel Framework, CRE 53.32]

49. As part of the initial and ongoing validation of an IMM model and its risk measures, the following requirements must be met:

- an institution must carry out backtesting using historical data on movements in market risk factors prior to OSFI approval. Backtesting must consider a number of distinct prediction time horizons out to at least one year, over a range of various start (initialization) dates and covering a wide range of market conditions;
- institutions must backtest the performance of their EPE model and the model's relevant risk measures as well as the market risk factor predictions that support EPE. For collateralized trades, the prediction time horizons considered must include those reflecting typical margin periods of risk applied in collateralized/margined trading, and must include long time horizons of at least one year;
- the pricing models used to calculate counterparty credit risk exposure for a given scenario of future shocks to market risk factors must be tested as part of the initial and ongoing model validation process. These pricing models may be different from those used to calculate Market Risk over a short horizon. Pricing models for options must account for the non-linearity of option value with respect to market risk factors;
- an EPE model must capture transaction specific information in order to aggregate exposures at the level of the netting set. Institutions must verify that transactions are assigned to the appropriate netting set within the model;
- static, historical backtesting on representative counterparty portfolios must be a part of the validation process. At regular intervals, an institution must conduct such backtesting on a number of representative counterparty portfolios. The representative portfolios must be chosen based on their sensitivity to the material risk factors and correlations to which the institution is exposed. In addition, IMM institutions need to conduct backtesting that is designed to test the key assumptions of the EPE model and the relevant risk measures, e.g. the modelled relationship between tenors of the same risk factor, and the modelled relationships between risk factors;
- significant differences between realized exposures and the forecast distribution could indicate a problem with the model or the underlying data that OSFI would require the institution to correct. Under such circumstances, OSFI may require additional capital to be held while the problem is being solved;
- the performance of EPE models and its risk measures must be subject to good backtesting practice. The backtesting programme must be capable of identifying poor performance in an EPE model's risk measures;
- institutions must validate their EPE models and all relevant risk measures out to time horizons commensurate with the maturity of trades for which exposure is calculated using an internal modelling method;
- the pricing models used to calculate counterparty exposure must be regularly tested against appropriate independent benchmarks as part of the ongoing model validation process;
- the ongoing validation of an institution's EPE model and the relevant risk measures include an assessment of recent performance;

- the frequency with which the parameters of an EPE model are updated needs to be assessed as part of the validation process;
- under the IMM, a measure that is more conservative than the metric used to calculate regulatory EAD for every counterparty, may be used in place of alpha times Effective EPE with prior approval from OSFI. The degree of relative conservatism will be assessed upon initial OSFI approval and at the regular supervisory reviews of the EPE models. The institution must validate the conservatism regularly;
- the ongoing assessment of model performance needs to cover all counterparties for which the models are used;
- the validation of IMM models must assess whether or not the institution level and netting set exposure calculations of EPE are appropriate.

[Basel Framework, CRE 53.33]

50. In the case where the pricing model used to calculate counterparty credit risk exposure is different than the pricing model used to calculate Market Risk over a short horizon, OSFI expects institutions to provide documented justification for the use of two different pricing models, including an assessment of the resulting model risk.

7.1.5.6 Operational requirements for EPE models

51. In order to be eligible to adopt an internal model for estimating EPE arising from CCR for regulatory capital purposes, an institution must meet the following operational requirements. These include meeting the requirements related to the qualifying standards on CCR Management, a use test, stress testing, identification of wrong-way risk, and internal controls. [Basel Framework, CRE 53.34]

Qualifying standards on CCR Management

52. The institution must satisfy its supervisor that, in addition to meeting the operational requirements identified in paragraphs 53 to 82 below, it adheres to sound practices for CCR management. [Basel Framework, CRE 53.35]

Use test

53. The distribution of exposures generated by the internal model used to calculate effective EPE must be closely integrated into the day-to-day CCR management process of the institution. For example, the institution could use the peak exposure from the distributions for counterparty credit limits or expected positive exposure for its internal allocation of capital. The internal model's output must accordingly play an essential role in the credit approval, counterparty credit risk management, internal capital allocations, and corporate governance of institutions that seek approval to apply such models for capital adequacy purposes. Models and estimates designed and implemented exclusively to qualify for the internal models method are not acceptable. [Basel Framework, CRE 53.36]

54. An institution must have a credible track record in the use of internal models that generate a distribution of exposures to CCR. Thus, the institution must demonstrate that it has been using an internal model to calculate the distributions of exposures upon which the EPE calculation is based that meets broadly the minimum requirements for at least one year prior to approval. [Basel Framework, CRE 53.37]

55. Institutions employing the internal model method must have an independent control unit that is responsible for the design and implementation of the firm's CCR management system, including the initial and ongoing validation of the internal model. This unit must control input data integrity and produce and analyze reports on the output of the firm's risk measurement model, including an evaluation of the relationship between measures of risk exposure and credit and trading limits. This unit must be independent from business credit and trading units; it must be adequately staffed; it must report directly to senior management of the firm. The work of this unit should be closely integrated into the day-to-day credit risk management process of the firm. Its output should accordingly be an integral part of the process of planning, monitoring and controlling the firm's credit and overall risk profile. [Basel Framework, CRE 53.38]

56. Institutions applying the IMM must have a collateral management unit that is responsible for calculating and making margin calls, managing margin call disputes and reporting levels of independent amounts, initial margins and variation margins accurately on a daily basis. This unit must control the integrity of the data used to make margin calls, and ensure that it is consistent and reconciled regularly with all relevant sources of data within the institution. This unit must also track the extent of reuse of collateral (both cash and non-cash) and the rights that the institution gives away to its respective counterparties for the collateral that it posts. These internal reports must indicate the categories of collateral assets that are reused, and the terms of such reuse including instrument, credit quality and maturity. The unit must also track concentration to individual collateral asset classes accepted by the institutions. Senior management must allocate sufficient resources to this unit for its systems to have an appropriate level of operational performance, as measured by the timeliness and accuracy of outgoing calls and response time to incoming calls. Senior management must ensure that this unit is adequately staffed to process calls and disputes in a timely manner even under severe market crisis, and to enable the institution to limit its number of large disputes caused by trade volumes. [Basel Framework, CRE 53.39]

57. The institution's collateral management unit must produce and maintain appropriate collateral management information that is reported on a regular basis to senior management. Such internal reporting should include information on the type of collateral (both cash and non-cash) received and posted, as well as the size, aging and cause for margin call disputes. This internal reporting should also reflect trends in these figures. [Basel Framework, CRE 53.40]

58. An institution employing the IMM must ensure that its cash management policies account simultaneously for the liquidity risks of potential incoming margin calls in the context of exchanges of variation margin or other margin types, such as initial or independent margin, under adverse market shocks, potential incoming calls for the return of excess collateral posted by counterparties, and calls resulting from a potential downgrade of its own public rating. The

institution must ensure that the nature and horizon of collateral reuse is consistent with its liquidity needs and does not jeopardize its ability to post or return collateral in a timely manner. [Basel Framework, CRE 53.41]

59. The internal model used to generate the distribution of exposures must be part of a counterparty risk management framework that includes the identification, measurement, management, approval and internal reporting of counterparty risk.[13] This framework must include the measurement of usage of credit lines (aggregating counterparty exposures with other credit exposures) and economic capital allocation. In addition to EPE (a measure of future exposure), an institution must measure and manage current exposures. Where appropriate, the institution must measure current exposure gross and net of collateral held. The use test is satisfied if an institution uses other counterparty risk measures, such as peak exposure or potential future exposure (PFE), based on the distribution of exposures generated by the same model to compute EPE. [Basel Framework, CRE 53.42]

60. An institution is not required to estimate or report EE daily, but to meet the use test it must have the systems capability to estimate EE daily, if necessary, unless it demonstrates to OSFI that its exposures to CCR warrant some less frequent calculation. It must choose a time profile of forecasting horizons that adequately reflects the time structure of future cash flows and maturity of the contracts. For example, an institution may compute EE on a daily basis for the first 10 days, once a week out to one month, once a month out to 18 months, once a quarter out to five years and beyond five years in a manner that is consistent with the materiality and composition of the exposure. [Basel Framework, CRE 53.43]

61. Exposure must be measured out to the life of all contracts in the netting set (not just to the one-year horizon), monitored and controlled. The institution must have procedures in place to identify and control the risks for counterparties where exposure rises beyond the one-year horizon. Moreover, the forecasted increase in exposure must be an input into the firm's internal economic capital model. [Basel Framework, CRE 53.44]

Stress testing

62. An institution must have in place sound stress testing processes for use in the assessment of capital adequacy. These stress measures must be compared against the measure of EPE and considered by the institution as part of its internal capital adequacy assessment process. Stress testing must also involve identifying possible events or future changes in economic conditions that could have unfavourable effects on a firm's credit exposures and assessment of the firm's ability to withstand such changes. Examples of scenarios that could be used are; (i) economic or industry downturns, (ii) market-place events, or (iii) decreased liquidity conditions. [Basel Framework, CRE 53.45]

63. Institutions must have a comprehensive stress testing program for counterparty credit risk. The stress testing program must include the following elements:

[13] This section draws heavily on the Counterparty Risk Management Policy Group's paper, *Improving Counterparty Risk Management Practices* (June 1999)

- institutions must ensure complete trade capture and exposure aggregation across all forms of counterparty credit risk (not just OTC derivatives) at the counterparty-specific level in a sufficient time frame to conduct regular stress testing;
- for all counterparties, institutions should produce, at least monthly, exposure stress testing of principal market risk factors (e.g. interest rates, FX, equities, credit spreads, and commodity prices) in order to proactively identify, and when necessary, reduce outsized concentrations to specific directional sensitivities;
- institutions should apply multi-factor stress testing scenarios and assess material non-directional risks (i.e., yield curve exposure, basis risks, etc.) at least quarterly. Multiple-factor stress tests should, at a minimum, aim to address scenarios in which a) severe economic or market events have occurred; b) broad market liquidity has decreased significantly; and c) the market impact of liquidating positions of a large financial intermediary. These stress tests may be part of institution-wide stress testing;
- stressed market movements have an impact not only on counterparty exposures, but also on the credit quality of counterparties. At least quarterly, institutions should conduct stress testing applying stressed conditions to the joint movement of exposures and counterparty creditworthiness;
- exposure stress testing (including single factor, multifactor and material non-directional risks) and joint stressing of exposure and creditworthiness should be performed at the counterparty-specific, counterparty group (e.g. industry and region), and aggregate institution-wide CCR levels;
- stress tests results should be integrated into regular reporting to senior management. The analysis should capture the largest counterparty-level impacts across the portfolio, material concentrations within segments of the portfolio (within the same industry or region), and relevant portfolio and counterparty specific trends;
- the severity of factor shocks should be consistent with the purpose of the stress test. When evaluating solvency under stress, factor shocks should be severe enough to capture historical extreme market environments and/or extreme but plausible stressed market conditions. The impact of such shocks on capital resources should be evaluated, as well as the impact on capital requirements and earnings. For the purpose of day-to-day portfolio monitoring, hedging, and management of concentrations, institutions should also consider scenarios of lesser severity and higher probability;
- institutions should consider reverse stress tests to identify extreme, but plausible, scenarios that could result in significant adverse outcomes;
- senior management must take a lead role in the integration of stress testing into the risk management framework and risk culture of the institution and ensure that the results are meaningful and proactively used to manage counterparty credit risk. At a minimum, the results of stress testing for significant exposures should be compared to guidelines that express the institution's risk appetite and elevated for discussion and action when excessive or concentrated risks are present.

[Basel Framework, CRE 53.46]

Wrong-way risk

64. Institutions must identify exposures that give rise to a greater degree of general wrong-way risk. Stress testing and scenario analyses must be designed to identify risk factors that are positively correlated with counterparty credit worthiness. Such testing needs to address the possibility of severe shocks occurring when relationships between risk factors have changed. Institutions should monitor general wrong way risk by product, by region, by industry, or by other categories that are germane to the business. Reports should be provided to senior management on a regular basis that communicate wrong way risks and the steps that are being taken to manage that risk. [Basel Framework, CRE 53.47]

65. An institution is exposed to "specific wrong-way risk" (SWWR) if future exposure to a specific counterparty is highly correlated with the counterparty's probability of default. For example, a company writing put options on its own stock creates wrong-way exposures for the buyer that is specific to the counterparty. An institution must have procedures in place to identify, monitor and control cases of SWWR, beginning at the inception of a trade and continuing through the life of the trade. To calculate the CCR capital charge, the instruments for which there exists a legal connection between the counterparty and the underlying issuer, and for which specific wrong way risk has been identified, are not considered to be in the same netting set as other transactions with the counterparty. Furthermore, for single-name credit default swaps where there exists a legal connection between the counterparty and the underlying issuer, and where SWWR has been identified, EAD in respect of such swap counterparty exposure equals the full expected loss in the remaining fair value of the underlying instruments assuming the underlying issuer is in liquidation. The use of the full expected loss in remaining fair value of the underlying instrument allows the institution to recognize, in respect of such swap, the market value that has been lost already and any expected recoveries. Accordingly LGD for Advanced or Foundation IRB institutions must be set to 100% for such swap transactions.[14] For institutions using the standardized approach for credit risk, the risk weight to use is that of an unsecured transaction. For equity derivatives, bond options, securities financing transactions etc. referencing a single company where there exists a legal connection between the counterparty and the underlying company, and where SWWR has been identified, EAD equals the value of the transaction under the assumption of a jump-to-default of the underlying security. Inasmuch this makes re-use of possibly existing (market risk) calculations (for IRC) that already contain an LGD assumption, the LGD must be set to 100%. LGD for Advanced and Foundation IRB banks will be that of an unsecured exposure. For institutions using the standardized approach for credit risk, the risk weight of an unsecured transaction should be used.

