



Guideline

Subject: Capital Adequacy Requirements (CAR)

Chapter 4 - Settlement and Counterparty Risk

Effective Date: November 2017 / January 2018¹

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 are set out in nine chapters, each of which has been issued as a separate document. This document, Chapter 4 – Settlement and Counterparty Risk, should be read in conjunction with the other CAR chapters which include:

Chapter 1	Overview
Chapter 2	Definition of Capital
Chapter 3	Credit Risk – Standardized Approach
Chapter 4	Settlement and Counterparty Risk
Chapter 5	Credit Risk Mitigation
Chapter 6	Credit Risk – Internal Ratings Based Approach
Chapter 7	Structured Products
Chapter 8	Operational Risk
Chapter 9	Market Risk

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

¹ For institutions with a fiscal year ending October 31 or December 31, respectively

Table of Contents

4.1. Treatment of counterparty credit risk and cross-product netting	4
4.1.1. Definitions and general terminology	4
4.1.1.1. <i>General terms</i>	4
4.1.1.2. <i>Transaction types</i>	6
4.1.1.3. <i>Netting sets, hedging sets, and related terms</i>	6
4.1.1.4. <i>Distributions</i>	7
4.1.1.5. <i>Exposure measures and adjustments</i>	8
4.1.1.6. <i>CCR-related risks</i>	9
4.1.2. Scope of application	9
4.1.3. Cross-product netting rules	11
4.1.3.1. <i>Legal Criteria</i>	11
4.1.3.2. <i>Operational Criteria</i>	12
4.1.4. Approval to adopt an internal modelling method to estimate EAD	12
4.1.5. Internal Model Method: measuring exposure and minimum requirements	13
4.1.5.1. <i>Exposure amount or EAD under the internal model method</i>	13
4.1.5.2. <i>Own estimates for alpha</i>	15
4.1.5.3. <i>Maturity</i>	16
4.1.5.4. <i>Margin agreements</i>	17
4.1.5.5. <i>Model validation</i>	19
4.1.5.6. <i>Operational requirements for EPE models</i>	22
4.1.6. Current Exposure Method	29
4.1.6.1. <i>Add-on Factors</i>	30
4.1.6.2. <i>Risk-weighted equivalent of non-netted contracts</i>	31
4.1.6.3. <i>Netting of forwards, swaps, purchased options and other similar derivatives</i>	34
4.1.7. CVA Risk Capital Charge	38
4.1.7.1. <i>Banks with IMM approval and Specific Interest Rate Risk VaR model approval for bonds: Advanced CVA risk capital charge</i>	39
4.1.7.2. <i>All other banks: standardised CVA risk capital charge</i>	42

4.1.8. Calculation of the aggregate CCR and CVA risk capital charges	43
4.1.8.1. <i>Banks with IMM approval and market-risk internal-models approval for the specific interest-rate risk of bonds</i>	44
4.1.8.2. <i>Banks with IMM approval and without Specific Risk VaR approval for bonds</i>	44
4.1.8.3. <i>All other banks</i>	44
4.1.9. Central Counterparties	45
4.1.9.1. <i>Exposures to Qualifying CCPs</i>	45
4.1.9.2. <i>Risk Sensitive Waterfall Approach.....</i>	51
4.1.9.3. <i>Alternative Approach</i>	55
4.1.9.4. <i>Exposures to Non-qualifying CCPs</i>	56
4.2. Capital treatment for failed trades and non-DvP transactions	56
4.2.1. <i>Overarching principles</i>	57
4.2.2. <i>Capital requirements</i>	58
Appendix 4-1.....	59

Chapter 4 – Settlement and Counterparty Risk

[previously Annex 4]

1. This chapter is drawn from the Basel Committee on Banking Supervision (BCBS) Basel II and Basel III frameworks, entitled: “International Convergence of Capital Measurement and Capital Standards – June 2006”, “Basel III: A global regulatory framework for more resilient banks and banking systems – December 2010 (rev June 2011)” and “Capital requirements for bank exposures to central counterparties – July 2012”. For reference, the Basel II, Basel III and Capital requirements for bank exposures to CCPs text paragraph numbers that are associated with the text appearing in this chapter are indicated in square brackets at the end of each paragraph².

4.1. 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 (CCR) under this guideline.³ Banks may seek supervisory approval to make use of an internal modelling method meeting the requirements and specifications identified herein. As alternatives banks may also use the current exposure method. [BCBS June 2006 Annex 4 par 1]

4.1.1. Definitions and general terminology

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

4.1.1.1. 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 a firm's exposure to credit risk through a loan, where the exposure to credit risk is unilateral and only the lending bank faces the risk of loss, CCR creates a bilateral risk of loss: the market value of the transaction can be positive or negative to either counterparty to the transaction. The market value is uncertain and can vary over time with the movement of underlying market factors.
- 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

² Following the format: [BCBS June 2006 par x], [BCBS June 2011 par x] and [BCBS July 2012, par x].

³ In the present document, the terms “exposure at default” and “exposure amount” are used together in order to identify measures of exposure under both an IRB and a standardised approach for credit risk.

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 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 on-going basis, domestic rules and regulations that are consistent with the CPSS-IOSCO Principles for Financial Market Infrastructures.

As is the case more generally, OSFI still reserves the right to require banks to hold additional capital against their exposures to such CCPs via Pillar 2. This might be appropriate where, for example, an external assessment such as an Financial Sector Assessment Program (FSAP) has found material shortcomings in the CCP or the regulation of CCPs, and the CCP and/or the CCP regulator have not since publicly addressed the issues identified.

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 terms defined in paragraph 138 and 139 for the purposes of calculating the capital requirements for default fund exposures must be made available or calculated in accordance with paragraph 141.

- 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 participants⁴.
- 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 credit exposure of the CCP to the clearing member arising from the possible future change in the value of their transactions. For the purposes of this chapter, initial margin does not include contributions to a CCP for mutualised loss sharing arrangements (i.e., in case a CCP uses initial margin to mutualise losses among the clearing members, it will be treated as a default fund exposure).
- **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.

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. National supervisors should be consulted to determine the treatment of this initial margin and default fund contributions.

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- **Trade exposures** (in section 4.1.9) include the current⁵ and potential future credit 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 mutualised loss sharing arrangements. The description given by a CCP to its mutualised 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).

[BCBS June 2006 Annex 4 par 2A] or [BCBS July 2012, Annex 4 Section I, A]

4.1.1.2. *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 bank 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 a bank extends credit in connection with the purchase, sale, carrying or trading of securities. Margin lending transactions do not include other loans that happen to be secured by securities collateral. Generally, in margin lending transactions, the loan amount is collateralised by securities whose value is greater than the amount of the loan.

[BCBS June 2006 Annex 4 par 2B]

4.1.1.3. *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 recognised for regulatory capital purposes under chapters 3 and 5 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 recognised for regulatory capital purposes should be interpreted as its own netting set for the purpose of these rules.

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.

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- **Risk Position** is a risk number that is assigned to a transaction under the CCR standardised method (set out in this chapter) using a regulatory algorithm.
 - **Hedging Set** is a group of risk positions from the transactions within a single netting set for which only their balance is relevant for determining the exposure amount or EAD under the CCR standardised method.
 - **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 43.
 - **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.

[BCBS June 2006 Annex 4 par 2C]

4.1.1.4. 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 realised 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 bank owes the counterparty money, the bank 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.

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- **Actual Distribution** is a distribution of market values or exposures at a future time period where the distribution is calculated using historic or realised values such as volatilities calculated using past price or rate changes.

[BCBS June 2006 Annex 4 par 2D]

4.1.1.5. *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 bank 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 bank to the counterparty.

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- **Debit Valuation Adjustment** is a valuation adjustment that reflects the market value of the credit risk of the bank to the counterparty (i.e., changes in the reporting bank's own credit risk), but does not reflect the market value of the credit risk of the counterparty to the bank. [Added by OSFI]
[BCBS June 2006 Annex 4 par 2E unless otherwise noted]

4.1.1.6. *CCR-related risks*

- **Rollover Risk** is the amount by which expected positive exposure is understated when future transactions with a counterparty are expected to be conducted on an ongoing basis, but the additional exposure generated by those future transactions is not included in calculation of expected positive exposure.
- **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 counterparty is positively correlated with the probability of default of the counterparty due to the nature of the transactions with the counterparty.
[BCBS June 2006 Annex 4 par 2F]

4.1.2. *Scope of application*

4. The methods for computing the exposure amount under the standardised approach for credit risk or EAD under the internal ratings-based (IRB) approach to credit risk described in this chapter are applicable to SFTs and OTC derivatives. [BCBS June 2006 Annex 4 par 3]

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 determined⁶

[BCBS June 2006 Annex 4 par 4]

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;

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

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- 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
- [BCBS June 2006 Annex 4 par 5]

7. Exposures to central counterparties arising from OTC derivatives, exchange traded derivatives transactions and SFTs will be subject to the counterparty credit risk treatment laid out in section 4.1.9. Exposures arising from settlement of cash transactions (equities, fixed income, spot FX and spot commodities) are not subject to this treatment. The settlement of cash transactions remains subject to the treatment described in section 4.2. and [BCBS July 2012, Annex 4, section II par 6(i)]

8. 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. [BCBS July 2012, Annex 4, section II par 6(ii)]

9. Under the two methods identified in this chapter, when a bank purchases credit derivative protection against a banking book exposure, or against a counterparty credit risk exposure, it will determine its capital requirement for the hedged exposure subject to the criteria and general rules for the recognition of credit derivatives, i.e. substitution or double default rules as appropriate. Where these rules apply, the exposure amount or EAD for counterparty credit risk from such instruments is zero. [BCBS June 2006 Annex 4 par 7]

10. The exposure amount or EAD for counterparty credit risk is zero for 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. [BCBS June 2006 Annex 4 par 8]

11. Under the internal model and current exposure methods, the exposure amount or EAD for a given counterparty is equal to the sum of the exposure amounts or EADs calculated for each netting set with that counterparty. [BCBS June 2006 Annex 4 par 9]

12. Outstanding EAD for a given OTC derivative counterparty is defined as the greater of zero and the difference between the sum of EADs across all netting sets with the counterparty and the credit valuation adjustment (CVA) for that counterparty which has already been recognised by the bank as an incurred write-down (i.e. a CVA loss). This CVA loss is calculated without taking into account any offsetting debit valuation adjustments which have been deducted from capital under Chapter 2 – Definition of Capital, Section 2.3.1 Regulatory Adjustment to Common Equity Tier 1 Capital, Cumulative gains and losses due to changes in own credit risk

on fair valued financial liabilities⁷. RWAs for a given OTC derivative counterparty may be calculated as the applicable risk weight under the Standardised or IRB approach multiplied by the outstanding EAD of the counterparty. This reduction of EAD by incurred CVA losses does not apply to the determination of the CVA risk capital charge. [BCBS June 2011 addition to Annex 4 par 9]

4.1.3. Cross-product netting rules⁸

13. Banks 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 following legal and operational criteria for a Cross-Product Netting Arrangement (as defined below). The bank must also have satisfied any prior approval or other procedural requirements that its national supervisor determines to implement for purposes of recognising a Cross-Product Netting Arrangement. [BCBS June 2006 Annex 4 par 10]

4.1.3.1. Legal Criteria

14. The bank has executed a written, bilateral netting agreement with the counterparty that creates a single legal obligation, covering all included bilateral master agreements and transactions (“Cross-Product Netting Arrangement”), such that the bank would have either a claim to receive or obligation to pay only the net sum of the positive and negative (i) close-out values of any included individual master agreements and (ii) mark-to-market values of any included individual transactions (the “Cross-Product Net Amount”), in the event a counterparty fails to perform due to any of the following: default, bankruptcy, liquidation or similar circumstances. [BCBS June 2006 Annex 4 par 11]

15. The bank has written and reasoned legal opinions that conclude with a high degree of certainty that, in the event of a legal challenge, relevant courts or administrative authorities would find the 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.