The counterparty credit risk arising from trades where SWWR has been identified can be mitigated through either prepayment or the collection of independent collateral amounts. If a counterparty prepays the notional amount of the exposure for a trade where SWWR has been

[14] Note that the recoveries may also be possible on the underlying instrument beneath such swap. The capital requirements for such underlying exposure are to be calculated without reduction for the swap which introduces wrong way risk. Generally this means that such underlying exposure will receive the risk weight and capital treatment associated with an unsecured transaction (i.e. assuming such underlying exposure is an unsecured credit exposure).

identified, or a portion of it, then the EAD for that trade may be reduced by the amount of the prepayment.

In situations where independent collateral amounts have been collected, the EAD for those trades may be reduced by the independent collateral amount (after any applicable haircuts) provided one of the following situations applies:

- The independent collateral amount is legally pledged to cover risk solely on the trade for which SWWR has been identified; or
- Both counterparties to the trade where SWWR has been identified agree that the independent collateral amount is posted to account for the SWWR trade and this independent amount is managed internally as such.

[Basel Framework, CRE 53.48]

Right-Way Risk

66. An institution is exposed to "specific right-way risk" (SRWR) if the future exposure to a specific counterparty is highly inversely correlated with the counterparty's probability of default. An example of SRWR are warrants, which can be a component of call spread overlay trades written by the counterparty on the counterparty's stock.

67. There are transactions where SRWR is present and, given the structure of these, institutions will have a zero EAD to the counterparty if the counterparty defaults.

68. Where an institution has identified SRWR, only the trade types identified in paragraph 69 below, and subject to due diligence,[15] are permitted to receive a zero EAD. Institutions wishing to add other trade types should contact OSFI's Capital Division for prior permission.

69. Permitted trade types include:

- An equity warrant, or option in each case written by the counterparty on the counterparty's own stock purchased as part of a call spread overlay transaction, where a bond hedge has also been purchased. Call spread overlay transactions involve a counterparty issuing convertible bonds and wishing to synthetically increase the conversion price.
- Issuer forward as well as issuer range forward sales of equity whereby the institution has also simultaneously shorted the shares of the counterparty. Issuer and issuer range forward sales of equity are typically done by a counterparty, with future capital expenditures or other funding needs, wishing to lock in a favourable current stock price or range of stock prices without needing to issue shares until the maturity of the forward or range forward transaction.
- Accelerated share repurchase agreements whereby counterparties provide an institution with funds to buy back shares in a defined period of time (typically under six months).

[15] Trade types listed in paragraph 69 do not automatically qualify for a zero EAD. Banks must perform their due diligence to ensure the trade would have a zero EAD if the counterparty were to default.

Integrity of Modelling Process

70. Other operational requirements focus on the internal controls needed to ensure the integrity of model inputs; specifically, the requirements address the transaction data, historical market data, frequency of calculation, and valuation models used in measuring EPE. [Basel Framework, CRE 53.49]

71. The internal model must reflect transaction terms and specifications in a timely, complete, and conservative fashion. Such terms include, but are not limited to, contract notional amounts, maturity, reference assets, collateral thresholds, margining arrangements, netting arrangements, etc. The terms and specifications must reside in a secure database that is subject to formal and periodic audit. The process for recognizing netting arrangements must require signoff by legal staff to verify the legal enforceability of netting and be input into the database by an independent unit. The transmission of transaction terms and specifications data to the internal model must also be subject to internal audit and formal reconciliation processes must be in place between the internal model and source data systems to verify on an ongoing basis that transaction terms and specifications are being reflected in EPE correctly or at least conservatively. [Basel Framework, CRE 53.50]

72. When the Effective EPE model is calibrated using historic market data, the institution must employ current market data to compute current exposures and at least three years of historical data must be used to estimate parameters of the model. Alternatively, market implied data may be used to estimate parameters of the model. In all cases, the data must be updated quarterly or more frequently if market conditions warrant. To calculate the Effective EPE using a stress calibration, the institution must also calibrate Effective EPE using three years of data that include a period of stress to the credit default spreads of an institution's counterparties or calibrate Effective EPE using market implied data from a suitable period of stress. The following process will be used to assess the adequacy of the stress calibration:

- The institution must demonstrate, at least quarterly, that the stress period coincides with a period of increased CDS or other credit spreads – such as loan or corporate bond spreads – for a representative selection of the institution's counterparties with traded credit spreads. In situations where the institution does not have adequate credit spread data for a counterparty, the institution should map each counterparty to specific credit spread data based on region, internal rating and business types.
- The exposure model for all counterparties must use data, either historic or implied, that includes the data from the stressed credit period, and must use such data in a manner consistent with the method used for the calibration of the Effective EPE model to current data.

[Basel Framework, CRE 53.52]

73. When two different calibration methods are used for different parameters within the Effective EPE model, OSFI expects institutions' model development and validation groups to provide documented justification for the choice of calibration methods that includes an assessment of the resulting model risk.

74. If an institution wished to recognize in its EAD calculations for OTC derivatives the effect of collateral other than cash of the same currency as the exposure itself, then it must model collateral jointly with the exposure. If the institution is not able to model collateral jointly with the exposure then it must use either haircuts that meet the standards of the financial collateral comprehensive method with own haircut estimates or the standard supervisory haircuts. [Basel Framework, CRE 53.52]

75. If the internal model includes the effect of collateral on changes in the market value of the netting set, the institution must model collateral other than cash of the same currency as the exposure itself jointly with the exposure in its EAD calculations for securities-financing transactions. [Basel Framework, CRE 53.53]

76. The EPE model (and modifications made to it) must be subject to an internal model validation process. The process must be clearly articulated in firms' policies and procedures. The validation process must specify the kind of testing needed to ensure model integrity and identify conditions under which assumptions are violated and may result in an understatement of EPE. The validation process must include a review of the comprehensiveness of the EPE model, for example such as whether the EPE model covers all products that have a material contribution to counterparty risk exposures. [Basel Framework, CRE 53.54]

77. The use of an internal model to estimate EPE, and hence the exposure amount or EAD, of positions subject to a CCR capital charge will be conditional upon the explicit OSFI approval. [Basel Framework, CRE 53.55]

78. The BCBS has issued guidance regarding the use of internal models to estimate certain parameters of risk and determine minimum capital charges against those risks. OSFI requires that institutions seeking to make use of internal models to estimate EPE meet similar requirements regarding, for example, the integrity of the risk management system, the skills of staff that will rely on such measures in operational areas and in control functions, the accuracy of models, and the rigour of internal controls over relevant internal processes. As an example, institutions seeking to make use of an internal model to estimate EPE must demonstrate that they meet the Committee's general criteria for institutions seeking to make use of internal models to assess market risk exposures, but in the context of assessing counterparty credit risk.[16] [Basel Framework, CRE 53.56]

79. The Internal Capital Adequacy Assessment Program provides general background and specific guidance to cover counterparty credit risks that may not be fully covered by the Pillar 1 process. [Basel Framework, CRE 53.57]

80. No particular form of model is required to qualify to make use of an internal model. Although this text describes an internal model as a simulation model, other forms of models, including analytic models, are acceptable subject to OSFI approval and review. Institutions that seek recognition for the use of an internal model that is not based on simulations must

[16] *Amendment to the Capital Accord to Incorporate Market Risk,* Basel Committee on banking Supervision (1996), Part B.1., "General Criteria".

demonstrate to OSFI that the model meets all operational requirements. [Basel Framework, CRE 53.58]

81. For an institution that qualifies to net transactions, the institution must have internal procedures to verify that, prior to including a transaction in a netting set, the transaction is covered by a legally enforceable netting contract that meets the applicable requirements of section 7.1.7.1 and section 4.3.3 of Chapter 4, or the Cross-Product Netting Rules set forth in this chapter. [Basel Framework, CRE 53.59]

82. For an institution that makes use of collateral to mitigate its CCR, the institution must have internal procedures to verify that, prior to recognizing the effect of collateral in its calculations, the collateral meets the appropriate legal certainty standards as set out in Chapter 4. [Basel Framework, CRE 53.60]

7.1.6 *Cross-product netting rules*[17]

83. Institutions that receive approval to estimate their exposures to CCR using the internal model method may include within a netting set SFTs, or both SFTs and OTC derivatives subject to a legally valid form of bilateral netting that satisfies the legal and operational criteria for a Cross-Product Netting Arrangement defined below. The institution must also have satisfied any prior approval or other procedural requirements set out by OSFI for the purposes of recognizing a Cross-Product Netting Arrangement. [Basel Framework, CRE 53.62]

7.1.6.1 Legal Criteria

84. The institution has executed a written, bilateral netting agreement with the counterparty that creates a single legal obligation, covering all included bilateral master agreements and transactions ("Cross-Product Netting Arrangement"), such that the institution would have either a claim to receive or obligation to pay only the net sum of the positive and negative (i) close-out values of any included individual master agreements and (ii) mark-to-market values of any included individual transactions (the "Cross-Product Net Amount"), in the event a counterparty fails to perform due to any of the following: default, bankruptcy, liquidation or similar circumstances. [Basel Framework, CRE 53.63]

85. The institution has written and reasoned legal opinions that conclude with a high degree of certainty that, in the event of a legal challenge, relevant courts or administrative authorities would find the firm's exposure under the Cross-Product Netting Arrangement to be the Cross-Product Net Amount under the laws of all relevant jurisdictions. In reaching this conclusion, legal opinions must address the validity and enforceability of the entire Cross-Product Netting Arrangement under its terms and the impact of the Cross-Product Netting Arrangement on the material provisions of any included bilateral master agreement.

[17] These Cross-Product Netting Rules apply specifically to netting across SFTs, or to netting across both SFTs and OTC derivatives, for purposes of regulatory capital computation under IMM. They do not revise or replace the rules that apply to recognition of netting within the OTC derivatives, repo-style transaction, and margin lending transaction product categories under this guideline. The rules in this guideline continue to apply for purposes of regulatory capital recognition of netting within product categories under IMM or other relevant methodology.

- The laws of "all relevant jurisdictions" are: (i) the law of the jurisdiction in which the counterparty is chartered and, if the foreign branch of a counterparty is involved, then also under the law of the jurisdiction in which the branch is located, (ii) the law that governs the individual transactions, and (iii) the law that governs any contract or agreement necessary to effect the netting.
- A legal opinion must be generally recognized as such by the legal community in the firm's home country or a memorandum of law that addresses all relevant issues in a reasoned manner.

[Basel Framework, CRE 53.64]

86. The institution has internal procedures to verify that, prior to including a transaction in a netting set, the transaction is covered by legal opinions that meet the above criteria. [Basel Framework, CRE 53.65]

87. The institution undertakes to update legal opinions as necessary to ensure continuing enforceability of the Cross-Product Netting Arrangement in light of possible changes in relevant law. [Basel Framework, CRE 53.66]

88. The Cross-Product Netting Arrangement does not include a walkaway clause. A walkaway clause is a provision which permits a non-defaulting counterparty to make only limited payments, or no payment at all, to the estate of the defaulter, even if the defaulter is a net creditor. [Basel Framework, CRE 53.67]

89. Each included bilateral master agreement and transaction included in the Cross-Product Netting Arrangement satisfies applicable legal requirements for recognition of credit risk mitigation techniques in Chapter 4.3.[Basel Framework, CRE 53.68]

90. The institution maintains all required documentation in its files. [Basel Framework, CRE 53.69]

7.1.6.2 *Operational Criteria*

91. OSFI is satisfied that the effects of a Cross-Product Netting Arrangement are factored into the firm's measurement of a counterparty's aggregate credit risk exposure and that the institution manages its counterparty credit risk on such basis. [Basel Framework, CRE 53.70]

92. Credit risk to each counterparty is aggregated to arrive at a single legal exposure across products covered by the Cross-Product Netting Arrangement. This aggregation must be factored into credit limit and economic capital processes. [Basel Framework, CRE 53.71]

7.1.7 Standardized Approach for Counterparty Credit Risk

93. Institutions that do not have approval to apply the internal models method must use the SA-CCR method. SA-CCR can be used for OTC derivatives, exchange-traded derivatives and long settlement transactions; SFTs are subject to the treatments set out under the Internal Model

Method of this chapter or in Chapter 4 of the CAR Guideline. EAD is to be calculated separately for each netting set. It is determined as follows:

$EAD = alpha \times (RC + PFE)$[18]

where:

alpha = 1.4,

RC = the replacement cost calculated according to paragraphs 98 to 114, and

PFE = the amount for potential future exposure calculated according to paragraphs 115 to 168

[Basel Framework, CRE 52.1]

94. The replacement cost (*RC*) and the *PFE* components are calculated differently for margined and unmargined netting sets. Margined netting sets are covered by a margin agreement under which the bank's counterparty has to post variation margin; all other netting sets, including those covered by a one-way margin agreement where only the bank posts variation margin, are treated as unmargined for the purposes of the SA-CCR. The *EAD* for a margined netting set is capped at the *EAD* of the same netting set calculated on an unmargined basis. [Basel Framework, CRE 52.2]

95. The EAD for sold options that are outside netting and margin agreements can be set to zero. [Basel Framework, CRE 52.2, FAQ #1]

96. For credit derivatives where the bank is the protection seller and that are outside netting and margin agreements, the EAD may be capped at the amount of unpaid premiums. Institutions have the option to remove such credit derivatives from their legal netting sets and treat them as individual unmargined transactions in order to apply the cap. [Basel Framework, CRE 52.2, FAQ #2]

97. Non-linear products where no specific treatment exists under the SACCR can be decomposed in a manner similar to paragraph 131. Linear products may not be decomposed. [Basel Framework, CRE 52.1, FAQ #3]

7.1.7.1 RC and NICA

98. For unmargined transactions, the *RC* intends to capture the loss that would occur if a counterparty were to default and were closed out of its transactions immediately. The *PFE* add-on represents a potential conservative increase in exposure over a one-year time horizon from the present date (i.e. the calculation date). [Basel Framework, CRE 52.3]

99. For margined trades, the *RC* intends to capture the loss that would occur if a counterparty were to default at the present or at a future time, assuming that the closeout and replacement of transactions occur instantaneously. However, there may be a period (the margin

[18] EAD can be set to zero for sold options that are outside of netting and margin agreements. Options sold *outside* of a margin agreement but *inside* a netting agreement do not qualify for EAD to be set at zero.

period of risk) between the last exchange of collateral before default and replacement of the trades in the market. The *PFE* add-on represents the potential change in value of the trades during this time period. [Basel Framework, CRE 52.4]

100. In both cases, the haircut applicable to noncash collateral in the replacement cost formulation represents the potential change in value of the collateral during the appropriate time period (one year for unmargined trades and the margin period of risk for margined trades). [Basel Framework, CRE 52.5]

101. Cash variation margin (VM) is not subject to any additional haircut provided the variation margin is posted in a currency that is agreed to and listed in the applicable contract.[19] Cash initial margin (IM) that is exchanged in a currency other than the termination currency (that is, the currency in which the institution will submit its claim upon a counterparty default) is subject to the additional haircut for foreign currency risk.