- 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

⁷ The incurred CVA loss deducted from exposures to determine outstanding EAD is the CVA loss gross of all debit value adjustments (DVA) which have been separately deducted from capital. To the extent DVA has not been separately deducted from a bank’s capital, the incurred CVA loss used to determine outstanding EAD will be net of such DVA.

⁸ 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.

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 recognised 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.

[BCBS June 2006 Annex 4 par 12]

16. The bank has internal procedures to verify that, prior to including a transaction in a netting set, the transaction is covered by legal opinions that meet the above criteria. [BCBS June 2006 Annex 4 par 13]

17. The bank undertakes to update legal opinions as necessary to ensure continuing enforceability of the Cross-Product Netting Arrangement in light of possible changes in relevant law. [BCBS June 2006 Annex 4 par 14]

18. 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. [BCBS June 2006 Annex 4 par 15]

19. Each included bilateral master agreement and transaction included in the Cross-Product Netting Arrangement satisfies applicable legal requirements for recognition of (i) bilateral netting of derivatives contracts in section 4.1.14.1.6.3, or (ii) credit risk mitigation techniques in chapter 5. [BCBS June 2006 Annex 4 par 16]

20. The bank maintains all required documentation in its files. [BCBS June 2006 Annex 4 par 17]

4.1.3.2. Operational Criteria

21. The supervisory authority 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 bank manages its counterparty credit risk on such basis. [BCBS June 2006, Annex 4 par 18]

22. 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. [BCBS June 2006 Annex 4 par 19]

4.1.4. Approval to adopt an internal modelling method to estimate EAD

23. A bank (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 approval from its supervisor. The internal modelling method is available both for banks that adopt the internal ratings-based approach to credit risk and for banks for which the standardised

approach to credit risk applies to all of their credit risk exposures. The bank must meet all of the requirements given in Section 4.1.5 of this chapter and must apply the method to all of its exposures that are subject to counterparty credit risk, except for long settlement transactions. [BCBS June 2006 Annex 4 par 20]

24. A bank 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 above. The bank must apply the method to all relevant exposures within that category, except for those that are immaterial in size and risk. During the initial implementation of the internal models method, a bank may use the current exposure method for a portion of its business. The bank must submit a plan to its supervisor to bring all material exposures for that category of transactions under the internal model method. [(BCBS June 2006 Annex 4 par 21)]

25. For all OTC derivative transactions and for all long settlement transactions for which a bank has not received approval from its supervisor to use the internal models method, the bank must use the current exposure method. [BCBS June 2006 Annex 4 par 22]

26. Exposures or EAD arising from long settlement transactions can be determined using the current exposure method regardless of the methods chosen for treating OTC derivatives and SFTs. In computing capital requirements for long settlement transactions banks that hold permission to use the internal ratings-based approach may opt to apply the risk weights under the standardised approach for credit risk on a permanent basis and irrespective to the materiality of such positions. [BCBS June 2006 Annex 4 par 23]

27. After adoption of the internal model method, the bank must comply with the above requirements on a permanent basis. Only under exceptional circumstances or for immaterial exposures can a bank revert to the current exposure method for all or part of its exposure. The bank must demonstrate that reversion to a less sophisticated method does not lead to an arbitrage of the regulatory capital rules. [BCBS June 2006 Annex 4 par 24]

4.1.5. Internal Model Method: measuring exposure and minimum requirements

4.1.5.1. Exposure amount or EAD under the internal model method

28. CCR exposure or EAD is measured at the level of the netting set as defined in Sections 4.1.1 and 4.1.3. 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. Banks may include eligible financial collateral as defined in paragraph 45 of section 5.1.3 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. [BCBS June 2006 Annex 4 par 25]

29. To determine the default risk capital charge for counterparty credit risk as defined in paragraph 117, banks must use the greater of the portfolio-level capital charge (not including the CVA charge in paragraphs 109 -116) 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. [BCBS June 2011 Annex 4 par 25(i)]

OSFI Notes

30. OSFI expects banks 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.

31. To the extent that a bank recognises collateral in exposure amount or EAD via current exposure, a bank would not be permitted to recognise the benefits in its estimates of LGD. As a result, the bank would be required to use an LGD of an otherwise similar uncollateralised facility. In other words, the bank would be required to use an LGD that does not include collateral that is already included in EAD. [BCBS June 2006 Annex 4 par 26]

32. Under the Internal Model Method, the bank need not employ a single model. Although the following text describes an internal model as a simulation model, no particular form of model is required. Analytical models are acceptable so long as they are subject to supervisory review, meet all of the requirements set forth in this section and are applied to all material exposures subject to a CCR-related capital 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. [BCBS June 2006 Annex 4 par 27]

33. 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. [BCBS June 2006 Annex 4 par 28]

34. When using an internal model, exposure amount or EAD is calculated as the product of alpha times Effective EPE, as specified below (except for counterparties that have been identified as having explicit specific wrong way risk – see paragraph 74):

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

[BCBS June 2006 and June 2011 Annex 4 par 29]

35. 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 at a series of future dates $t_1, t_2, t_3 \dots$ ⁹ Specifically, “Effective EE” is computed recursively as

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

where the current date is denoted as t_0 and Effective EE_{t_0} equals current exposure.

[BCBS June 2006 Annex 4 par 30]

36. 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:

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

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.

[BCBS June 2006 Annex 4 par 31]

37. Alpha (α) is set equal to 1.4. [BCBS June 2006 Annex 4 par 32]

38. Supervisors have the 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. [BCBS June 2006 Annex 4 par 33]

4.1.5.2. *Own estimates for alpha*

39. Banks may seek approval from their supervisors to compute internal estimates of alpha subject to a floor of 1.2, where alpha equals the ratio of economic capital from a full simulation of counterparty exposure across counterparties (numerator) and economic capital based on EPE (denominator), assuming they meet certain operating requirements. Eligible banks must meet all the operating requirements for internal estimates of EPE and must demonstrate that their internal estimates of alpha capture in the numerator the material sources of stochastic dependency of distributions of market values of transactions or of portfolios of transactions across counterparties (e.g. the correlation of defaults across counterparties and between market risk and default). [BCBS June 2006 Annex 4 par 34]

⁹ In theory, the expectations should be taken with respect to the actual probability distribution of future exposure and not the risk-neutral one. Supervisors recognise that practical considerations may make it more feasible to use the risk-neutral one. As a result, supervisors will not mandate which kind of forecasting distribution to employ.

40. In the denominator, EPE must be used as if it were a fixed outstanding loan amount. [BCBS June 2006 Annex 4 par 35]

41. To this end, banks must ensure that the numerator and denominator of alpha are computed in a consistent fashion with respect to the modelling methodology, parameter specifications and portfolio composition. The approach used must be based on the firm's internal economic capital approach, be well-documented and be subject to independent validation. In addition, banks must review their estimates on at least a quarterly basis, and more frequently when the composition of the portfolio varies over time. Banks must assess the model risk 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. [BCBS June 2006 and June 2011 Annex 4 par 36]

42. 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. [BCBS June 2006 Annex 4 par 37]

4.1.5.3. Maturity

43. 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 6 - Internal Ratings Based Approach paragraph 120 of chapter 6 is replaced with the following:

$$M = \frac{\sum_{k=1}^{t_k \leq 1 \text{ year}} \text{Effective } EE_k \times \Delta t_k \times df_k + \sum_{k=1}^{\text{maturity}} \text{EE}_k \times \Delta t_k \times df_k}{\sum_{k=1}^{t_k \leq 1 \text{ year}} \text{Effective } EE_k \times \Delta t_k \times df_k}$$

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 years¹⁰.

[BCBS June 2006 Annex 4 par 38]

44. For netting sets in which all contracts have an original maturity of less than one year, the formula for effective maturity (M) in Chapter 6 - Internal Ratings Based Approach paragraph 120 is unchanged and a floor of one year applies, with the exception of short-term exposures as described in Chapter 6 - Internal Ratings Based Approach, paragraphs 121 to 123. [BCBS June 2006 Annex 4 par 39]

¹⁰ Conceptually, M equals the effective credit duration of the counterparty exposure. A bank that uses an internal model to calculate a one-sided credit valuation adjustment (CVA) can use the effective credit duration estimated by such a model in place of the above formula with prior approval of its supervisor.

4.1.5.4. Margin agreements

45. If the netting set is subject to a margin agreement and the internal model captures the effects of margining when estimating EE, the model's EE measure may be used directly in equation (2). Such models are noticeably more complicated than models of EPE for unmarginated counterparties. As such, they are subject to a higher degree of supervisory scrutiny before they are approved, as discussed below. [BCBS June 2006 Annex 4 par 40]

46. 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 unmarginated exposure the bank is willing to accept, and the minimum transfer amount. Such a model must either model the mark-to-market change in the value of collateral posted or apply this Framework's rules for collateral. [BCBS June 2011 Annex 4 after par 40]

47. Shortcut method: a bank that can model EPE without margin agreements but cannot achieve the higher level of modelling sophistication to model EPE with margin agreements can use the following method for margined counterparties subject to re-margining and daily mark-to-market as described in paragraph 48.¹¹ The method is a simple approximation to Effective EPE and sets Effective EPE for a margined counterparty equal to the lesser of:

- a) effective EPE without any held or posted margining collateral, plus any collateral that has been posted to the counterparty independent of the daily valuation and margining process or current exposure (i.e. initial margin or independent amount); or
- b) an add-on that reflects the potential increase in exposure over the margin period of risk plus the larger of
 - i. the current exposure net of and including all collateral currently held or posted, excluding any collateral called or in dispute; or
 - ii. the largest net exposure including all collateral held or posted under the margin agreement that would not trigger a collateral call. This amount should reflect all applicable thresholds, minimum transfer amounts, independent amounts and initial margins under the margin agreement.