102. Replacement cost is calculated at the netting set level, whereas *PFE* add-ons are calculated for each asset class within a given netting set and then aggregated (see paragraphs 115 to 168). [Basel Framework, CRE 52.6]

103. For capital adequacy purposes, institutions may net transactions (e.g., when determining the RC component of a netting set) subject to novation under which any obligation between an institution and its counterparty to deliver a given currency on a given value date is automatically amalgamated with all other obligations for the same currency and value date, legally substituting one single amount for the previous gross obligations. Institutions may also net transactions subject to any legally valid form of bilateral netting not covered in the preceding sentence, including other forms of novation.[20] In every such case where netting is applied, an institution must satisfy its OSFI that it has:

(i) A netting contract with the counterparty or other agreement which creates a single legal obligation, covering all included transactions, such that the institution would have either a claim to receive or obligation to pay only the net sum of the positive and negative mark-to-market values of included individual transactions in the event a counterparty fails to perform due to any of the following: default, bankruptcy, liquidation or similar circumstances;[21]

(ii) Written and reasoned legal reviews that, in the event of a legal challenge, the relevant courts and administrative authorities would find the institution's exposure to be such a net amount under:

[19] Currencies listed in the CSA are not subject to additional haircuts.

[20] In instances where trades are removed from the netting set in which they naturally belong and are moved to a separate netting set solely for the purposes of calculating EAD, it is permissible to allocate collateral to these transactions. An example of such an instance would be Specific Wrong Way Risk (WWR) transactions which are required to each be moved to their own standalone netting set.

[21] The netting contract must not contain any clause which, in the event of default of a counterparty, permits a non-defaulting counterparty to make limited payments only, or no payments at all, to the estate of the defaulting party, even if the defaulting party is a net creditor.

- The law of the jurisdiction in which the counterparty is chartered and, if the foreign branch of a counterparty is involved, then also under the law of the jurisdiction in which the branch is located;
- The law that governs the individual transactions; and
- The law that governs any contract or agreement necessary to affect the netting.

OSFI, after consultation when necessary with other relevant supervisors, must be satisfied that the netting is enforceable under the laws of each of the relevant jurisdictions.[22]

(iii) Procedures in place to ensure that the legal characteristics of netting arrangements are kept under review in light of the possible changes in relevant law.

[Basel Framework, CRE 52.7]

104. There are two formulations of replacement cost depending on whether the trades with a counterparty are subject to a margin agreement. Where a margin agreement exists, the formulation could apply both to bilateral transactions and central clearing relationships. The formulation also addresses the various arrangements that an institution may have to post and/or receive collateral that may be referred to as initial margin. [Basel Framework, CRE 52.9]

A. Formulation for unmargined transactions

105. For unmargined transactions (that is, where VM is not exchanged, but collateral other than VM may be present), *RC* is defined as the greater of: (i) the current market value of the derivative contracts less net haircut collateral held by the institution (if any), and (ii) zero. This is consistent with the use of replacement cost as the measure of current exposure, meaning that when the institution owes the counterparty money it has no exposure to the counterparty if it can instantly replace its trades and sell collateral at current market prices. Mathematically:

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

where *V* is the value of the derivative transactions in the netting set and *C* is the haircut value of net collateral held, which is calculated in accordance with the *NICA* methodology defined in paragraph 112. For this purpose, the value of non-cash collateral posted by the institution to its counterparty is increased and the value of the non-cash collateral received by the institution from its counterparty is decreased using haircuts (which are the same as those that apply to repo-style transactions) for the time periods described in paragraph 100.
[Basel Framework, CRE 52.10 and 52.11]

106. In the above formulation, it is assumed that the replacement cost representing today's exposure to the counterparty cannot go less than zero. However, institutions sometimes hold excess collateral (even in the absence of a margin agreement) or have out-of-the-money trades which can further protect the institution from the increase of the exposure. As discussed in paragraphs 116 to 118, the SA-CCR would allow such over-collateralization and negative mark-

[22] Thus, if any of these supervisors is dissatisfied about enforceability under its laws, the netting contract or agreement will not meet this condition and neither counterparty could obtain supervisory benefit.

to market value to reduce *PFE*, but would not affect replacement cost. [Basel Framework, CRE 52.12]

107. Bilateral transactions with a one-way margining agreement in favour of the institution's counterparty (that is, where an institution posts, but does not collect, collateral) must be treated as unmargined transactions. [Basel Framework, CRE 52.10, FAQ #1]

B. Formulation for margined transactions

108. The RC formula for margined transactions builds on the RC formula for unmargined transactions. It also employs concepts used in standard margining agreements, as discussed more fully below. [Basel Framework, CRE 52.13]

109. The RC for margined transactions in the SA-CCR is defined as the greatest exposure that would not trigger a call for VM, taking into account the mechanics of collateral exchanges in margining agreements. Such mechanics include, for example, "Threshold", "Minimum Transfer Amount" and "Independent Amount" in the standard industry documentation,[23] which are factored into a call for VM.[24] [Basel Framework, CRE 52.14]

C. Incorporating NICA into replacement cost

110. One objective of the SA-CCR is to more fully reflect the effect of margining agreements and the associated exchange of collateral in the calculation of CCR exposures. The following paragraphs address how the exchange of collateral is incorporated into the SA-CCR. [Basel Framework, CRE 52.15]

111. To avoid confusion surrounding the use of terms initial margin and independent amount which are used in various contexts and sometimes interchangeably, the term *independent collateral amount* (ICA) is introduced. ICA represents (i) collateral (other than VM) posted by the counterparty that the institution may seize upon default of the counterparty, the amount of which does not change in response to the value of the transactions it secures and/or (ii) the *Independent Amount* (IA) parameter as defined in standard industry documentation. ICA can change in response to factors such as the value of the collateral or a change in the number of transactions in the netting set. [Basel Framework, CRE 52.16]

112. Because both an institution and its counterparty may be required to post ICA, it is necessary to introduce a companion term, *net independent collateral amount* (*NICA*), to describe the amount of collateral that an institution may use to offset its exposure on the default of the

[23] For example, the 1992 (Multicurrency-Cross Border) Master Agreement and the 2002 Master Agreement published by the International Swaps & Derivatives Association, Inc. (ISDA Master Agreement). The ISDA Master Agreement includes the ISDA CSA: the 1994 Credit Support Annex (Security Interest – New York Law), or, as applicable, the 1995 Credit Support Annex (Transfer – English Law) and the 1995 Credit Support Deed (Security Interest – English Law).

[24] For example, in the ISDA Master Agreement, the term "Credit Support Amount", or the overall amount of collateral that must be delivered between the parties, is defined as the greater of the Secured Party's Exposure plus the aggregate of all Independent Amounts applicable to the Pledgor minus all Independent Amounts applicable to the Secured Party, minus the Pledgor's Threshold and zero.

counterparty. *NICA* does not include collateral that an institution has posted to a segregated, bankruptcy remote account, which presumably would be returned upon the bankruptcy of the counterparty. That is, *NICA* represents any collateral (segregated or unsegregated) posted by the counterparty less the unsegregated collateral posted by the institution. With respect to IA, *NICA* takes into account the differential of IA required for the institution minus IA required for the counterparty. [Basel Framework, CRE 52.17]

113. For margined trades, the replacement cost is:

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

Where: *V* and *C* are defined as in the unmargined formulation, except that C now includes the net variation margin amount, where the amount received by the institution is accounted with a positive sign and the amount posted by the institution is accounted with a negative sign, *TH* is the positive threshold before the counterparty must send the institution collateral, and *MTA* is the minimum transfer amount applicable to the counterparty. [Basel Framework, CRE 52.18]

114. *TH + MTA – NICA* represents the largest exposure that would not trigger a VM call and it contains levels of collateral that need always to be maintained. For example, without initial margin or IA, the greatest exposure that would not trigger a variation margin call is the threshold plus any minimum transfer amount. In the adapted formulation, *NICA* is subtracted from *TH + MTA*. This makes the calculation more accurate by fully reflecting both the actual level of exposure that would not trigger a margin call and the effect of collateral held and/or posted by an institution. The calculation is floored at zero, recognizing that the institution may hold *NICA* in excess of *TH + MTA*, which could otherwise result in a negative replacement cost. [Basel Framework, CRE 52.19]

7.1.7.2 *PFE Add-ons*

115. The *PFE* add-on consists of (i) an aggregate add-on component, which consists of add-ons calculated for each asset class and (ii) a multiplier that allows for the recognition of excess collateral or negative mark-to-market value for the transactions. Mathematically:

$PFE = multiplier \times AddOn^{aggregate}$

Where $AddOn^{aggregate}$ is the aggregate add-on component and multiplier is defined as a function of three inputs: *V, C* and $AddOn^{aggregate}$.

The paragraphs below describe the inputs that enter into the calculation of the add-on formulas in more detail, and set out the formula for each asset class.
[Basel Framework, CRE 52.20]

7.1.7.3 *Recognition of excess collateral and negative mark-to-market*

116. As a general principle, over-collateralization should reduce capital requirements for counterparty credit risk. In fact, many institutions hold excess collateral (i.e., collateral greater than the net market value of the derivatives contracts) precisely to offset potential increases in

exposure represented by the add-on. As discussed in paragraphs 105 and 113, collateral may reduce the replacement cost component of the exposure under the SA-CCR. The *PFE* component also reflects the risk-reducing property of excess collateral. [Basel Framework, CRE 52.21]

117. For prudential reasons and in line with Basel Committee direction, OSFI applied a multiplier to the *PFE* component that decreases as excess collateral increases, without reaching zero (the multiplier is floored at 5% of the *PFE* add-on). When the collateral held is less than the net market value of the derivative contracts ("under-collateralization"), the current replacement cost is positive and the multiplier is equal to one (i.e. the PFE component is equal to the full value of the aggregate add-on). Where the collateral held is greater than the net market value of the derivative contracts ("over-collateralization"), the current replacement cost is zero and the multiplier is less than one (i.e. the PFE component is less than the full value of the aggregate add-on). [Basel Framework, CRE 52.22]

118. This multiplier will also be activated when the current value of the derivative transactions is negative. This is because out-of-the-money transactions do not currently represent an exposure and have less chance to go in-the-money. Mathematically:

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

where exp(…) equals to the exponential function, *Floor* is 5%, *V* is the value of the derivative transactions in the netting set, and *C* is the haircut value of net collateral held.
[Basel Framework, CRE 52.23]

7.1.7.4 Aggregation across asset classes

119. Diversification benefits across asset classes are not recognized. Instead, the respective add-ons for each asset class are simply aggregated. Mathematically:

$$AddOn^{aggregate} = \sum_{a} AddOn^{a}$$

where the sum of each asset class add-on is taken.

[Basel Framework, CRE 52.25]

7.1.7.5 *Allocation of derivative transactions to one or more asset classes*

120. The designation of a derivative transaction to an asset class is be made on the basis of its primary risk driver. Most derivative transactions have one primary risk driver, defined by its reference underlying instrument (e.g., an interest rate curve for an interest rate swap, a reference entity for a credit default swap, a foreign exchange rate for a FX call option, etc). When this primary risk driver is clearly identifiable, the transaction will fall into one of the asset classes described above. [Basel Framework, CRE 52.26]

121. For more complex trades that may have more than one risk driver (e.g., multi-asset or hybrid derivatives), institutions must take sensitivities and volatility of the underlying into account for determining the primary risk driver.

OSFI may also require more complex trades to be allocated to more than one asset class, resulting in the same position being included in multiple classes. In this case, for each asset class to which the position is allocated, institutions must determine appropriately the sign and delta adjustment of the relevant risk driver.
[Basel Framework, CRE 52.27 and 52.28]

7.1.7.6 General steps for calculating the add-on

122. For each transaction, the primary risk factor or factors need to be determined and attributed to one or more of the five asset classes: interest rate, foreign exchange, credit, equity or commodity. The add-on for each asset class is calculated using asset-class-specific formulas that represent a stylized Effective EPE calculation under the assumption that all trades in the asset class have zero current mark-to-market value (i.e. they are at-the-money). [Basel Framework, CRE 52.29]

123. Although the add-on formulas are asset class-specific, they have a number of features in common. To determine the add-on, transactions in each asset class are subject to adjustment in the following general steps:

1) The **effective notional (D)** must be calculated for each derivative (i.e. each individual trade) in the netting set. The effective notional is a measure of the sensitivity of the trade to movements in the underlying risk factors (i.e. interest rates, exchange rates, credit spreads, equity prices and commodity prices). The effective notional is calculated as the product of the following parameters (i.e. $D = d \times MF \times \delta$):

    a. The **adjustment notional (d)**. The adjusted notional is a measure of the size of the trade. For derivatives in the foreign exchange asset class this is simply the notional value of the foreign currency leg of the derivative contracted, converted to the domestic currency. For derivatives in the equity and commodity asset classes, it is simply the current price of the relevant share or unit of commodity multiplied by the number of shares/units that the derivative references. For derivatives in the interest rate and credit asset classes, the notional amount is adjusted by a measure of the duration of the instrument to account for the fact that the value of the instruments with longer durations are more sensitive to movements in underlying risk factors (i.e. interest rates and credit spreads).

    b. The **maturity factor (MF)**. The maturity factor is a parameter that takes account of the time period over which the potential future exposure is calculated. The calculation of the maturity factor varies depending on whether the netting set is margined or unmargined.

    c. The **supervisory delta (δ).** The supervisory delta ensures the effective notional takes into account the direction of the trade, i.e. whether the trade is long or short, by having a positive or negative sign. It is also takes into account whether the

trade has a non-linear relationship with the underlying risk factor (which is the case for options and collateralized debt obligation tranches).