The add-on is calculated as $E[\max(\Delta MtM, 0)]$, where $E[\dots]$ is the expectation (i.e. the average over scenarios) and ΔMtM is the possible change of the mark-to-market value of the transactions during the margin period of risk. Changes in the value of collateral need to be reflected using the supervisory haircut method or the internal estimates method, but no collateral payments are assumed during the margin period of risk. The margin period of risk is subject to the supervisory floor specified in paragraphs 48 to 50. Backtesting

¹¹ Where a bank generally uses this shortcut method to measure Effective EPE, this shortcut method may be used by a bank that is a clearing member in a CCP for its transactions with the CCP and with clients, including those client transactions that result in back-to-back trades with a CCP.

should test whether realised (current) exposures are consistent with the shortcut method prediction over all margin periods within one year. If some of the trades in the netting set have a maturity of less than one year, and the netting set has higher risk factor sensitivities without these trades, this fact should be taken into account. If backtesting indicates that effective EPE is underestimated, the bank should take actions to make the method more conservative, e.g. by scaling up risk factor moves.

[BCBS June 2011 Annex 4 par 41]

48. 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:

- 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 characterised by the absence of continuously active markets where a counterparty would, within two or fewer days, obtain multiple price quotations that would not move the market or represent a price reflecting a market discount (in the case of collateral) or premium (in the case of an OTC derivative). Examples of situations where trades are deemed illiquid for this purpose include, but are not limited to, trades that are not marked daily and trades that are subject to specific accounting treatment for valuation purposes (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, a bank must consider whether trades or securities it holds as collateral are concentrated in a particular counterparty and if that counterparty exited the market precipitously whether the bank would be able to replace its trades.

[BCBS June 2011 Annex 4 par 41(i)]

49. If a bank has experienced more than two margin call disputes on a particular netting set over the previous two quarters that have lasted longer than the applicable margin period of risk (before consideration of this provision), then the bank must reflect this history appropriately by using a margin period of risk that is at least double the supervisory floor for that netting set for the subsequent two quarters. [BCBS June 2011 Annex 4 par 41(ii)]

50. For re-margining with a periodicity of N-days, irrespective of the shortcut method or full IMM model, the margin period of risk should be at least equal to the supervisory floor, F, plus the N days minus one day. That is,

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

[BCBS June 2011 Annex 4 par 41(iii)]

51. Banks using the internal models method must not capture the effect of a reduction of EAD due to any clause in a collateral agreement that requires receipt of collateral when counterparty credit quality deteriorates. [BCBS June 2011 Annex 4 par 41(iv)]

4.1.5.5. *Model validation*

52. It is important that supervisory authorities are able to assure themselves that banks using models have counterparty credit risk management systems that are conceptually sound and implemented with integrity. Accordingly the supervisory authority will specify a number of qualitative criteria that banks would have to meet before they are permitted to use a models-based approach. The extent to which banks meet the qualitative criteria may influence the level at which supervisory authorities will set the multiplication factor referred to in paragraph 37 (Alpha) above. Only those banks in full compliance with the qualitative criteria will be eligible for application of the minimum multiplication factor. The qualitative criteria include:

- the bank must conduct a regular programme of backtesting, ie an ex-post comparison of the risk measures¹² generated by the model against realised risk measures, as well as comparing hypothetical changes based on static positions with realised measures;
- the bank must carry out an initial validation and an on-going periodic review of its IMM model and the risk measures generated by it. The validation and review must be independent of the model developers;
- senior management should be actively involved in the risk control process and must regard credit and counterparty credit risk control as an essential aspect of the business to which significant resources need to be devoted. In this regard, the daily reports prepared by the independent risk control unit must be reviewed by a level of management with sufficient seniority and authority to enforce both reductions of positions taken by individual traders and reductions in the bank's overall risk exposure;
- the bank's internal risk measurement exposure model must be closely integrated into the day-to-day risk management process of the bank. Its output should accordingly be an integral part of the process of planning, monitoring and controlling the bank's counterparty credit risk profile;
- the risk measurement system should be used in conjunction with internal trading and exposure limits. In this regard, exposure limits should be related to the bank's risk measurement model in a manner that is consistent over time and that is well understood by traders, the credit function and senior management;

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.

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- banks should have a routine in place for ensuring compliance with a documented set of internal policies, controls and procedures concerning the operation of the risk measurement system. The bank's risk measurement system must be well documented, for example, through a risk management manual that describes the basic principles of the risk management system and that provides an explanation of the empirical techniques used to measure counterparty credit risk;
 - an independent review of the risk measurement system should be carried out regularly in the bank's own internal auditing process. This review should include both the activities of the business trading units and of the independent risk control unit. A review of the overall risk management process should take place at regular intervals (ideally no less than once a year) and should specifically address, at a minimum:
 - the adequacy of the documentation of the risk management system and process;
 - the organisation 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 below in paragraphs 53 - 56.
 - the on-going validation of counterparty credit risk models, including backtesting, must be reviewed periodically by a level of management with sufficient authority to decide the course of action that will be taken to address weaknesses in the models.

[BCBS June 2011 Annex 4 par 42]

53. Banks must document the process for initial and on-going validation of their IMM model to a level of detail that would enable a third party to recreate the analysis. Banks must also document the calculation of the risk measures generated by the models to a level of detail that would allow a third party to re-create the risk measures. This documentation must set out the frequency with which backtesting analysis and any other on-going validation will be conducted, how the validation is conducted with respect to data flows and portfolios and the analyses that are used. [BCBS June 2011 Annex 4 par 43]

54. Banks must define criteria with which to assess their EPE models and the models that input into the calculation of EPE and have a written policy in place that describes the process by

which unacceptable performance will be determined and remedied. [BCBS June 2011 Annex 4 par 44]

55. Banks must define how representative counterparty portfolios are constructed for the purposes of validating an EPE model and its risk measures. [BCBS June 2011 Annex 4 par 45]

56. When validating EPE models and its risk measures that produce forecast distributions, validation must assess more than a single statistic of the model distribution. [BCBS June 2011 Annex 4 par 46]

57. As part of the initial and on-going validation of an IMM model and its risk measures, the following requirements must be met:

- a bank must carry out backtesting using historical data on movements in market risk factors prior to supervisory approval. Backtesting must consider a number of distinct prediction time horizons out to at least one year, over a range of various start (initialisation) dates and covering a wide range of market conditions;
- banks must backtest the performance of their EPE model and the model's relevant risk measures as well as the market risk factor predictions that support EPE. For collateralised trades, the prediction time horizons considered must include those reflecting typical margin periods of risk applied in collateralised/margined trading, and must include long time horizons of at least 1 year;
- the pricing models used to calculate counterparty credit risk exposure for a given scenario of future shocks to market risk factors must be tested as part of the initial and on-going model validation process. These pricing models may be different from those used to calculate Market Risk over a short horizon. Pricing models for options must account for the 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. Banks 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 as directed by its supervisor, a bank must conduct such backtesting on a number of representative counterparty portfolios. The representative portfolios must be chosen based on their sensitivity to the material risk factors and correlations to which the bank is exposed. In addition, IMM banks need to conduct backtesting that is designed to test the key assumptions of the EPE model and the relevant risk measures, e.g. the modelled relationship between tenors of the same risk factor, and the modelled relationships between risk factors;
- significant differences between realised exposures and the forecast distribution could indicate a problem with the model or the underlying data that the supervisor would require the bank to correct. Under such circumstances, supervisors may require additional capital to be held while the problem is being solved;

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- 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;
 - banks must validate their EPE models and all relevant risk measures out to time horizons commensurate with the maturity of trades for which exposure is calculated using an internal modelling method;
 - the pricing models used to calculate counterparty exposure must be regularly tested against appropriate independent benchmarks as part of the on-going model validation process;
 - the on-going validation of a bank'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 the prior approval of the supervisor. The degree of relative conservatism will be assessed upon initial supervisory approval and at the regular supervisory reviews of the EPE models. The bank must validate the conservatism regularly;
 - the on-going 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 bank level and netting set exposure calculations of EPE are appropriate.

[BCBS June 2011 Annex 4 par 46(i)]

OSFI Notes

58. 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 banks to provide documented justification for the use of two different pricing models, including an assessment of the resulting model risk.

4.1.5.6. Operational requirements for EPE models

59. In order to be eligible to adopt an internal model for estimating EPE arising from CCR for regulatory capital purposes, a bank must meet the following operational requirements. These include meeting the requirements related to the qualifying standards on CCR Management, a use test, stress testing, identification of wrong-way risk, and internal controls. [BCBS June 2006 Annex 4 par 47]

Qualifying standards on CCR Management

60. The bank must satisfy its supervisor that, in addition to meeting the operational requirements identified in paragraphs 61 to 87 below, it adheres to sound practices for CCR management. [BCBS June 2006 Annex 4 par 48]

Use test

61. The distribution of exposures generated by the internal model used to calculate effective EPE must be closely integrated into the day-to-day CCR management process of the bank. For example, the bank could use the peak exposure from the distributions for counterparty credit limits or expected positive exposure for its internal allocation of capital. The internal model's output must accordingly play an essential role in the credit approval, counterparty credit risk management, internal capital allocations, and corporate governance of banks that seek approval to apply such models for capital adequacy purposes. Models and estimates designed and implemented exclusively to qualify for the internal models method are not acceptable. [BCBS June 2006 Annex 4 par 49]

62. The bank must have an independent risk control unit that is responsible for the design and implementation of the bank's counterparty credit risk management system. The unit should produce and analyse daily reports on the output of the bank's risk measurement model, including an evaluation of the relationship between measures of counterparty credit exposure and trading limits. The unit must be independent from the business trading units and should report directly to senior management of the bank. [BCBS June 2011 Annex 4 par 49(i)]

63. A bank must have a credible track record in the use of internal models that generate a distribution of exposures to CCR. Thus, the bank must demonstrate that it has been using an internal model to calculate the distributions of exposures upon which the EPE calculation is based that meets broadly the minimum requirements for at least one year prior to supervisory approval. [BCBS June 2006 Annex 4 par 50]

64. Banks 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 on-going validation of the internal model. This unit must control input data integrity and produce and analyse 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. [BCBS June 2006 Annex 4 par 51]

65. Banks applying the internal model method must have a collateral management unit that is responsible for calculating and making margin calls, managing margin call disputes and reporting levels of independent amounts, initial margins and variation margins accurately on a daily basis. This unit must control the integrity of the data used to make margin calls, and ensure

that it is consistent and reconciled regularly with all relevant sources of data within the bank. This unit must also track the extent of reuse of collateral (both cash and non-cash) and the rights that the bank gives away to its respective counterparties for the collateral that it posts. These internal reports must indicate the categories of collateral assets that are reused, and the terms of such reuse including instrument, credit quality and maturity. The unit must also track concentration to individual collateral asset classes accepted by the banks. Senior management must allocate sufficient resources to this unit for its systems to have an appropriate level of operational performance, as measured by the timeliness and accuracy of outgoing calls and response time to incoming calls. Senior management must ensure that this unit is adequately staffed to process calls and disputes in a timely manner even under severe market crisis, and to enable the bank to limit its number of large disputes caused by trade volumes. [BCBS June 2011 Annex 4 par 51(i)]

66. The bank's collateral management unit must produce and maintain appropriate collateral management information that is reported on a regular basis to senior management. Such internal reporting should include information on the type of collateral (both cash and non-cash) received and posted, as well as the size, aging and cause for margin call disputes. This internal reporting should also reflect trends in these figures. [BCBS June 2011 Annex 4 par 51(ii)]

67. A bank employing the internal models method must ensure that its cash management policies account simultaneously for the liquidity risks of potential incoming margin calls in the context of exchanges of variation margin or other margin types, such as initial or independent margin, under adverse market shocks, potential incoming calls for the return of excess collateral posted by counterparties, and calls resulting from a potential downgrade of its own public rating. The bank must ensure that the nature and horizon of collateral reuse is consistent with its liquidity needs and does not jeopardise its ability to post or return collateral in a timely manner. [BCBS June 2011 Annex 4 par 51(iii)]

68. 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), a bank must measure and manage current exposures. Where appropriate, the bank must measure current exposure gross and net of collateral held. The use test is satisfied if a bank uses other counterparty risk measures, such as peak exposure or potential future exposure (PFE), based on the distribution of exposures generated by the same model to compute EPE. [BCBS June 2006 Annex 4 par 52]

69. A bank is not required to estimate or report EE daily, but to meet the use test it must have the systems capability to estimate EE daily, if necessary, unless it demonstrates to its

¹³ This section draws heavily on the Counterparty Risk Management Policy Group's paper, *Improving Counterparty Risk Management Practices* (June 1999); a copy can be found online at <http://www.mfainfo.org/washington/derivatives/Improving%20Counterparty%20risk.pdf>.

supervisor that its exposures to CCR warrant some less frequent calculation. It must choose a time profile of forecasting horizons that adequately reflects the time structure of future cash flows and maturity of the contracts. For example, a bank may compute EE on a daily basis for the first ten days, once a week out to one month, once a month out to eighteen months, once a quarter out to five years and beyond five years in a manner that is consistent with the materiality and composition of the exposure. [BCBS June 2006 Annex 4 par 53]

70. Exposure must be measured out to the life of all contracts in the netting set (not just to the one year horizon), monitored and controlled. The bank must have procedures in place to identify and control the risks for counterparties where exposure rises beyond the one-year horizon. Moreover, the forecasted increase in exposure must be an input into the firm's internal economic capital model. [BCBS June 2006 Annex 4 par 54]

Stress testing

71. A bank must have in place sound stress testing processes for use in the assessment of capital adequacy. These stress measures must be compared against the measure of EPE and considered by the bank as part of its internal capital adequacy assessment process. Stress testing must also involve identifying possible events or future changes in economic conditions that could have unfavourable effects on a 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. [BCBS June 2006 Annex 4 par 55]

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

- banks must ensure complete trade capture and exposure aggregation across all forms of counterparty credit risk (not just OTC derivatives) at the counterparty-specific level in a sufficient time frame to conduct regular stress testing;
- for all counterparties, banks should produce, at least monthly, exposure stress testing of principal market risk factors (eg interest rates, FX, equities, credit spreads, and commodity prices) in order to proactively identify, and when necessary, reduce outsized concentrations to specific directional sensitivities;
- banks 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 bank-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, banks should conduct stress testing applying stressed conditions to the joint movement of exposures and counterparty creditworthiness;

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- 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 bank-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, banks should also consider scenarios of lesser severity and higher probability;
 - banks 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 bank and ensure that the results are meaningful and proactively used to manage counterparty credit risk. At a minimum, the results of stress testing for significant exposures should be compared to guidelines that express the bank's risk appetite and elevated for discussion and action when excessive or concentrated risks are present.

[BCBS June 2011 Annex 4 par 56]

Wrong-way risk

73. Banks must identify exposures that give rise to a greater degree of general wrong-way risk. Stress testing and scenario analyses must be designed to identify risk factors that are positively correlated with counterparty credit worthiness. Such testing needs to address the possibility of severe shocks occurring when relationships between risk factors have changed. Banks should monitor general wrong way risk by product, by region, by industry, or by other categories that are germane to the business. Reports should be provided to senior management on a regular basis that communicate wrong way risks and the steps that are being taken to manage that risk. [BCBS June 2011 Annex 4 par 57]

74. A bank is exposed to “specific wrong-way risk” if future exposure to a specific counterparty is highly correlated with the counterparty’s probability of default. For example, a company writing put options on its own stock creates wrong-way exposures for the buyer that is specific to the counterparty. A bank must have procedures in place to identify, monitor and control cases of specific wrong way risk, beginning at the inception of a trade and continuing through the life of the trade. To calculate the CCR capital 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 specific wrong way risk has been identified, EAD in respect of such swap counterparty exposure equals the full expected loss in the remaining fair value of the underlying instruments assuming the underlying issuer is in liquidation. The use of the full expected loss in remaining fair value of the underlying instrument allows the bank to recognise, in respect of such swap, the market value that has been lost already and any expected recoveries. Accordingly LGD for Advanced or Foundation IRB banks must be set to 100% for such swap transactions¹⁴. For banks using the Standardised Approach, the risk weight to use is that of an unsecured transaction. For equity derivatives, bond options, securities financing transactions etc. referencing a single company where there exists a legal connection between the counterparty and the underlying company, and where specific wrong way risk has been identified, EAD equals the value of the transaction under the assumption of a jump-to-default of the underlying security. Inasmuch this makes re-use of possibly existing (market risk) calculations (for IRC) that already contain an LGD assumption, the LGD must be set to 100%. [BCBS June 2011 Annex 4 par 58]

Integrity of Modelling Process

75. 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. [BCBS June 2006 Annex 4 par 59]

76. The internal model must reflect transaction terms and specifications in a timely, complete, and conservative fashion. Such terms include, but are not limited to, contract notional amounts, maturity, reference assets, collateral thresholds, margining arrangements, netting arrangements, etc. The terms and specifications must reside in a secure database that is subject to formal and periodic audit. The process for recognising netting arrangements must require signoff by legal staff to verify the legal enforceability of netting and be input into the database by an independent unit. The transmission of transaction terms and specifications data to the internal model must also be subject to internal audit and formal reconciliation processes must be in place between the internal model and source data systems to verify on an ongoing basis that transaction terms and specifications are being reflected in EPE correctly or at least conservatively. [BCBS June 2006 Annex 4 par 60]

77. When the Effective EPE model is calibrated using historic market data, the bank must employ current market data to compute current exposures and at least three years of historical data must be used to estimate parameters of the model. Alternatively, market implied data may be used to estimate parameters of the model. In all cases, the data must be updated quarterly or more frequently if market conditions warrant. To calculate the Effective EPE using a stress

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 under the Accord 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).

calibration, the bank must also calibrate Effective EPE using three years of data that include a period of stress to the credit default spreads of a bank's counterparties or calibrate Effective EPE using market implied data from a suitable period of stress. The following process will be used to assess the adequacy of the stress calibration:

- the bank must demonstrate, at least quarterly, that the stress period coincides with a period of increased CDS or other credit spreads – such as loan or corporate bond spreads – for a representative selection of the bank's counterparties with traded credit spreads. In situations where the bank does not have adequate credit spread data for a counterparty, the bank should map each counterparty to specific credit spread data based on region, internal rating and business types;
- 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.

[BCBS June 2011 Annex 4 par 61]

OSFI Notes

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

79. If a bank wished to recognise 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 bank 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. [BCBS June 2011 Annex 4 par 61(i)]

80. If the internal model includes the effect of collateral on changes in the market value of the netting set, the bank must model collateral other than cash of the same currency as the exposure itself jointly with the exposure in its EAD calculations for securities-financing transactions. [BCBS June 2011 Annex 4 par 61(ii)]

81. 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. [BCBS June 2006 Annex 4 par 62]

82. 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 approval of the

firm's supervisory authority. Home and host country supervisory authorities of banks that carry out material trading activities in multiple jurisdictions will work co-operatively to ensure an efficient approval process. [BCBS June 2006 Annex 4 par 63]

83. In the revised Framework and in prior documents, the Committee has issued guidance regarding the use of internal models to estimate certain parameters of risk and determine minimum capital charges against those risks. Supervisors will require that banks seeking to make use of internal models to estimate EPE meet similar requirements regarding, for example, the integrity of the risk management system, the skills of staff that will rely on such measures in operational areas and in control functions, the accuracy of models, and the rigour of internal controls over relevant internal processes. As an example, banks seeking to make use of an internal model to estimate EPE must demonstrate that they meet the Committee's general criteria for banks seeking to make use of internal models to assess market risk exposures, but in the context of assessing counterparty credit risk.¹⁵ [BCBS June 2006 Annex 4 par 64]

84. Pillar 2 of the revised Framework provides general background and specific guidance to cover counterparty credit risks that may not be fully covered by the Pillar 1 process. [BCBS June 2006 Annex 4 par 65]

85. No particular form of model is required to qualify to make use of an internal model. Although this text describes an internal model as a simulation model, other forms of models, including analytic models, are acceptable subject to supervisory approval and review. Banks that seek recognition for the use of an internal model that is not based on simulations must demonstrate to their supervisors that the model meets all operational requirements. [BCBS June 2006 Annex 4 par 66]

86. For a bank that qualifies to net transactions, the bank must have internal procedures to verify that, prior to including a transaction in a netting set, the transaction is covered by a legally enforceable netting contract that meets the applicable requirements of section 4.1.6.3 and chapter 5, or the Cross-Product Netting Rules set forth in this chapter. [BCBS June 2006 Annex 4 par 67]

87. For a bank that makes use of collateral to mitigate its CCR, the bank must have internal procedures to verify that, prior to recognising the effect of collateral in its calculations, the collateral meets the appropriate legal certainty standards as set out in chapter 5. [BCBS June 2006 Annex 4 par 68]

4.1.6. Current Exposure Method

88. Banks that do not have approval to apply the internal models method may use the current exposure method. The current exposure method is to be applied to OTC derivatives only; SFTs are subject to the treatments set out under the Internal Model Method of this chapter or in Chapter 5 of the CAR Guideline. [BCBS, June 2006, Annex 4, par 91]

¹⁵ *Amendment to the Capital Accord to Incorporate Market Risk*, Basel Committee on banking Supervision (1996), Part B.1., "General Criteria."