2) A **supervisory factor (SF)** is identified for each individual trade in the netting set. The supervisory factor is the supervisory specified change in value of the underlying risk factor on which the potential future exposure calculation is based, which has been calibrated to take into account the volatility of underlying risk factors.

3) The trades within each asset class are separated into supervisory specified hedging sets. The purpose of the hedging sets is to group together trades within the netting set where long and short positions should be permitted to offset each other in the calculation of the potential future exposure.

4) Aggregation formulas are applied to aggregate the effective notionals and supervisory factors across all trades within each hedging set and finally at the asset-class level to give the asset class level add-on. The method of aggregation varies between assets classes and for credit, equity and commodity derivatives. It also involves the application of supervisory correlation parameters to capture diversification of the trades and basis risk.

[Basel Framework, CRE 52.30]

7.1.7.7 Time Period Parameters Mi, Ei, Si, and Ti

124. Four time period parameters are used in the SA-CCR (all expressed in years):

- For all asset classes, the maturity M_i of a contract is the time period (starting today) until the latest day when the contract may still be active. This time period appears in the maturity factor defined in paragraphs 139 to 144 that scales down adjusted notional for unmargined trades for all asset classes. If a derivative contract has another derivative contract as its underlying (for example, a swaption) and may be physically exercised into the underlying contract (i.e., an institution would assume a position in the underlying contract in the event of exercise), then maturity of the contract is the time period until the final settlement date of the underlying derivative contract.

- For interest rate and credit derivatives, S_i is the period of time (starting today) until the start of the time period referenced by an interest rate or credit contract. If the derivative references the value of another interest rate or credit instrument (e.g., swaption or bond option), the time period must be determined on the basis of the underlying instrument. S_i appears in the definition of supervisory duration defined in paragraph 126.

- For interest rate and credit derivatives, E_i is the period of time (starting today) until the end of the time period referenced by an interest rate or credit contract. If the derivative references the value of another interest rate or credit instrument (e.g., swaption or bond option), the time period must be determined on the basis of the underlying instrument. E_i appears in the definition of supervisory duration defined in paragraph 126. In addition, *Ei* is used for allocating derivatives in the interest rate asset class to maturity buckets, which are used in the calculation of the add-on (see paragraph 146).For options in all asset classes, T_i is the time period (starting today) until the latest contractual exercise date as referenced by the contract. This period shall be used for the determination of the option delta in paragraph 132.

- Unless otherwise specified, time periods between dates should be measured in years. [Basel Framework, CRE 52.31]

125. Table 1 includes example transactions and provides each transaction's related maturity M_i, start date S_i and end date E_i. In addition, the option delta in paragraph 132 depends on the latest contractual exercise date T_i (not separately shown in the table).

Table 1

Instrument	M_i	S_i	E_i
Interest rate or credit default swap maturing in 10 years	10 years	0	10 years
10-year interest rate swap, forward starting in 5 years	15 years	5 years	15 years
Forward rate agreement for time period starting in 6 months and ending in 12 months	1 year	0.5 year	1 year
Cash-settled European swaption referencing 5-year interest rate swap with exercise date in 6 months	0.5 year	0.5 year	5.5 years
Physically-settled European swaption referencing 5-year interest rate swap with exercise date in 6 months	5.5 years	0.5 year	5.5 years
10-year Bermudan swaption with annual exercise dates	10 years	1 year	10 years
Interest rate cap or floor specified for semi-annual interest rate with maturity 5 years	5 years	0	5 years
Option on a bond maturing in 5 years with the latest exercise date in 1 year	1 year	1 year	5 years
3-month Eurodollar futures that matures in 1 year[25]	1 year	1 year	1.25 years
Futures on 20-year treasury bond that matures in 2 years	2 years	2 years	22 years
6-month option on 2-year futures on 20-year treasury bond	2 years	2 years	22 years

[Basel Framework, CRE 52.32]

7.1.7.8 Trade-level Adjusted Notional (for trade I): $d_i^{(a)}$

126. The adjusted notionals are defined at the trade level and take into account both the size of a position and its maturity dependency, if any. [Basel Framework, CRE 52.33]

127. For interest rate and credit derivatives, the trade-level adjusted notional is the product of the trade notional amount, converted to the domestic currency, and the supervisory duration SD_i (i.e., d_i = notional x SD_i) which is given by the formula below. The calculated value of SD_i is

[25] Eurodollar example does not include the effect of margining or settlement and would apply only in the case where a futures contract were neither margined nor settled. Concerning the end date (E_i), the value of 1.25 years applies. Note that per paragraph 146, the parameter E_i defines the maturity bucket for the purpose of netting. This means that the trade of this example will be attributed to the intermediate maturity bucket "between one and five years" and not to the short maturity bucket "less than one year" irrespective of daily settlement

floored at 10 business days.[26] If the start date has occurred (e.g., an ongoing interest rate swap), S_i must be set to zero.

$$SD_i = \frac{e^{(-0.05 \times S_i)} - e^{(-0.05 \times E_i)}}{0.05}$$

[Basel Framework, CRE 52.34]

128. For foreign exchange derivatives, the adjusted notional is defined as the notional of the foreign currency leg of the contract, converted to the domestic currency. If both legs of a foreign exchange derivative are denominated in currencies other than the domestic currency, the notional amount of each leg is converted to the domestic currency and the leg with the larger domestic currency value is the adjusted notional amount. [Basel Framework, CRE 52.35]

129. For equity and commodity derivatives, the adjusted notional is defined as the product of the current price of one unit of the stock or commodity (e.g., a share of equity or barrel of oil) and the number of units referenced by the trade. For equity and commodity volatility transactions, the underlying volatility or variance referenced by the transactions should replace the unit price and the contractual notional should replace the number of units.

[Basel Framework, CRE52.36]

130. In many cases the trade notional amount is stated clearly and fixed until maturity. When this is not the case, institutions must use the following rules to determine the trade notional amount.

- Where the notional is a formula of market values, the institution must enter the current market values to determine the trade notional amount.
- For all interest rate and credit derivatives with variable notional amounts specified in the contract (such as amortizing and accreting swaps), institutions must use the average notional over the remaining life of the swap as the trade notional amount. The average should be calculated as "time weighted". The averaging described in this paragraph does not cover transactions where the notional varies due to price changes (typically FX, equity and commodity derivatives).
- Leveraged swaps must be converted to the notional of the equivalent unleveraged swap, that is, where all rates in a swap are multiplied by a factor, the stated notional must be multiplied by the factor on the interest rates to determine the trade notional amount.
- For a derivative contract with multiple exchanges of principal, the notional is multiplied by the number of exchanges of principal in the derivative contract to determine the trade notional amount.
- For a derivative contract that is structured such that on specified dates any outstanding exposure is settled and the terms are reset so that the fair value of the contract is zero, the remaining maturity equals the time until the next reset date.

[26] There is a distinction between the time period of the underlying transaction and the remaining maturity of the derivative contract. For example, a European interest rate swaption with expiry of one year and the term of the underlying swap of five years has S_i = one year and E_i = six years.

- Consistent with the above point, trades with daily settlement should be treated as unmargined transactions with a maturity factor given by the first formula in paragraph 139 with the parameter M_i set to its floor value of 10 business days. For trades subject to daily margining, the maturity factor is given by the second formula of paragraph 143 depending on the margin period of risk (MPOR), which can be as low as five business days. Note that, the parameter E_i defines the maturity bucket for the purpose of netting. [Basel Framework, CRE 52.32, FAQ #1]

Calculation of effective notional for options

131. For the purposes of effective notional calculations (i.e. D = d × MF × δ), **single-payment options** must be treated as follows:

- For European, Asian, American and Bermudan put and call options, the supervisory delta must be calculated using the simplified Black-Scholes formula in paragraph 133. In the case of Asian options, the underlying price must be set equal to the current value of the average used in the payoff. In the case of American and Bermudan options, the latest allowed exercise date must be used as the exercise date T_i in the formula.

  For Bermudan swaptions, the start date S_i must be equal to the earliest allowed exercise date, while the end date E_i must be equal to the end date of the underlying swap.

- For digital options (also known as binary options), the payoff of each digital option (bought or sold) with strike K_i must be approximated via the "collar" combination of bought and sold European options of the same type (call or put) with the strikes set equal to $0.95 \cdot K_i$ and $1.05 \cdot K_i$. The size of the position in the collar components must be such that the digital payoff is reproduced exactly outside of the region between the two strikes. The effective notional is then computed for the bought and sold European components of the collar separately, using the option formulas for the supervisory delta in paragraph 132 (the exercise date T_i and the current value of the underlying P_i of the digital option must be used). The absolute value of the digital option effective notional must be capped by the ratio of the digital payoff to the relevant supervisory factor.

- If a trade's payoff can be represented as a combination of European option payoffs (e.g. collar, butterfly/calendar spread, straddle, strangle, etc.), each European option component must be treated as a separate trade.

[Basel Framework, CRE 52.42]

- For the purposes of effective notional calculations, **multi-payment options** must be represented as a combination of single-payment options. In particular, interest rate caps/floors may be represented as a combination of single-payment options. In particular, interest rate caps/floors may be represented as the portfolio of individual caplets/floorlets, each of which is a European option on the floating interest rate over a specific coupon period. For each caplet/floorlet, S_i and T_i are the time periods starting from the current date to the

start of the coupon period, while E_i is the time period starting from the current date to the end of the coupon period.

[Basel Framework, CRE 52.43]

7.1.7.9 Supervisory delta adjustments: δi

132. The supervisory delta adjustment parameters are also defined at the trade level and are applied to the adjusted notional amounts to reflect the direction of the transaction and its non-linearity. [Basel Framework, CRE 52.38]

133. The delta adjustments for all derivatives are defined as follows:

Delta for Instruments that are not Options of CDO Tranches

δi	**Long in the primary risk factor[27]**	**Short in the primary risk factor[28]**
Instruments that are not options or CDO tranches	+1	-1

Delta for Options

δi	***Bought***	***Sold***
Call Options[29]	$+\Phi\left(\frac{\ln\left(\frac{P_i}{K_i}\right)+0.5\times\sigma^2\times T_i}{\sigma_i\times\sqrt{T_i}}\right)$	$-\Phi\left(\frac{\ln\left(\frac{P_i}{K_i}\right)+0.5\times\sigma^2\times T_i}{\sigma_i\times\sqrt{T_i}}\right)$
Put Options	$-\Phi\left(-\frac{\ln\left(\frac{P_i}{K_i}\right)+0.5\times\sigma^2\times T_i}{\sigma_i\times\sqrt{T_i}}\right)$	$+\Phi\left(-\frac{\ln\left(\frac{P_i}{K_i}\right)+0.5\times\sigma^2\times T_i}{\sigma_i\times\sqrt{T_i}}\right)$
With the following parameters that institutions must determine appropriately: P_i : Underlying price (spot, forward, average, etc.) K_i : Strike price T_i : Latest contractual exercise date of the option The supervisory volatility of an option is specified on the basis of supervisory factor applicable to the trade (see Table 2 in paragraph 162).		

Delta for CDO Tranches

δi	***Purchased (long protection)***	***Sold (short protection)***

[27] "Long in the primary risk factor" means that the market value of the instrument increases when the value of the primary risk factor increases.

[28] "Short in the primary risk factor" means that the market value of the instrument decreases when the value of the primary risk factor increases.

[29] The symbol Φ in these equations represents the standard normal cumulative distribution function.

CDO tranche[30]	$+\frac{15}{(1+14\times A_i)\times(1+14\times D_i)}$	$-\frac{15}{(1+14\times A_i)\times(1+14\times D_i)}$
With the following parameters that institutions must determine appropriately: A_i : Attachment point of the CDO tranche D_i : Detachment point of the CDO tranche		

Whenever appropriate, the forward (rather than spot) value of the underlying in the supervisory delta adjustments formula should be used in order to account for the risk-free rate as well as for possible cash flows prior to the option expiry (such as dividends).
[Basel Framework, CRE 52.39 to 52.41]

134. For cases where the term P/K is either zero or negatives such that the term In(P/K) cannot be computed, the following adjustments should be made:

- institutions must incorporate a shift in the price value and strike value by adding λ, where λ represents the presumed lowest possible extent to which interest rates in the respective currency can become negative.[31]
- For commodity derivatives, institutions must incorporate a shift in the price value and strike value by adding λ, where λ represents the presumed lowest possible extent to which prices in that particular commodity can become negative.[32]

Therefore, the Delta δ_i for a transaction *i* in such cases is calculated as:

Delta for options if Term P/K is Zero or Negative

Delta(δ)	**Bought**	**Sold**
Call Options	$+\Phi\left(\frac{\ln\left(\left(P_i+\lambda_j\right)/\left(K_i+\lambda_j\right)\right)+0.5\times\sigma_i{}^2\times T_i}{\sigma_i\times\sqrt{T_i}}\right)$	$-\Phi\left(\frac{\ln\left(\left(P_i+\lambda_j\right)/\left(K_i+\lambda_j\right)\right)+0.5\times\sigma_i{}^2\times T_i}{\sigma_i\times\sqrt{T_i}}\right)$
Put Options	$-\Phi\left(\frac{-\ln\left(\left(P_i+\lambda_j\right)/\left(K_i+\lambda_j\right)\right)-0.5\times\sigma_i{}^2\times T_i}{\sigma_i\times\sqrt{T_i}}\right)$	$+\Phi\left(\frac{-\ln\left(\left(P_i+\lambda_j\right)/\left(K_i+\lambda_j\right)\right)-0.5\times\sigma_i{}^2\times T_i}{\sigma_i\times\sqrt{T_i}}\right)$

30 First-to-default, second-to-default and subsequent-to-default credit derivative transactions should be treated as CDO tranches under the SACCR. For an nth-to-default transaction on a pool of m reference names, banks must use an attachment point of A=(n–1)/m and a detachment point of D=n/m in order to calculate the supervisory delta formula set out paragraph 133.