89. Institutions should calculate the credit equivalent amount these contracts using the **current exposure method** by adding

- the amount for potential future credit exposure (or "add-on") of all contracts (this is calculated by multiplying the notional principal amounts by the add-on factors in the following table)
- the replacement cost (obtained by "marking to market") of all its contracts with positive value.

[BCBS, June 2006, Annex 4, par 92(i)]

90. The add-on applied in calculating the credit equivalent amount depends on the maturity of the contract and on the volatility of the rates and prices underlying that type of instrument. Options purchased over the counter are included with the same conversion factors as other instruments.

4.1.6.1. Add-on Factors

Current Exposure Method Add-on Factors					
Contract Type	Residual maturity Banking & Trading book			Credit Derivatives	
	One year or less	Over one year to five years	Over five years	Trading Book	Banking Book sold Protection
Interest Rate	0.0%	0.5%	1.5%		
Foreign Exchange and Gold	1.0%	5.0%	7.5%		
Equity	6.0%	8.0%	10.0%		
Precious Metals Except Gold	7.0%	7.0%	8.0%		
Other Commodities	10.0%	12.0%	15.0%		
Qualifying Single Name Credit Derivative				5.0%	CEM not applicable.
Non-Qualifying Single Name Credit Derivative				10.0%	Treat as direct credit substitute 100% of notional

[BCBS, June 2006, Annex 4, par 92(i) and par 707]

91. The calculation of counterparty credit risk requirements is the same whether an institution uses the standardized or models approach to credit and market risk.

92. For a *total rate of return product*, each party relies on the other for payment; therefore, each party records a counterparty credit risk charge. The counterparty credit risk for *credit default swaps* is determined on the same basis as any other over-the-counter option contract. The beneficiary of the swap (fixed payer) relies on the guarantor/protection provider (variable payer)

to pay if a credit event occurs and, therefore, must record a counterparty credit risk charge against the guarantor/protection provider. The guarantor/protection provider in the swap is exposed to the beneficiary only if there are future premiums or interest related payments, but the guarantor/protection provider must always record an exposure to the reference asset. There is no counterparty credit risk charge for *credit-linked notes* as the guarantor/protection provider has pre-funded its potential obligation arising from the reference asset.

93. The appropriate add-on factor to use to calculate the potential future credit exposure to counterparty credit risk for single name credit derivatives under the Current Exposure Method depends on whether the reference asset is a qualifying asset as defined in section 9.10.1.1 of chapter 9. For total rate of return products and credit default swaps, the add-on factor is 5% if the reference asset is a qualifying asset, and 10% otherwise; the factor does not depend on the residual maturity of the contract. The add-on is required for both buyers and sellers of credit protection, with one exception: The add-on factor is only required for protection sellers under credit default swaps if the swap is subject to closeout upon the insolvency of the protection buyer while the reference entity is still solvent. In this case, the add-on is capped at the amount of unpaid premiums. [BCBS, June 2006, par 707]

94. The add-on factor for counterparty credit risk in basket transactions is determined by allocating the lowest credit quality assets in the basket to the number of assets required to default in order to trigger a payout. Thus, in a first-to-default transaction, the add-on is determined by the lowest credit quality asset in the basket, so that if there are any non-qualifying assets in the basket then the 10% factor applies. In a second-to-default transaction, the add-on is determined by the second lowest credit quality asset, and so on. [BCBS, June 2006, par 708]

95. Since all credit derivative positions are exposed to counterparty risk, the full counterparty risk charge is required for each leg of an offsetting transaction, even if the positions are completely matched.

4.1.6.2. Risk-weighted equivalent of non-netted contracts

A worksheet similar to that set out below could be used to determine the risk-weighted equivalent of non-netted contracts:

Type of Contract	Notional Principal Amount 1	Positive Replacement Cost (MTM) 2	Add-On Factor % 3	Potential Future Credit Exposure 1 x 3 = 4	Credit Equivalent 2 + 4 = 5	Risk Weight % 6	Risk-Weighted Equivalent 5 x 6 = 7
Interest Rate							
≤ 1 year			0.0			0	
			0.0			20	
			0.0			50	
			0.0			100	
			0.0			150	

Type of Contract	Notional Principal Amount 1	Positive Replacement Cost (MTM) 2	Add-On Factor % 3	Potential Future Credit Exposure 1 x 3 = 4	Credit Equivalent 2 + 4 = 5	Risk Weight % 6	Risk-Weighted Equivalent 5 x 6 = 7
> 1 year ≤ 5 years			0.5 0.5 0.5 0.5 0.5			0 20 50 100 150	
>5 years			1.5 1.5 1.5 1.5 1.5			0 20 50 100 150	
Foreign Exchange Rate and Gold							
≤ 1 year			1.0 1.0 1.0 1.0 1.0			0 20 50 100 150	
> 1 year ≤ 5 years			5.0 5.0 5.0 5.0 5.0			0 20 50 100 150	
> 5 years			7.5 7.5 7.5 7.5 7.5			0 20 50 100 150	
Equity							
≤ 1 year			6.0 6.0 6.0 6.0 6.0			0 20 50 100 150	
> 1 year ≤ 5 years			8.0 8.0 8.0 8.0 8.0			0 20 50 100 150	
> 5 years			10.0 10.0 10.0 10.0 10.0			0 20 50 100 150	
Precious Metals Except Gold							
≤1 year			7.0 7.0 7.0 7.0 7.0			0 20 50 100 150	

Type of Contract	Notional Principal Amount 1	Positive Replacement Cost (MTM) 2	Add-On Factor % 3	Potential Future Credit Exposure 1 x 3 = 4	Credit Equivalent 2 + 4 = 5	Risk Weight % 6	Risk-Weighted Equivalent 5 x 6 = 7
> 1 year ≤ 5 years			7.0			0	
			7.0			20	
			7.0			50	
			7.0			100	
			7.0			150	
> 5 years			8.0			0	
			8.0			20	
			8.0			50	
			8.0			100	
			8.0			150	
Other Commodities							
≤ 1 year			10.0			0	
			10.0			20	
			10.0			50	
			10.0			100	
			10.0			150	
> 1 year ≤ 5 years			12.0			0	
			12.0			20	
			12.0			50	
			12.0			100	
			12.0			150	
> 5 years			15.0			0	
			15.0			20	
			15.0			50	
			15.0			100	
			15.0			150	

[BCBS June 2006 Annex 4 par 92]

OSFI Notes:

96. Notes to the matrix and worksheet:

- trade exposures to QCCPs are subject to separate treatment in section 4.1.9;
- for contracts with multiple exchanges of principal, the factors are to be multiplied by the number of remaining payments in the contract;
- for contracts that are structured to settle outstanding exposure following specified payment dates and where the terms are reset such that the market value of the contract is zero on these specified dates, the residual maturity would be set equal to the time until the next reset date. In the case of interest rate contracts with remaining maturities of more than one year and that meet these criteria, the add-on factor is subject to a floor of 0.5%;
- contracts not covered by any of the rows of this matrix are to be treated as "other commodities";
- no potential future credit exposure would be calculated for single currency floating/floating interest rate swaps; the credit exposure on these contracts would be

evaluated solely on the basis of their mark-to-market value (replacement cost);

- the add-ons are based on effective rather than stated notional amounts. In the event that the stated notional amount is leveraged or enhanced by the structure of the transaction, institutions must use the actual or effective notional amount when determining potential future credit exposure. For example, a stated notional amount of \$1 million with payments calculated at two times LIBOR would have an effective notional amount of \$2 million;
- potential future credit exposure is to be calculated for all OTC contracts (with the exception of single currency-floating/floating interest rate swaps), regardless whether the replacement cost is positive or negative.

[BCBS, June 2006 Annex 4, par 92(i)]

97. Banks can obtain capital relief for collateral as defined in Chapter 5, Section 5.1.3 and chapter 9. The methodology for the recognition of eligible collateral follows that of the applicable approach for credit risk. [BCBS June 2006 Annex 4 par 93]

98. The counterparty credit risk exposure amount or EAD for single name credit derivative transactions in the trading book will be calculated using the potential future credit exposure add-on factors set out in this chapter. [BCBS June 2006 Annex 4 par 94]

99. To determine capital requirements for hedged banking book exposures, the treatment for credit derivatives in this guideline applies to qualifying credit derivative instruments. [BCBS June 2006 Annex 4 par 95]

100. Where a credit derivative is an nth-to-default transaction (such as a first-to-default transaction), the treatment specified in paragraph 94 applies. [BCBS June 2006 Annex 4 par 96]

4.1.6.3. *Netting of forwards, swaps, purchased options and other similar derivatives* [Moved from Chapter 3 – Credit Risk Standardized Approach, Section 3.5]

101. Institutions may net contracts that are subject to novation or any other legally valid form of netting. Novation refers to a written bilateral contract between two counterparties under which any obligation to each other to deliver a given currency on a given 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. [BCBS, June 2006 Annex 4 par 96(i)]

102. Institutions that wish to net transactions under either novation or another form of bilateral netting will need to satisfy OSFI¹⁶ that the following conditions are met:

- the institution has executed a written, bilateral netting contract or agreement with each counterparty that creates a single legal obligation, covering all included bilateral

¹⁶ If any supervisor is dissatisfied about enforceability under the laws of its country, neither counterparty can net the contracts for capital purposes.

transactions subject to netting. The result of such an arrangement would be that the institution only has one obligation for payment or one claim to receive funds based on the net sum of the positive and negative mark-to-market values of all of the transactions with that counterparty in the event that counterparty fails to perform due to any of the following: default, bankruptcy, liquidation or similar circumstances;

- the institution must have written and reasoned legal opinions that, in the event of any legal challenge, the relevant courts or administrative authorities would find the exposure under the netting agreement to be the net amount under the laws of all relevant jurisdictions. In reaching this conclusion, legal opinions must address the validity and enforceability of the entire netting agreement under its terms.
 - the laws of “all relevant jurisdictions” are: a) the law of the jurisdictions where the counterparties are chartered and, if the foreign branch of a counterparty is involved, the laws of the jurisdiction in which the branch is located b) the law governing the individual transactions; and c) the law governing any contracts or agreements required to effect netting;
 - a legal opinion must be generally recognised as such by the legal community in the firm’s home country or by a memorandum of law that addresses all relevant issues in a reasoned manner.
- 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;
- the institution must have procedures in place to update legal opinions as necessary to ensure continuing enforceability of the netting arrangements in light of possible changes in relevant law;
- the institution maintains all required documentation in its files.

[BCBS, June 2006 Annex 4 par 96(ii)]

103. Any contract containing a walkaway clause will not be eligible to qualify for netting for the purpose of calculating capital requirements. A walkaway clause is a provision within the contract that permits a non-defaulting counterparty to make only limited payments, or no payments, to the estate of the defaulter, even if the defaulter is a net creditor. [BCBS, June 2006 Annex 4 par 96(iii)]

104. Institutions that are approved to estimate their exposures to CCR using the internal model method may use the cross-product netting rules as set out in this chapter. Cross-product netting of repo-style transactions against OTC derivative transactions is not permitted under the current exposure method.