31 This assumes for the strike price that $K_i + \lambda_j$ is also greater than zero, otherwise a greater value needs to be chosen for λ_j. λ adjustment values which are unique to each currency.

32 This assumes for the strike price that $K_i + \lambda_j$ is also greater than zero, otherwise a greater value needs to be chosen for λ_j. λ adjustment values which are unique to each commodity type.

The same parameter must be used consistently for all interest rate options in the same currency and all commodity options on the same commodity type. Institutions should select a value of λ_j, which is low but still gives a positive $K_i+\lambda_j$ value.
[Basel Framework, CRE 52.40, FAQ #2]

7.1.7.10 Supervisory Factors: $SF_i^{(a)}$

135. Supervisory factors (SF_i) are used, together with aggregation formulas, to convert the effective notional amounts into the add-on for each hedging set. Each factor has been calibrated to reflect the Effective EPE of a single at-the-money linear trade of unit notional and one-year maturity. This includes the estimate of realized volatilities assumed by supervisors for each underlying asset class. The supervisory factors are listed in Table 2 in paragraph 162.[Basel Framework, CRE 52.44]

7.1.7.11 Hedging Sets

136. The hedging sets in the different asset classes are defined as follows, except for those described in paragraphs 137 and 138.

- Interest rate derivatives consist of a separate hedging set for each currency;
- FX derivatives consist of a separate hedging set for each currency pair;
- Credit derivatives consist of a single hedging set;
- Equity derivatives consist of a single hedging set;
- Commodity derivatives consist of four hedging sets defined for broad categories of commodity derivatives: energy, metals, agricultural and other commodities.

[Basel Framework, CRE 52.45]

137. Derivatives that reference the basis between two risk factors and are denominated in a single currency[33] (basis transactions) must be treated within separate hedging sets within the corresponding asset class. There is a separate hedging set[34] for each pair of risk factors (i.e. for each specific basis). Examples of specific bases include three-month Libor versus six-month Libor, three-month Libor versus three-month T-Bill, one-month Libor versus OIS rate, Brent Crude oil versus Henry Hub gas. For hedging sets consisting of basis transactions, the supervisory factor applicable to a given asset class must be multiplied by one-half. Basket equity derivatives comprised of 10 or less effective constituents[35] may be decomposed into their underlying constituents. Baskets comprised of more than 10 effective constituents should be treated as indices. [Basel Framework, CRE 52.46]

138. Derivatives that reference the volatility of a risk factor (volatility transactions) must be treated within separate hedging sets within the corresponding asset class. Volatility hedging sets

[33] Derivatives with two floating legs that are denominated in different currencies (such as cross-currency swaps) are not subject to this treatment; rather, they should be treated as non-basis foreign exchange contracts.

[34] Within this hedging set, long and short positions are determined with respect to the basis.

[35] Number of effective constituents = $\left(\frac{(\sum_i share\ price_i \times number\ of\ shares_i)^2}{\sum_i (share\ price_i \times number\ of\ shares_i)^2}\right)$

must follow the same hedging set construction outlined in paragraph 136 (for example, all equity volatility transactions form a single hedging set). Examples of volatility transactions include variance and volatility swaps, options on realized or implied volatility. For hedging sets consisting of volatility transactions, the supervisory factor applicable to a given asset class must be multiplied by a factor of five.

[Basel Framework, CRE 52.36]

7.1.7.12 Maturity Factors

139. The minimum time risk horizons for an unmargined transaction is the lesser of one year and remaining maturity of the derivative contract, floored at 10 business days. Therefore, the calculation of the effective notional for an unmargined transaction includes the following maturity factor, where M_i is the remaining maturity floored by 10 business days:

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

[Basel Framework, CRE 52.48]

140. The maturity parameter (M_i) is expressed in years but is subject to a floor of 10 business days. Banks should use standard market convention to convert business days into years, and vice versa. For example, 250 business days in a year, which results in a floor of 10/250 years for M_i.
[Basel Framework, CRE 52.49]

141. For margined transactions, the maturity factor is calculated using the minimum margin period of risk (MPOR), subject to specified floors. That is, institutions must first estimate the margin period of risk (as defined in section 7.1.1.3) for each of their netting sets. They must then use the higher of their estimated margin period of risk and the relevant floor in the calculation of the maturity factor (defined in paragraph 143). The floors for the margin period of risk are as follows:

- Ten business days for non-centrally cleared derivative transactions subject to daily margin agreements.
- The sum of nine business days plus the re-margining period for non-centrally cleared transactions that are not subject to daily margin agreements.
- The relevant floors for centrally cleared transactions are prescribed in section 7.1.8.

[Basel Framework, CRE 52.50]

142. The following are exceptions to the floors on the minimum margin period of risk set out in paragraph 141 above:

- For netting sets consisting of 5,000 transactions that are not with a central counterparty or client cleared trades, the floor on the margin period of risk is 20 business days.

- For netting sets containing one or more trades involving either illiquid inbound varition margin, or an OTC derivative that cannot be easily replaced, the floor on the margin period of risk is 20 business days. For these purposes, "Illiquid inbound variation margin" and "OTC derivatives that cannot be easily replaced" must be determined in the context of stressed market conditions and will be characterized by the absence of continuously active markets where a counterparty would, within two or fewer days, obtain multiple price quotations that would not move the market or represent a price reflecting a market discount (in the case of collateral) or premium (in the case of an OTC derivative). Examples of situations where trades are deemed illiquid for this purpose include, but are not limited to, trades that are not marked daily and trades that are subject to specific accounting treatment for valuation purposes (e.g., OTC derivatives transactions referencing securities whose fair value is determined by models with inputs that are not observed in the market).
- If an institution has experienced more than two margin call disputes on a particular netting set over the previous two quarters that have lasted longer than the applicable margin period of risk (before considering this provision), then the institution must reflect this history appropriately by doubling the applicable supervisory floor on the margin period of risk for that netting set for the subsequent two quarters.
- In the case of non-centrally cleared derivatives subject to Guideline E-22 (Margin Requirements for non-centrally Cleared Derivatives), the previous bullet point only applies to variation margin call disputes.

[Basel Framework, CRE 52.51]

143. The calculation of the effective notional for a margined transaction includes the following maturity factor, where $MPOR_i$ is the margin period of risk appropriate for the margin agreement containing the transaction *i* (subject to floors set out in paragraphs 141 and 142 above):

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

[Basel Framework, CRE 52.52]

144. The margin period of risk ($MPOR_i$) is often expressed in days, but the calculation of the maturity factor for margined netting sets references one year in the denominator. Banks should use standard market convention to convert business days into years, and vice-versa. For example, one year can be converted into 250 business days in the denominator of the MF formula if MPOR is expressed in business days. Alternatively, the MPOR expressed in business days can be converted into years by dividing it by 250.
[Basel Framework, CRE 52.53]

7.1.7.13 Supervisory correlation parameters: $\rho_i^{(a)}$

145. These parameters only apply to the PFE add-on calculation for equity, credit and commodity derivatives, and are set out in Table 2 in paragraph 162. For these asset classes, the supervisory correlation parameters are derived from a single-factor model and specify the weight between systematic and idiosyncratic components. This weight determines the degree of offset between individual trades, recognizing that imperfect hedges provide some, but not perfect, offset. Supervisory correlation parameters do not apply to interest rate and foreign exchange derivatives. [Basel Framework, CRE 52.54]

Asset Class Level Add-ons

7.1.7.14 Add-on for interest rate derivatives[36]

146. The add-on for interest rate derivatives captures the risk of interest rate derivatives of different maturities being imperfectly correlated. It does this by allocating trades to maturity buckets, in which full offsetting of long and short positions is permitted, and by using an aggregation formula that only permits limited offsetting between transactions in different maturity buckets. This allocation of derivatives to maturity buckets and the process of aggregation are only used in the interest rate derivative asset class.[Basel Framework, CRE 52.56]

147. The add-on for interest rate derivatives within a netting set is calculated using the following steps.

(1) Step 1: Calculate the effective notional for each trade in the netting set that is in the rate derivative asset class. The is calculated as the product of the following three terms (i) the adjusted notional of the trade (d); (ii) the supervisory delta adjustment of the trade (*δ)*; and (iii) the maturity factor (MF). That is, for each trade i, $D_i = d_i \times \delta_i \times MF_i$.

(2) Step 2: Allocate the trades in the interest rate derivative asset class to hedging sets. In the interest rate derivative asset class the hedging sets consist of all the derivatives that reference the same currency.

(3) Step 3: Within each hedging set, allocate each of the trades to the following three maturity buckets: less than one year (bucket 1), between one and five years (bucket 2) and more than five years (bucket 3).

(4) Step 4: Calculate the effective notional of each maturity bucket by adding together all the trade-level effective notionals calculated in step 1 of the trades within the maturity bucket. Let D^{B1}, D^{B2} and D^{B3} be the effective notionals of the buckets 1,2 and 3 respectively.

[36] Inflation derivatives may be treated in the same manner as interest rate derivatives. Derivatives referencing inflation rates for the same currency should form a separate hedging set and should be subjected to the same 0.5% supervisory factor. AddOn amounts from inflation derivatives must be added to $Addon^{IR}$ mentioned in step 7 of the paragraph 147.

(5) Step 5: Calculate the effective notional of the hedging set (EN_{HS}) by using either of the two following aggregation formulas (the latter to be used if the banks chooses not to recognize offsets between long and short positions across maturity buckets):

Offset formula:

$$EN_{HS} = [(D^{B1})^2 + (D^{B2})^2 + (D^{B3})^2 + 1.4 \times D^{B1} \times D^{B2} + 1.4 \times D^{B2} \times D^{B3} + 0.6 \times D^{B1} \times D^{B3}]^{\frac{1}{2}}$$

No offset formula:

$$EN_{HS} = |D^{B1}| + |D^{B2}| + |D^{B3}|$$

(6) Step 6: Calculate the hedging set level add-on ($AddOn_{HS}$) by multiplying the effective notional of the hedging set (EN_{HS}) by the prescribed supervisory factor (SF_{HS}). The prescribed supervisory factor in the interest rate asset class is set to 0.5%, which means $AddOn_{HS} = EN_{HS} \times 0.005$.

(7) Step 7: Calculate the asset class level add-on ($AddOn^{IR}$) by adding together all of the hedging set level add-ons calculated in step 6.

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

[Basel Framework, CRE 52.57]

7.1.7.15 Add-on for foreign exchange derivatives

148. The steps to calculate the add-on for foreign exchange derivatives are similar to the steps for the interest rate derivative asset class, except that there is no allocation of trades to maturity buckets (which means that there is full offsetting of long and short positions within the hedging set of the foreign exchange derivative asset class).

[Basel Framework, CRE 52.58]

149. The add-on for foreign exchange derivative asset class ($AddOn^{FX}$) within a netting set is calculated using the following steps:

(1) Step 1: Calculate the effective notional for each trade in the netting set that is in the foreign exchange derivative asset class. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d); (ii) the supervisory delta adjustment of the trade[37] (δ); and (iii) the maturity factor (MF). That is, for each trade i, $D_i = d_i \times \delta_i \times MF_i$.

[37] For foreign exchange options, the ordering of the respective currency pair will impact the calculation of the supervisory delta adjustment. As such, for each currency pair, the same ordering convention must be used consistently across an institution and over time. The convention is to be chosen in such a way that it corresponds best to the market practice for how derivatives in the respective currency pair are usually quoted and traded.

(2) Step 2: Allocate the trade in the foreign exchange derivative asset class to hedging sets. In the foreign exchange derivative asset class the hedging sets consist of all the derivatives that reference the same currency pair.

(3) Step 3: Calculate the effective notional of each hedging set (EN_{HS}) by adding together the trade level effective notionals calculated in step 1.

(4) Step 4: Calculate the hedging set level add-on ($AddOn_{HS}$) by multiplying the absolute value of the effective notional of the hedging set (EN_{HS}) by the prescribed supervisory factor (SF_{HS}). The prescribed supervisory factor in the foreign exchange derivative asset class is set at 4%, which means that $AddOn_{HS} = |EN_{HS}| \times 0.04$.

(5) Step 5: Calculate the asset class level add-on ($AddOn^{FX}$) by adding together all of the hedging set level add-ons calculated in step 4.

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

[Basel Framework, CRE 52.59]

7.1.7.16 *Add-on for credit derivatives*

150. The calculation of the add-on for the credit derivative asset class only gives full recognition of the offsetting of long and short positions for derivatives that reference the same entity (e.g., the same corporate issuer of bonds). Partial offsetting is recognized between derivatives that reference different entities in step 4 below. [Basel Framework, CRE 52.60]

151. The add-on for the credit derivative asset class ($AddOn^{Credit}$) within a netting set is calculated using the following steps:

(1) Step 1: Calculate the effective notional for each trade in the netting set that is in the credit derivative asset class. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d); (ii) the supervisory delta adjustment of the trade (δ); and (iii) the maturity factor (MF). That is, for each trade i, $D_i = d_i \times \delta_i \times MF_i$.

(2) Step 2: Calculate the combined effective notional for all derivatives that reference the same entity. Each separate credit index that is referenced by derivatives in the credit derivative asset class should be treated as a separate entity. The combined effective notional of the entity (EN_{entity}) is calculated by adding together the trade level effective notionals calculated in step 1 that reference that entity.