105. Credit exposure on bilaterally netted forwards, swaps, purchased options and other similar derivatives transactions is calculated as the sum of the net mark-to-market replacement cost, if positive, plus an add-on for potential future credit exposure based on the notional principal of the individual underlying contracts. However, for purposes of calculating potential future credit exposure of contracts subject to legally enforceable netting agreements in which

notional principal is equivalent to cash flows, notional principal is defined as the net receipts falling due on each value date in each currency. The reason that these contracts are treated as a single contract is that offsetting contracts in the same currency maturing on the same date will have lower potential future credit exposure as well as lower current exposure. For multilateral netting schemes, current exposure (i.e., replacement cost) is a function of the loss allocation rules of the clearing-house. [BCBS, June 2006 Annex 4 par 96(iv)]

106. The calculation of the gross add-ons should be based on the legal cash flow obligations in all currencies. This is calculated by netting all receivable and payable amounts in the same currency for each value date. The netted cash flow obligations are converted to the reporting currency using the current forward rates for each value date. Once converted, the amounts receivable for the value date are added together and the gross add-on is calculated by multiplying the receivable amount by the appropriate add-on factor.

107. The potential future credit exposure for netted transactions (A_{Net}) equals the sum of: (i) 40% of the add-on as presently calculated (A_{Gross})¹⁷; and (ii) 60% of the add-on multiplied by the ratio of net current replacement cost to gross current replacement cost (NGR).

Where

NGR = level of net replacement cost/level of gross replacement cost for transactions
subject to legally enforceable netting agreements.

[BCBS, June 2006 Annex 4 par 96(iv)]

108. The calculation of NGR can be made on a counterparty-by-counterparty basis or on an aggregate basis for all transactions, subject to legally enforceable netting agreements. On a counterparty-by-counterparty basis a unique NGR is calculated for each counterparty. On an aggregate basis, one NGR is calculated and applied to all counterparties.

Steps for determining the credit equivalent amount of netted contracts

1. For each counterparty subject to bilateral netting, determine the add-ons and replacement costs of each transaction. A worksheet similar to that set out below could be used for this purpose.

¹⁷ A_{Gross} equals the sum of the potential future credit exposures (i.e., notional principal amount of each transaction times the appropriate add-on factor from Section 4.1.6) for all transactions subject to legally enforceable netting agreements.

Counterparty 1					
Transaction	Notional Principal Amount	Add-on Factor (ref. 4-3-2)	Potential Future Credit Exposure	Gross Replacement Cost	Negative Replacement Cost
	1	2	$1 \times 2 = 3$	4	5
1					
2					
3					
Etc.					
Total			A_{Gross}	R^+	R^-

- Calculate the net replacement cost for each counterparty; it is equal to the greater of:
 - zero; or
 - the sum of the gross and negative replacement costs ($R^+ + R^-$) (note: negative replacement costs for one counterparty cannot be used to offset gross replacement costs for another counterparty).
- Calculate the NGR.

For institutions using the counterparty-by-counterparty basis, the NGR is the net replacement cost (from step 2) divided by the gross replacement cost (amount R^+ calculated in step 1).

For institutions using the aggregate basis, the NGR is the sum of the net replacement costs of all counterparties subject to bilateral netting divided by the sum of the gross replacement costs for all counterparties subject to bilateral netting.

A simple example of calculating the NGR ratio is set out below:

Transaction	Counterparty 1		Counterparty 2		Counterparty 3	
	Notional amount	Mark to Market Value	Notional amount	Mark to market value	Notional amount	Mark to market value
Transaction 1	100	10	50	8	30	-3
Transaction 2	100	-5	50	2	30	1
Gross replacement cost (R^+)		10		10		1
Net replacement cost (NR)		5		10		0
NGR (per counterparty)	0.5		1		0	
NGR (aggregate)	$\sum NR / \sum R^+ = 15/21 = 0.71$					

4. Calculate A_{Net} .

A_{Net} must be calculated for each counterparty subject to bilateral netting; however, the NGR applied will depend on whether the institution is using the counterparty-by-counterparty basis or the aggregate basis. The institution must choose which basis it will use and use it consistently for all netted transactions.

A_{Net} is:

For netted contracts where the net replacement cost is > 0

$$(.4 * A_{Gross}) + (.6 * A_{Gross} * NGR)$$

For netted contracts where the net replacement cost is $= 0$

$$.4 * A_{Gross}$$

5. Calculate the credit equivalent amount for each counterparty by adding the net replacement cost (step 2) and A_{Net} (step 4). Aggregate the counterparties by risk weight and enter the total credit equivalent amount on Schedule 40.

Note: Contracts may be subject to netting among different types of derivative instruments (e.g., interest rate, foreign exchange, equity, etc.). If this is the case, allocate the net replacement cost to the types of derivative instrument by pro-rating the net replacement cost among those instrument types which have a gross positive replacement cost.

4.1.7. CVA Risk Capital Charge

109. In addition to the default risk capital requirements for counterparty credit risk determined based on the standardised or internal ratings-based (IRB) approaches for credit risk, a bank must add a capital charge to cover the risk of mark-to-market losses on the expected counterparty risk (such losses being known as credit value adjustments, CVA) to OTC derivatives. The CVA capital charge will be calculated in the manner set forth below depending on the bank's approved method of calculating capital charges for counterparty credit risk and specific interest rate risk. A bank is not required to include in this capital charge (i) transactions with a central counterparty (CCP); and (ii) securities financing transactions (SFT), unless their supervisor determines that the bank's CVA loss exposures arising from SFT transactions are material. [BCBS June 2011 Annex 4 par 97]

4.1.7.1. *Banks with IMM approval and Specific Interest Rate Risk VaR model¹⁸ approval for bonds: Advanced CVA risk capital charge*

110. Banks with IMM approval for counterparty credit risk and approval to use the market risk internal models approach for the specific interest-rate risk of bonds must calculate this additional capital charge by modelling the impact of changes in the counterparties' credit spreads on the CVAs of all OTC derivative counterparties, together with eligible CVA hedges according to new paragraphs 114 and 115, using the bank's VaR model for bonds. This VaR model is restricted to changes in the counterparties' credit spreads and does not model the sensitivity of CVA to changes in other market factors, such as changes in the value of the reference asset, commodity, currency or interest rate of a derivative. Regardless of the accounting valuation method a bank uses for determining CVA, the CVA capital charge calculation must be based on the following formula for the CVA of each counterparty:

$$CVA = (LGD_{MKT}) \times \sum_{i=1}^T \text{MAX} \left[0; \exp \left(-\frac{s_{i-1} \times t_{i-1}}{LGD_{MKT}} \right) - \exp \left(-\frac{s_i \times t_i}{LGD_{MKT}} \right) \right] \times \left(\frac{EE_{i-1} \times D_{i-1} + EE_i \times D_i}{2} \right)$$

Where

- t_i is the time of the i -th revaluation time bucket, starting from $t_0=0$;
- t_T is the longest contractual maturity across the netting sets with the counterparty;
- s_i is the credit spread of the counterparty at tenor t_i , used to calculate the CVA of the counterparty. Whenever the CDS spread of the counterparty is available, this must be used. Whenever such a CDS spread is not available, the bank must use a proxy spread that is appropriate based on the rating, industry and region of the counterparty;
- LGD_{MKT} is the loss given default of the counterparty and should be based on the spread of a market instrument of the counterparty (or where a counterparty instrument is not available, based on the proxy spread that is appropriate based on the rating, industry and region of the counterparty). It should be noted that this LGD_{MKT} , which inputs into the calculation of the CVA risk capital charge, is different from the LGD that is determined for the IRB and CCR default risk charge, as this LGD_{MKT} is a market assessment rather than an internal estimate;
- the first factor within the sum represents an approximation of the market implied marginal probability of a default occurring between times t_{i-1} and t_i . Market implied default probability (also known as risk neutral probability) represents the market price of buying protection against a default and is in general different from the real-world likelihood of a default;
- EE_i is the expected exposure to the counterparty at revaluation time t_i , as defined in paragraph 35 (regulatory expected exposure), where exposures of different netting sets for such counterparty are added, and where the longest maturity of each netting set is

¹⁸ "VaR model" refers to the internal model approach to market risk.

given by the longest contractual maturity inside the netting set. For banks using the short cut method (paragraph 47) for margined trades, the paragraph 111 should be applied;

- D_i is the default risk-free discount factor at time t_i , where $D_0 = 1$.
[BCBS June 2011 Annex 4 par 98]

111. The formula in paragraph 110 must be the basis for all inputs into the bank's approved VaR model for bonds when calculating the CVA risk capital charge for a counterparty. For example, if this approved VaR model is based on full repricing, then the formula must be used directly. If the bank's approved VaR model is based on credit spread sensitivities for specific tenors, the bank must base each credit spread sensitivity on the following formula¹⁹:

$$\text{Regulatory CS01}_i = 0.0001 \times t_i \times \exp\left(-\frac{s_i \times t_i}{LGD_{MKT}}\right) \times \left(\frac{EE_{i-1} \times D_{i-1} - EE_{i+1} \times D_{i+1}}{2}\right)$$

If the bank's approved VaR model uses credit spread sensitivities to parallel shifts in credit spreads (Regulatory CS01), then the bank must use the following formula²⁰:

$$\text{Regulatory CS01} = 0.0001 \times \sum_i^T \left(t_i \times \exp\left(-\frac{s_i \times t_i}{LGD_{MKT}}\right) - t_{i-1} \times \exp\left(-\frac{s_{i-1} \times t_{i-1}}{LGD_{MKT}}\right) \right) \times \left(\frac{EE_{i-1} \times D_{i-1} + EE_i \times D_i}{2}\right)$$

If the bank's approved VaR model uses second-order sensitivities to shifts in credit spreads (spread gamma), the gammas must be calculated based on the formula in paragraph 110.

Banks using the short cut method for collateralised OTC derivatives (paragraph 47), must compute the CVA risk capital charge according to paragraph 110, by assuming a constant EE (expected exposure) profile, where EE is set equal to the effective expected positive exposure of the shortcut method for a maturity equal to the maximum of (i) half of the longest maturity occurring in the netting set and (ii) the notional weighted average maturity of all transactions inside the netting set.

Banks with IMM approval for the majority of their businesses, but which use CEM (Current Exposure Method) for certain smaller portfolios, and which have approval to use the market risk internal models approach for the specific interest rate risk of bonds, will include these non-IMM netting sets into the CVA risk capital charge, according to paragraph 110, unless the national supervisor decides that paragraph 116 should apply for these portfolios. Non-IMM netting sets are included into the advanced CVA risk capital charge by assuming a constant EE profile, where EE is set equal to the EAD as computed under CEM for a maturity equal to the maximum of (i) half of the longest maturity occurring in the netting set and (ii) the notional weighted average maturity of all transactions inside the netting set. The same approach applies where the IMM model does not produce an expected exposure profile.