(3) Step 3: Calculate the add-on for each entity ($AddOn_{entity}$) by multiplying the combined effective notional for that entity calculated in step 2 by the supervisory factor that is specified for that entity (SF_{entity}). The supervisory factors vary according to the credit rating of the entity in the case of single name derivatives, and whether the index is considered investment grade or non-investment grade in the case of derivatives that reference an index. The supervisory factors are set out in Table 2 in paragraph 162.

(4) Calculate the asset class level add-on ($AddOn^{Credit}$) by using the formula that follows. In the formula the summations are across all entities referenced by the derivatives, $AddOn_{entity}$ is the add-on amount calculated in step 3 for each entity referenced by the derivatives and ρ_{entity} is the supervisory prescribed correlation factor corresponding to the entity. As set out in Table 2 in paragraph 162, the correlation factor is 50% for single entities and 80% for indices.

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

[Basel Framework, CRE 52.61]

152. The formula to recognized partial offsetting in step 4 above, is a single-factor model, which divides the risk of the credit derivative asset class into a systemic component and an idiosyncratic component. The entity level add-ons are allowed to offset each other fully in the systemic component, whereas, there is no offsetting benefit in the idiosyncratic component. These two components are weighted by a correlation factor which determines the degree of offsetting/hedging benefit within the credit derivative asset class. The higher the correlation factor, the higher the importance of the systemic component, hence the higher the degree of offsetting benefits. [Basel Framework, CRE 52.62]

153. It should be noted that a higher or lower correlation does not necessarily mean a higher or lower capital charge. For portfolios consisting of long and short credit positions, a high correlation factor would reduce the charge. For portfolios consisting exclusively of long positions (or short positions), a higher correlation factor would increase the charge. If most of the risk consists of systematic risk, then individual reference entities would be highly correlated and long and short positions should offset each other. If, however, most of the risk is idiosyncratic to a reference entity, then individual long and short positions would not be effective hedges for each other. [Basel Framework, CRE 52.63]

154. The use of a single hedging set for credit derivatives implies that credit derivatives from different industries and regions are equally able to offset the systematic component of an exposure, although they would not be able to offset the idiosyncratic portion. This approach recognizes that meaningful distinctions between industries and/or regions are complex and difficult to analyze for global conglomerates. [Basel Framework, CRE 52.64]

7.1.7.17 Add-on for equity derivatives

155. The calculation of the add-on for the equity derivative asset class is very similar to the calculation of the add-on for the credit derivative asset class. It only gives full recognition of the offsetting of long and short positions for derivatives that reference the same entity (e.g., the same corporate issuer of shares). Partial offsetting is recognized between derivatives that reference different entities in step 4 below. [Basel Framework CRE 52.65]

156. The add-on for the equity derivative asset class ($AddOn^{Equity}$) within a netting set is calculated using the following steps:

(1) Step 1: Calculate the effective notional for each trade in the netting set that is in the equity derivative asset class. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d); (ii) the supervisory delta adjustment of the trade (δ); and (iii) the maturity factor (MF). That is, for each trade i, $D_i = d_i \times \delta_i \times MF_i$.

(2) Step 2: Calculate the combined effective notional for all derivatives that reference the same entity. Each separate equity index that is referenced by derivatives in the equity derivative asset class should be treated as a separate entity. The combined effective notional of the entity (EN_{entity}) is calculated by adding together the trade level effective notionals calculated in step 1 that reference that entity.

(3) Step 3: Calculate the add-on for each entity ($AddOn_{entity}$) by multiplying the combined effective notional for that entity calculated in step 2 by the supervisory factor that is specified for that entity (SF_{entity}). The supervisory factors are set out in Table 2 of paragraph 162 and vary according to whether the entity is a single name ($SF_{entity} = 32\%$) or an index ($SF_{entity} = 20\%$).

(4) Step 4: Calculate the asset class level add-on ($AddOn^{Equity}$) by using the formula that follows. In the formula the summations are across all entities referenced by the derivatives, $AddOn_{entity}$ is the add-on amount calculated in step 3 for each entity referenced by the derivatives and ρ_{entity} is the supervisory prescribed correlation factor corresponding to the entity. As set out in Table 2 in paragraph 162, the correlation factor is 50% for single entities and 80% for indices.

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

[Basel Framework, CRE 52.66]

157. The calibration of the supervisory factors for equity derivatives rely on estimates of the market volatility of equity indices, with the application of a conservative beta factor[38] to translate this estimate into an estimate of individual volatilities.[Basel Framework, CRE 52.67]

158. Institutions are not permitted to make any modelling assumptions in the calculation of the PFE add-ons, including estimating individual volatilities or taking publicly available estimates of beta. This is a pragmatic approach to ensure a consistent implementation across jurisdictions but also to keep the add-on calculation relatively simple and prudent. Therefore, only two values of supervisory factors have been defined for equity derivatives, one for single entities and one for indices.

[38] The beta of an individual equity measures the volatility of the stock relative to a broad market index. A value of beta greater than one means the individual equity is more volatile than the index. The greater the beta is, the more volatile the stock. The beta is calculated by running a linear regression of the stock on the broad index.

[Basel Framework, CRE52.68]

7.1.7.18 Add-on for commodity derivatives

159. The calculation of the add-on for the commodity derivative asset class is similar to the calculation of the add-on for the credit and equity derivative asset classes. It recognizes the full offsetting of long and short positions for derivatives that reference the same type of underlying commodity. It also allows partial offsetting between derivatives that reference different types of commodity, however, this partial offsetting is only permitted within each of the four hedging sets of the commodity derivative asset class, where the different commodity types are more likely to demonstrate some stable, meaningful joint dynamics. Offsetting between hedging sets is not recognized (e.g. a forward contract on crude oil cannot hedge a forward contract on corn). [Basel framework, CRE 52.69]

160. The add-on for the commodity derivative asset class ($AddOn^{Commodity}$) within a netting set is calculated using the following steps:

(1) Step 1: Calculate the effective notional for each trade in the netting set that is in the commodity derivative asset class. This is calculated as the product of the following three terms: (i) the adjusted notional of the trade (d); (ii) the supervisory delta adjustment of the trade (δ); and (iii) the maturity factor (MF). That is, for each trade i, $D_i = d_i \times \delta_i \times MF_i$.

(2) Step 2: Allocate the trades in the commodity derivative asset class to hedging sets. In the commodity derivative asset class there are four hedging sets consisting of derivatives that reference: energy, metals, agriculture and other commodities.

(3) Step 3: Calculate the combined effective notional for all derivatives within each hedging set that reference the same commodity type (e.g., all derivatives that reference copper within the metals hedging set). The combined effective notional of the commodity type ($EN_{ComType}$) is calculated by adding together the trade level effective notionals calculated in step 1 that reference the commodity type.

(4) Step 4: Calculate the add-on for each commodity type ($AddOn_{ComType}$) within each hedging set by multiplying the combined effective notional for that commodity calculated in step 3 by the supervisory factor that is specified for that commodity type ($SF_{ComType}$). The supervisory factors are set out in Table 2 in paragraph 162 and are set to 40% for electricity derivatives and 18% for derivatives that reference all other types of commodities.

(5) Step 5: Calculate the add-on for each of the four commodity hedging sets ($AddOn_{HS}$) by using the formula that follows. In the formula the summations are across all commodity types within the hedging set, $AddOn_{ComType}$ is the add-on amount calculated in step 4 for each commodity type and $\rho_{ComType}$ is the supervisory prescribed correlation factor corresponding to the commodity type. As set out in Table 2 of paragraph 162, the correlation factor is set to 40% for all commodity types.

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

(6) Step 6: Calculate the asset class level add-on ($AddOn^{Commodity}$) by adding together all of the hedging set level add-ons calculated in step 5:

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

[Basel Framework, CRE 52.70]

161. Regarding the calculation steps above, defining individual commodity types is operationally difficult. In fact, it is impossible to fully specify all relevant distinctions between commodity types so that all basis risk is captured. For example crude oil could be a commodity type within the energy hedging set, but in certain cases this definition could omit a substantial basis risk between different types of crude oil (West Texas Intermediate, Brent, Saudi Light, etc). Also, the four commodity type hedging sets have been defined without regard to characteristics such as location and quality. For example, the energy hedging set contains commodity types such as crude oil, electricity, natural gas and coal. OSFI may require banks to use more refined definitions of commodities when they are significantly exposed to the basis risk of different products within those commodity types. [Basel Framework, CRE 52.71]

Supervisory Specific Parameters

162. Table 2 includes the supervisory factors, correlations and supervisory option volatility add-ons for each asset class and subclass.

Table 2 – Summary Table of Supervisory Parameters

Asset Class	Subclass	Supervisory factor	Correlation	Supervisory option volatility[39]
Interest Rate	N/A	0.50%	N/A	50%
Foreign Exchange	N/A	4.0%	N/A	15%
Credit, Single Name	AAA	0.38%	50%	100%
Credit, Single Name	AA	0.38%	50%	100%
Credit, Single Name	A	0.42%	50%	100%
Credit, Single Name	BBB	0.54%	50%	100%
Credit, Single Name	BB	1.06%	50%	100%
Credit, Single Name	B	1.6%	50%	100%
Credit, Single Name	CCC	6.0%	50%	100%
Credit, Index	IG	0.38%	80%	80%
Credit, Index	SG	1.06%	80%	80%

[39] For swaptions for all currencies, a 50% supervisory option volatility should be used.

Equity, Single Name	N/A	32%	50%	120%
Equity, Index	N/A	20%	80%	75%
Commodity	Electricity	40%	40%	150%
Commodity	Oil/Gas	18%	40%	70%
Commodity	Metals	18%	40%	70%
Commodity	Agricultural	18%	40%	70%
Commodity	Other	18%	40%	70%

[Basel Framework, CRE 52.72]

163. For credit derivatives where the institution is the protection seller and that are outside netting and margin agreements, the EAD may be capped to the amount of unpaid premiums. Institutions have the option to remove such credit derivatives from their legal netting sets and treat them as individual un-margined transactions in order to apply the cap. For add-on factors, refer to Table 2 of paragraph 162.

164. For a basis transaction hedging set, the supervisory factor applicable to its relevant asset class must be multiplied by one-half. For a volatility transaction hedging set, the supervisory factor applicable to its relevant asset class must be multiplied by a factor of five. [Basel Framework 52.73]

7.1.7.19 *Treatment of multiple margin agreements and multiple netting sets*

165. If multiple margin agreements apply to a single netting set, (for example: one Credit Support Annex [CSA] for VM and one for Initial Margin [IM]), all collateral collected against the netting set in question can be used to offset exposures as if it were collected in a single netting set, provided the institution has performed sufficient legal review to ensure the requirements of paragraph 103 are satisfied.

When multiple CSAs apply to an individual netting set, the RC and PFE are calculated as follows:

<u>RC</u>

- The V and C terms should consider all transactions within a netting set, across all CSAs; and
- The TH + MTA - NICA is the sum of the thresholds and MTAs across all CSA agreement.

<u>PFE</u>

- In the multiplier term, similarly to RC, the V and C terms should consider all transactions in the netting set across all CSA agreements; and
- The margin period of risk applied to calculate effective notionals is specific to the individual CSA to which a trade belongs.

[Basel Framework, CRE 52.74]

166. If a single margin agreement applies to several netting sets, special treatment is necessary because it is problematic to allocate the common collateral to individual netting sets. The replacement cost at any given time is determined by the sum of two terms. The first term is equal to the unmargined current exposure of the institution to the counterparty aggregated across all netting sets within the margin agreement reduced by the positive current net collateral (i.e. collateral is subtracted only when the institution is a net holder of collateral). The second term is non-zero only when the institution is a net poster of collateral: it is equal to the current net posted collateral (if there is any) reduced by the unmargined current exposure of the counterparty to the institution aggregated across all netting sets within the margin agreement. Net collateral available to the institution should include both VM and NICA. Mathematically, RC for the entire margin agreement is:

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

where the summation $NS \in MA$is across the netting sets covered by the margin agreement (hence the notation), V_{NS} is the current mark-to-market value of the netting set *NS* and C_{MA} is the cash equivalent value of all currently available collateral under the margin agreement.

[Basel Framework 52.75]

167. Where a single margin agreement applies to several netting sets as described in paragraph 166, collateral will be exchanged based on mark-to-market values that are netted across all transactions covered under the margin agreement, irrespective of netting sets. That is, collateral exchanged on a net basis may not be sufficient to cover *PFE*.

In this situation, therefore, the *PFE* add-on must be calculated according to the unmargined methodology. Netting set-level *PFE*s are then aggregated. Mathematically:

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

where $PFE_{NS}^{(unmargined)}$is the PFE add-on for the netting set *NS* calculated according to the unmargined requirements.

For the calculation of the multiplier of the PFE of each individual netting set covered by a single margin agreement or collateral amount, the available collateral C (which, in the case of a variation margin agreement, includes variation margin posted or received) should be allocated to the netting sets as follows:

- If the institution is a net receiver of collateral (C>0), all of the individual amounts allocated to the individual netting sets must also be positive or zero. Netting sets with positive market values must first be allocated collateral up to the amount of those market values. Only after all positive market values have been compensated may surplus collateral be attributed freely among all netting sets.

- If the institution is a net provider of collateral (C<0), all of the individual amounts allocated to the individual netting sets must also be negative or zero. Netting sets with negative market values must first be allocated collateral up to the amount of their market values. If the collateral provided is larger than the sum of the negative market values, then all multipliers must be set equal to 1 and no allocation is necessary.
- The allocated parts must add up to the total collateral available for the margin agreement.

Apart from these limitations, institutions may allocate available collateral at their discretion. The multiplier is then calculated per netting set according to paragraph 118 taking the allocated amount of collateral into account.

[Basel Framework 52.76]

168. Eligible collateral which is taken outside a netting set, but is available to a bank to offset losses due to counterparty default on one netting set only, should be treated as an independent collateral amount associated with the netting set and used within the calculation of replacement cost in paragraph 105 when the netting set is unmargined and in paragraph 113 when the netting set is margined. Eligible collateral which is taken outside a netting set, and is available to a bank to offset losses due to counterparty default on more than one netting set, should be treated as collateral taken under a margin agreement applicable to multiple netting sets, in which case the treatment in paragraphs 166 and 167 applies. If eligible collateral is available to offset losses on non-derivatives exposures as well as exposures determined using the SA-CCR, only that portion of the collateral assigned to the derivatives may be used to reduce the derivatives exposure.