¹⁹ This derivation assumes positive marginal default probabilities before and after time bucket t_i and is valid for $i < T$. For the final time bucket $i = T$, the corresponding formula is:

$$\text{Regulatory CS01}_T = 0.0001 \times t_T \times \exp\left(-\frac{s_T \times t_T}{LGD_{MKT}}\right) \times \left(\frac{EE_{T-1} \times D_{T-1} + EE_T \times D_T}{2}\right)$$

²⁰ This derivation assumes positive marginal default probabilities.

For exposures to certain counterparties, the bank's approved market risk VaR model may not reflect the risk of credit spread changes appropriately, because the bank's market risk VaR model does not appropriately reflect the specific risk of debt instruments issued by the counterparty. For such exposures, the bank is not allowed to use the advanced CVA risk charge. Instead, for these exposures the bank must determine the CVA risk charge by application of the standardised method in paragraph 116. Only exposures to counterparties for which the bank has supervisory approval for modelling the specific risk of debt instruments are to be included into the advanced CVA risk charge. [BCBS June 2011 Annex 4 par 99]

112. The CVA risk capital charge consists of both general and specific credit spread risks, including Stressed VaR but excluding IRC (incremental risk charge). The VaR figure should be determined in accordance with the quantitative standards described in paragraph 197 of chapter 9. It is thus determined as the sum of (i) the non-stressed VaR component and (ii) the stressed VaR component.

- i. when calculating the non-stressed VaR, current parameter calibrations for expected exposure must be used;
- ii. when calculating the stressed VaR future counterparty EE profiles (according to the stressed exposure parameter calibrations as defined in paragraph 77) must be used. The period of stress for the credit spread parameters should be the most severe one-year stress period contained within the three year stress period used for the exposure parameters²¹.

[BCBS June 2011 Annex 4 par 100]

113. This additional CVA risk capital charge is the stand alone market risk charge, calculated on the set of CVAs (as specified in paragraph 110) for all OTC derivatives counterparties, collateralised and uncollateralised, together with eligible CVA hedges. Within this standalone CVA risk capital charge, no offset against other instruments on the bank's balance sheet will be permitted (except as otherwise expressly provided herein). [BCBS June 2011 Annex 4 par 101]

114. Only hedges used for the purpose of mitigating CVA risk, and managed as such, are eligible to be included in the VaR model used to calculate the above CVA capital charge or in the standardised CVA risk capital charge set forth in paragraph 116. For example, if a credit default swap (CDS) referencing an issuer is in the bank's inventory and that issuer also happens to be an OTC counterparty but the CDS is not managed as a hedge of CVA, then such a CDS is not eligible to offset the CVA within the standalone VaR calculation of the CVA risk capital charge. [BCBS June 2011 Annex 4 par 102]

115. The only eligible hedges that can be included in the calculation of the CVA risk capital charge under paragraphs 110 or 116 are single-name CDSs, single-name contingent CDSs, other equivalent hedging instruments referencing the counterparty directly, and index CDSs. In case of index CDSs, the following restrictions apply:

²¹ Note that the three-times multiplier inherent in the calculation of a bond VaR and a stressed VaR will apply to these calculations.

- the basis between any individual counterparty spread and the spreads of index CDS hedges must be reflected in the VaR. This requirement also applies to cases where a proxy is used for the spread of a counterparty, since idiosyncratic basis still needs to be reflected in such situations. For all counterparties with no available spread, the bank must use reasonable basis time series out of a representative bucket of similar names for which a spread is available;
- if the basis is not reflected to the satisfaction of the supervisor, then the bank must reflect only 50% of the notional amount of index hedges in the VaR.

Other types of counterparty risk hedges must not be reflected within the calculation of the CVA capital charge, and these other hedges must be treated as any other instrument in the bank's inventory for regulatory capital purposes. Tranched or nth to- default CDSs are not eligible CVA hedges. Eligible hedges that are included in the CVA capital charge must be removed from the bank's market risk capital charge calculation.

[BCBS June 2011 Annex 4 par 103]

4.1.7.2. All other banks: standardised CVA risk capital charge

116. When a bank does not have the required approvals to use paragraph 110 to calculate a CVA capital charge for its counterparties, the bank must calculate a portfolio capital charge using the following formula:

$$K = 2.33 \times \sqrt{h} \times \sqrt{\left(\sum_i 0.5 \times w_i \times (M_i \times EAD_i^{total} - M_i^{hedge} \times B_i) - \sum_{ind} w_{ind} \times M_{ind} \times B_{ind} \right)^2 + \sum_i 0.75 \times w_i^2 \times (M_i \times EAD_i^{total} - M_i^{hedge} \times B_i)^2}$$

Where

- h is the one-year risk horizon (in units of a year), h = 1;
- w_i is the weight applicable to counterparty 'i'. Counterparty 'i' must be mapped to one of the seven weights w_i based on its external rating, as shown in the table of this paragraph below. When a counterparty does not have an external rating, the bank must, subject to supervisory approval, map the internal rating of the counterparty to one of the external ratings. If the bank does not have an approved rating system, then any unrated counterparty will receive a weight of 2.0%;
- EAD_i^{total} is the exposure at default of counterparty 'i' (summed across its netting sets), including the effect of collateral as per the existing IMM or CEM rules as applicable to the calculation of counterparty risk capital charges for such counterparty by the bank. For non-IMM banks the exposure should be discounted by applying the factor (1-exp(-0.05*M_i))/(0.05*M_i). For IMM banks, no such discount should be applied as the discount factor is already included in M_i;
- B_i is the notional of purchased single name CDS hedges (summed if more than one position) referencing counterparty 'i', and used to hedge CVA risk. This notional amount should be discounted by applying the factor (1-exp(-0.05*M_i^{hedge}))/(0.05*M_i^{hedge});

- B_{ind} is the full notional of one or more index CDS of purchased protection, used to hedge CVA risk. This notional amount should be discounted by applying the factor $(1 - \exp(-0.05 * M_{ind})) / (0.05 * M_{ind})$;
- w_{ind} is the weight applicable to index hedges. The bank must map indices to one of the seven weights w_i based on the average spread of index 'ind';
- M_i is the effective maturity of the transactions with counterparty 'i'. For IMM banks, M_i is to be calculated as per paragraph 43 of this chapter. For non-IMM banks, M_i is the notional weighted average maturity as referred to in the third bullet point of paragraph 120 of chapter 6. However, for this purpose, M_i should not be capped at 5 years;
- M_i^{hedge} is the maturity of the hedge instrument with notional B_i (the quantities $M_i^{hedge} \times B_i$ are to be summed if these are several positions);
- M^{ind} is the maturity of the index hedge 'ind'. In case of more than one index hedge position, it is the notional weighted average maturity.

For any counterparty that is also a constituent of an index on which a CDS is used for hedging counterparty credit risk, the notional amount attributable to that single name (as per its reference entity weight) may, with supervisory approval, be subtracted from the index CDS notional amount and treated as a single name hedge (B_i) of the individual counterparty with maturity based on the maturity of the index.

The weights are given in this table, and are based on the external rating of the counterparty²²:

Rating	Weight W_i
AAA	0.7%
AA	0.7%
A	0.8%
BBB	1.0%
BB	2.0%
B	3.0%
CCC	10.0%

[BCBS June 2011 Annex 4 par 104]

4.1.8. Calculation of the aggregate CCR and CVA risk capital charges

117. This paragraph deals with the aggregation of the default risk capital charge and the CVA risk capital charge for potential mark-to-market losses. Note that outstanding EAD referred to in the default risk capital charges below is net of incurred CVA losses according to

²² The notations follow the methodology used by one institution, Standard & Poor's. The use of Standard & Poor's credit ratings is an example only; those of some other approved external credit assessment institutions could be used on an equivalent basis. The ratings used throughout this document, therefore, do not express any preferences or determinations on external assessment institutions by the Committee.

paragraph 12, which affects all items “i” below. In this paragraph, “IMM capital charge” refers to the default risk capital charge for CCR based on the RWAs obtained when multiplying the outstanding EAD of each counterparty under the IMM approach by the applicable credit risk weight (under the Standardised or IRB approach), and summing across counterparties. Equally, “CEM capital charge” refers to the default risk capital charges where outstanding EADs for all counterparties in the portfolio are determined based on the CEM. [BCBS June 2011 Annex 4 par 105]

4.1.8.1. Banks with IMM approval and market-risk internal-models approval for the specific interest-rate risk of bonds

118. The total CCR capital charge for such a bank is determined as the sum of the following components:

- i. the higher of (a) its IMM capital charge based on current parameter calibrations for EAD and (b) its IMM capital charge based on stressed parameter calibrations for EAD. For IRB banks, the risk weights applied to OTC derivative exposures should be calculated with the full maturity adjustment as a function of PD with M capped at 1 in Chapter 6 – Credit Risk – Internal Ratings Based Approach paragraph 80, provided the bank can demonstrate to its national supervisor that its specific VaR model applied in paragraph 110 contains the effect of rating migrations. If the bank cannot demonstrate this to the satisfaction of its national supervisor, the full maturity adjustment function, given by the formula

$$(1 - 1.5 \times b)^{-1} \times (1 + (M - 2.5) \times b)^{23} \text{ should apply;}$$

- ii. the advanced CVA risk capital charge determined pursuant to paragraphs 110 to 115. [BCBS June 2011 Annex 4 par 105]

4.1.8.2. Banks with IMM approval and without Specific Risk VaR approval for bonds

119. The total CCR capital charge for such a bank is determined as the sum of the following components:

- i. the higher of (a) the IMM capital charge based on current parameter calibrations for EAD and (b) the IMM capital charge based on stressed parameter calibrations for EAD;
- ii. the standardised CVA risk capital charge determined by paragraph 116. [BCBS June 2011 Annex 4 par 105]

4.1.8.3. All other banks

120. The total CCR capital charge for such banks is determined as the sum of the following two components:

²³ Where “M” is the effective maturity and “b” is the maturity adjustment as a function of the PD, as defined in paragraph 80 of chapter 6 of the CAR A-1 Guideline.