7.1.7.20 Treatment of trades subject to Specific Wrong-Way Risk and Specific Right-Way Risk

169. The requirements for trades where SWWR or SRWR has been identified outlined in paragraphs 65 and 66, respectively, also apply to trades where the exposure is measured using the SACCR.

7.1.8 Central Counterparties

170. When the clearing member-to-client leg of an exchange-traded derivative transaction is conducted under a bilateral agreement, both the client and the clearing member are to capitalize that transaction as an OTC derivative.[40] This treatment also applies to transactions between lower-level clients and higher-level clients in a multi-level client structure. [Basel Framework, CRE 54.2]

171. Regardless of whether a CCP is classified as a QCCP, an institution retains the responsibility to ensure that it maintains adequate capital for its exposures. Under the ICAAP, an institution should consider whether it might need to hold capital in excess of the minimum capital requirements if, for example, (i) its dealings with a CCP give rise to more risky exposures or (ii) where, given the context of that institution's dealings, it is unclear that the CCP meets the definition of a QCCP or (iii) an external assessment such as an International Monetary Fund Financial Sector Assessment Program has found material shortcomings in the CCP or regulation

[40] For this purpose, the treatment in paragraph 179 would also apply.

of CCPs, and the CCP and/or CCP regulator have not since publicly addressed the identified issues. [Basel Framework, CRE 54.3]

172. Where the institution is acting as a clearing member, the institution should assess through appropriate scenario analysis and stress testing whether the level of capital held against exposures to a CCP adequately addresses the inherent risks of those transactions. This assessment will include potential future or contingent exposures resulting from future drawings on default fund commitments, and/or from secondary commitments to take over or replace offsetting transactions from clients of another clearing member in case of this clearing member defaulting or becoming insolvent. [Basel Framework, CRE 54.4]

173. An institution must monitor and report to senior management on a regular basis all of its exposures to CCPs, including exposures arising from trading through a CCP and exposures arising from CCP membership obligations such as default fund contributions. [Basel Framework, CRE 54.5]

174. Where an institution is clearing derivative, SFT and/or long settlement transactions through a Qualifying CCP (QCCP) as defined in paragraph 3, then paragraphs 175 to 207 of this Chapter will apply. In the case of non-qualifying CCPs, paragraphs 208 and 209 of this Chapter will apply. Within three months of a central counterparty ceasing to qualify as a QCCP, unless OSFI requires otherwise, the trades with a former QCCP may continue to be capitalized as though they are with a QCCP. After that time, the bank's exposures with such a central counterparty must be capitalized according to paragraphs 208 and 209 of this Chapter. [Basel Framework, CRE 54.6]

7.1.8.1 *Exposures to Qualifying CCPs*

A. Trade exposures

(i) Clearing member exposures to CCPs

175. Where an institution acts as a clearing member of a CCP for its own purposes, a risk weight of 2% must be applied to the institution's trade exposure to the CCP in respect of OTC derivatives, exchange-traded derivative transactions, SFTs and long-settlement transactions. Where the clearing member offers clearing services to clients, the 2% risk weight also applies to the clearing member's trade exposure to the CCP that arises when the clearing member is obligated to reimburse the client for any losses suffered due to changes in the value of its transactions in the event that the CCP defaults. The risk weight applied to collateral posted to the CCP by the institution must be determined in accordance with paragraphs 185 to 188. [Basel Framework, CRE 54.7]

176. The exposure amount for such trade exposure is to be calculated in accordance with this chapter using the IMM or the SACCR, as consistently applied by such an institution to such an exposure in the ordinary course of its business, or Chapter 4 for collateralized transactions. In applying these methods:

(1)The 20-day floor for the margin period of risk (MPOR) as established in the first bullet point of paragraph 40 (IMM) and 142 (SACCR) dealing with the number of transactions will not apply, provided that the netting set does not contain illiquid collateral or exotic trades and provided there are no disputed trades. This refers to exposure calculations under the IMM and the SACCR as well as for the holding periods entering the exposure calculation of repo-style transactions in Chapter 4.

(2) In all cases, a minimum MPOR of 10 days must be used for the calculation of trade exposures to CCPs for OTC derivatives.

(3) Where CCPs retain variation margin against certain trades (e.g., where CCPs collect and hold variation margin against positions in exchange-traded or OTC forwards), and the member collateral is not protected against the insolvency of the CCP, the minimum time risk horizon applied to institutions' trade exposures on those trades must be the lesser of one year and the remaining maturity of the transaction, with a floor of 10 business days.

[Basel Framework, CRE 54.8]

177. The methods for calculating counterparty credit risk exposures , when applied to bilateral trading exposures (i.e., non-CCP counterparties), require banks to calculate exposures for each individual netting set. However, netting arrangements for CCPs are not as standardized as those for OTC netting agreements in the context of bilateral trading. As a consequence, paragraph 178 below makes certain adjustments to the methods for calculating counterparty credit risk exposure to permit netting under certain conditions for exposures to CCPs. [Basel Framework, CRE 54.9]

178. Where settlement is legally enforceable on a net basis in an event of default and regardless of whether the counterparty is insolvent or bankrupt, the total replacement cost of all contracts relevant to the trade exposure determination can be calculated as a net replacement cost if the applicable close-out netting sets meet the requirements set out in:

- Paragraphs 252 and, where applicable, also 253 of Chapter 4 in the case of repo-style transactions,
- Paragraph 103 of this Chapter in the case of derivative transactions, and
- Paragraphs 83 to 92 of this Chapter in the case of cross-product netting.

To the extent that the rules referenced above include the term "master agreement" or the phrase "a netting contract with a counterparty or other agreement", this terminology must be read as including any enforceable arrangement that provides legally enforceable rights of set-off.[41] If the institution cannot demonstrate that netting agreements meet these requirements, each single transaction will be regarded as a netting set of its own for the calculation of trade exposure.

[Basel Framework, CRE 54.10 and 54.11]

[41] This is to take account of the fact that netting arrangements for CCPs are not as standardized as those for OTC netting agreements in the context of bilateral trading; however, netting is generally provided for in CCP rules.

(ii) Clearing member exposures to clients

179. The clearing member will always capitalize its exposure (including potential CVA risk exposure) to clients as bilateral trades, irrespective of whether the clearing member guarantees the trade or acts as an intermediary between the client and the CCP. However, to recognize the shorter close-out period for cleared client transactions, clearing members can capitalize the exposure to their clients applying a margin period of risk of at least five days in IMM or SA-CCR.[42] [Basel Framework, CRE 54.12]

180. If a clearing member collects collateral from a client for client cleared trades and this collateral is passed on to the CCP, the clearing member may recognize this collateral for both the CCP-clearing member leg and the clearing member-client leg of the client cleared trade. Therefore, initial margin posted by clients to their clearing member mitigates the exposure the clearing member has against these clients. The same treatment applies, in an analogous fashion, to multi-level client structures (between a higher level client and a lower level client). [Basel Framework, CRE 54.13]

(iii) Client exposures

181. Subject to the two conditions set out in paragraph 182 below being met, the treatment set out in paragraphs 175 to 178 above (i.e. the treatment of clearing member exposures to CCPs) also applies to the following:

(1) An institution's exposure to a clearing member where:

   a. The institution is a client of the clearing member; and

   b. The transactions arise as a result of the clearing member active as a financial intermediary (i.e., the clearing member completes an offsetting transaction with a CCP).

(2) An institution's exposure to a CCP resulting from a transactions with the CCP where:

   a. The institution is a client of a clearing member; and

   b. The clearing member guarantees the performance of the institution's exposure to the CCP.

(3) Exposures of lower-level clients to higher-level clients in a multi-level client structure, provided that for all clients levels in-between the two conditions in paragraph 182 below are met.

[Basel Framework, CRE 54.14]

[42] The reduced EAD should also be used for the calculation of both the Advanced and Standardized CVA capital charge.

182. The two conditions referenced in paragraph 181 above are:

(1) The offsetting transactions are identified by the CCP as client transactions and collateral to support them is held by the CCP and/or the clearing member, as applicable, under arrangements that prevent any losses to the client due to: (a) the default or insolvency of the clearing member; (b) the default or insolvency of the clearing member's other clients; and (c) the joint default or insolvency of the clearing member and any of its other clients. Regarding the condition set out in this paragraph:

   a. Upon the insolvency of the clearing member, there must be no legal impediment (other than the need to obtain a court order to which the client is entitled) to the transfer of the collateral belonging to clients of a defaulting clearing member to the CCP, to one or more other surviving clearing members or to the client or the client's nominee.

   b. The client must have conducted a sufficient legal review (and undertake such further review as necessary to ensure continuing enforceability) and have a well founded basis to conclude that, in the event of legal challenge, the relevant courts and administrative authorities would find that such arrangements mentioned above would be legal, valid, binding and enforceable under the relevant laws of the relevant jurisdiction(s).

(2) Relevant laws, regulation, rules, contractual, or administrative arrangements provide that the offsetting transactions with the defaulted or insolvent clearing member are highly likely to continue to be indirectly transacted through the CCP, or by the CCP, if the clearing member defaults or becomes insolvent. In such circumstances, the client positions and collateral with the CCP will be transferred at market value unless the client requests to close out the position at market value. Regarding the condition set out in this paragraph, if there is a clear precedent for transactions being ported at a CCP and industry intent for this practice to continue, then these factors must be considered when assessing if trades are highly likely to be ported. The fact that CCP documentation does not prohibit client trades from being ported is not sufficient to say they are highly likely to be ported.

[Basel Framework, CRE 54.15]

183. Where a client is not protected from losses in the case that the clearing member and another client of the clearing member jointly default or become jointly insolvent, but all other conditions in the preceding paragraph are met, a risk weight of 4% will apply to the client's exposure to the clearing member, or to the higher level client, respectively. [Basel Framework, CRE 53.16]

184. Where the institution is a client of the clearing member and the requirements in paragraphs 181 to 183 are not met, the institution will capitalize its exposure (including potential CVA risk exposure) to the clearing member as a bilateral trade. [Basel Framework, CRE 54.17]

(iv) Treatment of posted collateral

185. In all cases, any assets or collateral posted must, from the perspective of the institution posting such collateral, receive the risk weights that otherwise applies to such assets or collateral under the capital adequacy framework, regardless of the fact that such assets have been posted as collateral.[43] That is, collateral posted must receive the banking book or trading book treatment it would receive if it had not been posted to the CCP. [Basel Framework, CRE 54.18]

186. In addition to the requirements in paragraph 185 above, the posted assets or collateral are subject to counterparty credit risk requirements, regardless of whether they are in the banking or trading book. This includes the increase in the counterparty credit risk exposure due to the application of haircuts. The counterparty credit risk requirements arise where assets or collateral of a clearing member or client are posted with a CCP or a clearing member and are not held in a bankruptcy remote manner. In such cases, the institution posting such assets or collateral must also recognize the credit risk based upon the assets or collateral being exposed to risk of loss based on the creditworthiness of the entity holding such assets or collateral, as described further below. [Basel Framework, CRE 54.19]

187. Where such collateral is included in the definition of trade exposures and the entity holding the collateral is the CCP, the following risk weights apply where the assets or collateral is not held on a bankruptcy-remote basis:

(1) For institutions that are clearing members a risk-weight of 2% applies.

(2) For institutions that are clients of clearing members:

a) A 2% risk weight applies if the conditions in paragraph 181 and 182 are met; or

b) A 4% risk weight applied if the conditions in paragraph 183 are met

[Basel Framework, CRE 54.20]

188. Where such collateral is included in the definition of trades exposures, there is no capital requirement for counterparty credit risk exposures if the collateral is: (a) held by a custodian;[44] and (b) bankruptcy remote from the CCP. Regarding this paragraph, all forms of collateral are included, such as: cash, securities, other pledged assets, and excess initial or variation margin, also called overcollateralization, that is held by a custodian, and is bankruptcy remote from the CCP, is not subject to a capital requirement for counterparty credit risk exposure

[43] Collateral posted must receive the banking book or trading book treatment it would receive if it had not been posted to the CCP. In addition, this collateral is subject to the CCR framework of the Basel rules, regardless of whether it is in the banking or trading book. This includes the increase due to haircuts under either the standardized supervisory haircuts or the own estimates.

[44] In this paragraph, the word "custodian" may include a trustee, agent, pledgee, secured creditor or any other person that holds property in a way that does not give such person a beneficial interest in such property and will not result in such property being subject to legally-enforceable claims by such persons creditors, or to a court-ordered stay of the return of such property, if such person becomes insolvent or bankrupt.

to such bankruptcy remote custodian (i.e. the related risk weight or EAD is equal to zero). [Basel Framework, CRE 54.21]

189. The relevant risk weight of the CCP will apply to assets or collateral posted by a bank that do not meet the definition of trade exposures (for example, treating the exposure as a financial institution under the standardized approach or internal ratings-based approach to credit risk). [Basel Framework, CRE 54.22]

190. Regarding the calculation of the exposure, or EAD, where banks use the SA-CCR to calculate exposures, collateral posted which is not held in a bankruptcy remote manner must be accounted for in the net independent collateral amount term in accordance with paragraph 110 to 114. For banks using IMM models, the alpha multiplier must be applied to the exposure on posted collateral. [Basel Framework, CRE 54.23]

B. Default fund exposures

191. Where a default fund is shared between products or types of business with settlement risk only (e.g., equities and bonds) and products or types of business which give rise to counterparty credit risk (i.e., OTC derivatives, exchange-traded derivatives, SFTs or long settlement transactions), all of the default fund contributions will receive the risk weight determined according to the formulae and methodology set forth below, without apportioning to different classes or types of business or products. However, where the default fund contributions from clearing members are segregated by product types and only accessible for specific product types, the capital requirements for those default fund exposures determined according to the formulae and methodology set forth below must be calculated for each specific product giving rise to counterparty credit risk. In case the CCP's prefunded own resources are shared among product types, the CCP will have to allocate those funds to each of the calculations, in proportion to the respective product specific EAD. [Basel Framework, CRE 54.24]

192. Whenever an institution is required to capitalize for exposures arising from default fund contributions to a QCCP, clearing member institutions will apply the following approach. [Basel Framework, CRE 54.25]

193. Clearing member institutions will apply a risk weight to their default fund contributions determined according to a risk sensitive formula that considers (i) the size and quality of a qualifying CCP's financial resources, (ii) the counterparty credit risk exposures of such CCP, and (iii) the application of such financial resources via the CCP's loss bearing waterfall, in the case of one or more clearing member defaults. The clearing member institution's risk sensitive capital requirement for its default fund contribution (K_{CM_i}) must be calculated using the formulae and methodology set forth below. This calculation may be performed by a CCP, institution, supervisor or other body with access to the required data, as long as the conditions in paragraphs 204 to 206 are met. [Basel Framework, CRE 54.26]

194. The clearing member bank's risk-sensitive capital requirement for its default fund contribution (K_{CMi}) is calculated in two steps:

1) Calculate the hypothetical capital requirement of the CCP due to its counterparty credit risk exposures to all of its clearing members and their clients.

2) Calculate the capital requirement for the clearing member institution.

[Basel Framework, CRE 54.27]

Hypothetical Capital Requirement of the CCP

195. The first step in calculating the clearing member institution's capital requirement for its default fund contribution is to calculate the hypothetical capital requirement of the CCP (K_{CCP}) due to its counterparty credit risk exposures to all of its clearing members and their clients. K_{CCP} is a hypothetical capital requirement for a CCP, calculated on a consistent basis for the sole purpose of determining the capitalization of clearing member default fund contributions; it does not represent the actual capital requirements for a CCP which may be determine by a CCP and its supervisor. [Basel Framework, CRE 54.28]

196. K_{CCP} is calculated using the following formula

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

where

(1) RW is a risk weight of 20%[45]

(2) Capital ratio means 8%

(3) CM is the clearing member

(4) EAD_i is the exposure amount of the CCP to CM 'i', including both the CM's own transactions and client transactions guaranteed by the CM, and all values of collateral held by the CCP (including the CM's prefunded default fund contribution) against these transactions, relating to the valuation at the end of the regulatory reporting date before the margin called on the final margin call of that day is exchanged.

(5) The sum is over all clearing member accounts.

[Basel Framework, CRE 54.29]

197. Where clearing members provide client clearing services, and client transactions and collateral are held in separate (individual or omnibus) sub-accounts to the clearing member's proprietary business, each such client sub-account should enter the sum in paragraph 196

[45] The 20% risk weight is a minimum requirement. As with other parts of the capital adequacy framework, OSFI may increase the risk weight. An increase in such risk weight would be appropriate if, for example, the clearing members in a CCP are not highly rated. Any such increase in risk weight is to be communicated by the affected institutions to the person completing this calculation.

separately, i.e. the member EAD in the formula above is then the sum of the client sub-account EADs and any house sub-account EAD. This will ensure that client collateral cannot be used to offset the CCP's exposures to clearing members' proprietary activity in the calculation of K_{CCP}. If any of these sub-accounts contains both derivatives and SFTs, the EAD of that sub-account is the sum of the derivative EAD and the SFT EAD. [Basel Framework, CRE 54.30]

198. In the case that collateral is held against an account containing both SFTs and derivatives, the prefunded initial margin provided by the member or client must be allocated to the SFT and derivatives exposures in proportion to the respective product specific EADs, calculated according to Chapter 4 for SFTs and the SACCR in this chapter (without including the effects of collateral) for derivatives. [Basel Framework, CRE 54.31]

199. If the default fund contributions of the member (DF_i) are not split with regard to client and house sub-accounts, they must be allocated per sub-account according to the respective fraction the initial margin of that sub-account has in relation to the total initial margin posted by or for the account of the clearing member. [Basel Framework, CRE 54.32]

200. For derivatives, EAD_i is calculated as the bilateral trade exposure the CCP has against the clearing member using the SACCR.[46] [47] In applying the SACCR:

1) A MPOR of 10 days must be used to calculate the CCP's potential future exposure to its clearing members on derivatives transactions (the 20 day floor on the MPOR for netting sets with more than 5,000 trades does not apply).

2) All collateral held by a CCP to which that CCP has a legal claim in the event of the default of the member or client, including default fund contributions of that member (DF_i), is used to offset the CCP's exposure to that member or client, through inclusion in the PFE multiplier in accordance with paragraphs 117 to 118 of this Chapter.

[Basel Framework, CRE 54.33]

201. For SFTs, EAD is equal to $\max(EBRM_i - IM_i - DF_i; 0)$, where

1) $EBRM_i$ denotes the exposure value to clearing member 'i' before risk mitigation under Chapter 4; where, for the purposes of this calculation, variation margin that has been exchanged (before the margin called on the final margin call of that day) enters into the mark-to-market value of the transactions;

2) IM_i is the initial margin collateral posted by the clearing member with the CCP;

[46] A MPOR of 10 days must be used to calculate the CCP's potential future exposure to its clearing members on derivatives transactions

[47] For exposures to QCCPs located in jurisdictions where the SA-CCR has not been implemented the EAD may be computed using the current exposure method as described *Capital requirements for bank exposures to central counterparties*.

3) DF_i is the prefunded default fund contribution by the clearing member that will be applied upon such clearing member's default, either along with or immediately following such member's initial margin, to reduce the CCP loss.

[Basel Framework, CRE 54.34]

202. As regards the calculation in this first step (i.e. paragraphs 195 to 201):

(1) Any haircuts to be applied for SFTs must be the standard supervisory haircuts in Chapter 4.

(2) The holding periods for SFT calculations in Chapter 4 and those.

(3) The netting sets that are applicable to regulated clearing members are the same as those referred to in paragraph 177. For all other clearing members, they need to follow the netting rules as laid out by the CCP based upon notification of each of its clearing members. OSFI can demand more granular netting sets than laid out by the CCP.

[Basel Framework, CRE 54.35]

Capital Requirement for Each Clearing Member

203. The second step in calculatingthe clearing member institution's capital requirement for its default fund contributions (K_{CMi}) is to apply the following formula:

$$K_{CM\,i} = max\left(K_{CCP} \times \left(\frac{DF_i^{pref}}{DF_{CCP} + DF_{CM}^{pref}}\right); 8\% \times 2\% \times DF_i^{pref}\right)$$

where

- $K_{CM\,i}$ is the capital requirements on the default contribution of member *i;*
- DF_{CM}^{pref} is the total prefunded default fund contributions from clearing members;
- DF_{CCP} is the CCP's prefunded own resources (e.g. contributed capital, retained earnings, etc), which are contributed to the default waterfall, where these are junior or *pari passu* to prefunded member contributions; and
- DF_i^{pref} is the prefunded default fund contributions provided by clearing member *i*.

[Basel Framework, CRE 54.36]

204. The CCP, institution, OSFI or other body with access to the required data, must make a calculation of K_{CCP}, DF_{CM}^{pref}, and DF_{CCP} in such a way to permit the supervisor of the CCP to oversee those calculations, and it must share sufficient information of the calculation results to permit each clearing member to calculate their capital requirement for the default fund and for the supervisor of such clearing member to review and confirm such calculations. [Basel Framework, CRE 54.37]

205. K_{CCP} must be calculated on a quarterly basis at a minimum; although national supervisors may require more frequent calculations in case of material changes (such as the CCP clearing a new product). The CCP, institution, supervisor or other body that did the calculations must make available to the home supervisor of any clearing member sufficient aggregate information about the composition of the CCP's exposures to clearing members and information provided to the clearing member for the purposes of the calculation of K_{CCP}, DF_{CM}^{pref}, and DF_{CCP}. Such information must be provided no less frequently than OSFI would require for monitoring the risk of the clearing member that it supervises. [Basel Framework, CRE 54.38]

206. . K_{CCP} and K_{CM_i} must be recalculated at least quarterly, and should also be recalculated when there are material changes to the number or exposure of cleared transactions or material changes to the financial resources of the CCP.

[Basel Framework, CRE 54.39]

C. Cap with regard to QCCPs

207. Where the sum of an institution's capital charges for exposures to a qualifying CCP due to its trade exposure and default fund contribution is higher than the total capital charge that would be applied to those same exposures if the CCP were for a non-qualifying CCP, as outlined in paragraphs 208 and 209 of this Chapter, the latter total capital charge shall be applied. [Basel Framework, CRE 54.40]

7.1.8.2 Exposures to Non-qualifying CCPs

208. Institutions must apply the standardized approach for credit risk in Chapter 4, according to the category of the counterparty, to their trade exposure to a non-qualifying CCP. [Basel Framework, CRE 54.41]

209. Institutions must deduct from CET1 capital their amount of default fund contributions to a non-qualifying CCP. For the purposes of this paragraph, the default fund contributions of such institutions will include both the funded and the unfunded contributions which are liable to be paid should the CCP so require. Where there is a liability for unfunded contributions (i.e., unlimited binding commitments) OSFI will determine in its Pillar 2 assessments the amount of unfunded commitments which must be deducted from CET1 capital amounts. [Basel Framework, CRE 54.42]

7.2. Capital treatment for failed trades and non-DvP transactions

[previously Annex 3]

210. The capital requirement for failed trades and non-DvP transactions outlined in this Chapter applies in addition to (i.e., it does not replace) the requirements for the transactions themselves under this framework.

7.2.1 Overarching principles

211. Institutions should continue to develop, implement and improve systems for tracking and monitoring the credit risk exposures arising from unsettled and failed transactions as appropriate for producing management information that facilitates action on a timely basis. [Basel Framework, CRE 70.2]

212. Transactions settled through a delivery-versus-payment system (DvP),[48] providing simultaneous exchanges of securities for cash, expose firms to a risk of loss on the difference between the transaction valued at the agreed settlement price and the transaction valued at current market price (i.e., positive current exposure). Transactions where cash is paid without receipt of the corresponding receivable (securities, foreign currencies, gold, or commodities) or, conversely, deliverables were delivered without receipt of the corresponding cash payment (non-DvP, or free-delivery) expose firms to a risk of loss on the full amount of cash paid or deliverables delivered. The current rules set out specific capital charges that address these two kinds of exposures. [Basel Framework, CRE 70.3 and 70.4]

213. The following capital treatment is applicable to all transactions on securities, foreign exchange instruments, and commodities that give rise to a risk of delayed settlement or delivery. This includes transactions through recognized clearing houses and central counterparties that are subject to daily mark-to-market and payment of daily variation margins and that involve a mismatched trade.[49] The treatment does not apply to the instruments that are subject to the counterparty credit risk requirements set out in section 7.1 or the credit risk mitigation section of chapter 4 of this guideline (i.e. over-the-counter derivatives, exchange-traded derivatives, long settlement transactions, securities financing transactions).[Basel Framework, CRE 70.5]

214. In cases of a system wide failure of a settlement, clearing system or central counterparty, a national supervisor may use its discretion to waive capital charges until the situation is rectified. [BCBS June 2006 Annex 3 par 4] and [Basel Framework, CRE 70.7]

215. Failure of a counterparty to settle a trade in itself will not be deemed a default for purposes of credit risk under this guideline. [Basel Framework, CRE 70.8]

216. In applying a risk weight to failed free-delivery exposures, institutions using the IRB approach for credit risk may assign PDs to counterparties for which they have no other banking book exposure on the basis of the counterparty's external rating. Institutions using the Advanced IRB approach may use a 45% LGD in lieu of estimating LGDs so long as they apply it to all failed trade exposures. Alternatively, institutions using the IRB approach may opt to apply the standardized approach risk weights or a 100% risk weight. [Basel Framework, CRE 70.10]

---

[48] For the purpose of this guideline, DvP transactions include payment-versus-payment (PvP) transactions.

[49] An exposure value of zero for counterparty credit risk can be attributed to payment transactions (e.g. funds transfer transactions) and other spot transactions that are outstanding with a central counterparty (e.g. a clearing house), when the central counterparty CCR exposures with all participants in its arrangements are fully collateralized on a daily basis.

7.2.2 Capital requirements

217. For DvP transactions, if the payments have not yet taken place five business days after the settlement date, firms must calculate a capital charge by multiplying the positive current exposure of the transaction by the appropriate factor, according to the Table 3.

Table 3

Number of working days after the agreed settlement date	**Corresponding risk multiplier**
From 5 to 15	8%
From 16 to 30	50%
From 31 to 45	75%
46 or more	100%

[Basel Framework, CRE 70.9]

218. For non-DvP transactions (i.e., free deliveries), after the first contractual payment/delivery leg, the institution that has made the payment will treat its exposure as a loan if the second leg has not been received by the end of the business day.[50] This means that an institution under the IRB approach will apply the appropriate IRB formula set out in this guideline, for the exposure to the counterparty, in the same way as it does for all other banking book exposures. Similarly, institutions under the standardized approach will use the standardized risk weights set forth in this guideline. However, when exposures are not material, institutions may choose to apply a uniform 100% risk-weight to these exposures, in order to avoid the burden of a full credit assessment. If five business days after the second contractual payment/delivery date the second leg has not yet effectively taken place, the institution that has made the first payment leg will deduct from capital the full amount of the value transferred plus replacement cost, if any. This treatment will apply until the second payment/delivery leg is effectively made. [Basel Framework, CRE 70.4]

[50] If the dates when two payment legs are made are the same according to the time zones where each payment is made, it is deemed that they are settled on the same day. For example, if a bank in Tokyo transfers Yen on day X (Japan Standard Time) and receives corresponding US Dollar via CHIPS on day X (US Eastern Standard Time), the settlement is deemed to take place on the same value date.