-
- i. the sum over all counterparties of the CEM based capital charge with EADs determined by paragraph 88;
 - ii. the standardised CVA risk capital charge determined by paragraph 116.
[BCBS June 2011 Annex 4 par 105]

4.1.9. Central Counterparties

121. Regardless of whether a CCP is classified as a qualifying CCP (QCCP), a bank retains the responsibility to ensure that it maintains adequate capital for its exposures. Under Pillar 2 of Basel II, a bank 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 bank's dealings, it is unclear that the CCP meets the definition of a QCCP. [BCBS, July 2012, Annex 4 par 106]

122. Where the bank is acting as a clearing member, the bank should assess through appropriate scenario analysis and stress testing whether the level of capital held against exposures to a CCP adequately addresses the inherent risks of those transactions. This assessment will include potential future or contingent exposures resulting from future drawings on default fund commitments, and/or from a 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. [BCBS, July 2012, Annex 4 par 107]

123. A bank 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. [BCBS, July 2012, Annex 4 par 108]

124. Where a bank is trading with a Qualifying CCP (QCCP) as defined in Section 4.1.1.1, paragraphs 125 to 141 will apply. In the case of non-qualifying CCPs, paragraphs 142 and 143 will apply. Within three months of a central counterparty ceasing to qualify as a QCCP, unless a bank's national supervisor requires otherwise, the trades with a former QCCP may continue to be capitalised as though they are with a QCCP. After that time, the bank's exposure with such a central counterparty must be capitalised according to paragraphs 142 and 143. [BCBS, July 2012, Annex 4 par 109]

4.1.9.1. Exposures to Qualifying CCPs

A. Trade exposures

(i) Clearing member exposures to CCPs

125. Where a bank acts as a clearing member of a CCP for its own purposes a risk weight of 2% must be applied to the clearing bank's trade exposure to the CCP in respect of OTC derivatives, exchange traded derivative transactions and SFTs. Where a clearing member offers clearing services to clients, the 2% risk weight also applies to the clearing member's trade exposure to the CCP that arise when the clearing member is obligate to reimburse the client for

any losses due to changes in the value of its transactions in the event that the CCP defaults. [BCBS, July 2012, Annex 4 par 110]

126. The exposure amount for such trade exposure is to be calculated in accordance with this chapter using the IMM²⁴ or CEM, as consistently applied by such bank to such an exposure in the ordinary course of its business, or Chapter 5 together with credit risk mitigation techniques set forth in Basel II for collateralised transactions²⁵.

Where the respective exposure methodology allows for it, margining can be taken into account.

In the case of IMM banks, the 20-day floor for the margin period of risk (MPOR) as established in the first bullet point of paragraph 48, included by the Basel III framework, 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 IMM, or the IMM short cut method of paragraph 47 and for the holding periods entering the exposure calculation of repo-style transactions in Chapter 5 – Credit Risk Mitigation, Section 5.1.3. [BCBS, July 2012, Annex 4 par 111]

127. 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 in²⁶:

- Chapter 5 – Credit Risk Mitigation, paragraph 63 and, where applicable, also 64 in the case of repo-style transactions;
- Paragraphs 101-103 in the case of derivative transactions;
- Paragraphs 13 to 22 in the case of cross-product netting.

To the extent that the rules referenced above include the term “master netting agreement”, this term should be read as including any “netting agreement” that provides legally enforceable rights of set-off²⁷. If the bank cannot demonstrate that netting agreements meet these rules, each single transaction will be regarded as a netting set of its own for the calculation of trade exposure. [BCBS, July 2012, Annex 4 par 112]

²⁴ Changes to IMM introduced in Basel III also apply for these purposes.

²⁵ In particular, see Chapter 5 – Credit Risk Mitigation, Sections 5.1.3 and 5.2.1 for OTC derivatives and standard supervisory haircuts or own estimates for haircuts, respectively; and for SFTs, see Chapter 5 – Credit Risk Mitigation, Section 5.2.4 for simple VaR model.

²⁶ For the purposes of this section 4.1.9, the treatment of netting also applies to exchange traded derivatives.

²⁷ This is to take account of the fact that for netting agreements employed by CCPs, no standardisation has currently emerged that would be comparable to the level of standardisation with respect to OTC netting agreements for bilateral trading.

(ii) Clearing member exposures to clients

128. The clearing member will always capitalise 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 recognise the shorter close-out period for cleared transactions, clearing members can capitalise the exposure to their clients applying a margin period of risk of at least 5 days (if they adopt the IMM); or multiplying the EAD by a scalar of no less than 0.71 (if they adopt the CEM).²⁸ On a trade by trade (or netting set) basis, the EAD after adjustment cannot be less than the positive replacement cost of the trade/netting set. That is, the absolute value of the reduction in EAD cannot exceed the amount of the trade's/netting set's potential future credit exposure. [BCBS, July 2012, Annex 4 par 113]

OSFI Notes

Paragraph 128(i) provides clarity on the interaction of paragraph 48 and 128.

128(i). Under paragraph 128, netting sets containing an illiquid trade are subject to an MPOR floored at 20 days (for banks using the IMM) or the full EAD (for banks using the CEM). An MPOR floor of 5 days (for banks using the IMM) and a scalar of no less than 0.71 (for banks using the CEM) may be applied for netting sets containing more than 5,000 trades.

(iii) Client exposures

129. Where a bank is a client of a clearing member, and enters into a transaction with the clearing member acting as a financial intermediary (i.e. the clearing member completes an offsetting transaction with a CCP), the client's exposures to the clearing member may receive the treatment in paragraph 125-127 above if the following two conditions are met:

- (a) 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: (i) the default or insolvency of the clearing member, (ii) the default or insolvency of the clearing member's other clients, and (iii) the joint default or insolvency of the clearing member and any of its other clients²⁹;

The client must be in a position to provide to the national supervisor, if requested, an independent, written and reasoned legal opinion that concludes that, in the event of legal

²⁸ The risk reduction in case the margin period of risk is greater than 5 days are as follows: 6 days – scalar=0.77; 7 days – scalar=0.84; 8 days – scalar=0.89; 9 days – scalar=0.95; 10 days – scalar=1.

²⁹ That is, upon the insolvency of the clearing member, there is no legal impediment (other than the need to obtain a court order to which the client is entitled) to the transfer of the collateral belonging to clients of a defaulting clearing member to the CCP, to one or more other surviving clearing members or to the client or the client's nominee. National supervisors should be consulted to determine whether this is achieved based on particular facts.

challenge, the relevant courts and administrative authorities would find that the client would bear no losses on account of the insolvency of an intermediary clearing member or of any other clients of such intermediary under relevant law:

- the law of the jurisdiction(s) of the client, clearing member and CCP;
- if the foreign branch of the client, clearing member or CCP are involved, then also under the law of the jurisdiction(s) in which the branch are located;
- the law that governs the individual transactions and collateral; and
- the law that governs any contract or agreement necessary to meet this condition (a).

(b) 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, should the clearing member default or become 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.

Where a client enters into a transaction with the CCP, with a clearing member guaranteeing its performance, the client's exposures to the CCP may receive the treatment in paragraph 125-127 if the above conditions are met.

[BCBS, July 2012, Annex 4 par 114]

OSFI Notes

129(i). OSFI recognises the potential operational challenges around meeting the requirements in paragraph 129(a). In light of these, Canadian banks who meet the following requirements will be deemed to be in compliance with paragraph 129(a).

The client must have conducted sufficient legal review (and undertake such further review as necessary to ensure continuing enforceability) to verify 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 in paragraph 129(a) would be legal, valid, binding and enforceable under the relevant laws of the relevant jurisdiction(s).

130. 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 paragraph 129 are met, a risk weight of 4% will apply to the client's exposure to the clearing member. [BCBS, July 2012, Annex 4 par 115]

131. Where the bank is a client of the clearing member and the requirements in paragraphs 129 or 130 are not met, the bank will capitalise its exposure (including potential CVA risk exposure) to the clearing member as a bilateral trade. [BCBS, July 2012, Annex 4 par 116]

(iv) Treatment of posted collateral

132. In all cases, any assets posted or collateral must, from the perspective of the bank posting such collateral, receive the risk weights that otherwise applies to such assets or collateral under the capital adequacy framework, regardless of the fact that such assets have been posted as collateral. 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, the bank posting such assets or collateral must also recognise counterparty credit risk based upon the assets or collateral being exposed to risk of loss based on the creditworthiness of the entity³⁰ holding such assets or collateral. [BCBS, July 2012, Annex 4 par 117]

133. Collateral posted by the clearing member (including cash, securities, other pledged assets, and excess margin, also called overcollateralisation), that is held by a custodian³¹, and is bankruptcy remote from the CCP, is not subject to a capital requirement for counterparty credit risk exposure to such bankruptcy remote custodian. [BCBS, July 2012, Annex 4 par 118]

134. Collateral posted by a client, that is held by a custodian, and is bankruptcy remote from the CCP, the clearing member and other clients, is not subject to a capital requirement for counterparty credit risk. If the collateral is held at the CCP on a client's behalf and is not held on a bankruptcy remote basis, a 2% risk-weight must be applied to the collateral if the conditions established in paragraph 129 are met; or 4% if the conditions in paragraph 130 are met. [BCBS, July 2012, Annex 4 par 119]

³⁰ Where the entity holding such assets or collateral is the CCP, a risk-weight of 2% applies to collateral included in the definition of trade exposures. The corresponding risk-weight of the CCP will apply to assets or collateral posted for other purposes.

³¹ 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, should such person become insolvent or bankrupt.

B. Default fund exposures

OSFI Notes

135. The methodology for determining the capital charge for default fund exposures to qualifying CCPs is set out below. In limited circumstances OSFI may provide an explicit waiver to use the alternative approach for qualifying CCPs also set out below.

To apply for the waiver to use the Alternative approach to calculating capital requirements for default fund exposures to QCCPs, OSFI is requesting that banks provide the following for each of the CCPs for which it is applying for the waiver:

- i. The rationale for the request
- ii. Documentation supporting (i)
- iii. Capital and RWA estimates for both the Risk Sensitive Waterfall approach and the Alternative approach, if available.
- iv. The period of time which the bank expects to require a waiver when the reason provided in (i) is of a temporary nature
- v. Confirmation from the bank that using the Alternative approach will not result in any implementation issues from the bank's perspective (e.g. a delay due to the use of a different method)

136. Both the risk sensitive waterfall approach and the alternative approach are temporary approaches which will be subject to a replacement at a future date.

137. 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 or SFTs, 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. [BCBS, July 2012, Annex 4 par 120]

4.1.9.2. Risk Sensitive Waterfall Approach

138. Whenever a bank is required to capitalise for exposures arising from default fund contributions to a qualifying CCP, clearing member banks will apply a risk weight to their default fund contributions. This risk weight will be determined according to a risk sensitive formula that considers (i) the size and quality of a qualifying CCP's financial resources, (ii) the counterparty credit risk exposures of such CCP, and (iii) the application of such financial resources via the CCP's loss bearing waterfall, in the case of one or more clearing member defaults. The clearing member bank's risk sensitive capital requirement for its default fund contribution (K_{CMi}) must be calculated using the formulae and methodology set forth below. This calculation may be performed by a CCP, bank, supervisor or other body with access to the required data, as long as the conditions in paragraph 141 are met. [BCBS, July 2012, Annex 4 par 122]

139. The steps for calculation will be the following:

- (i) first, calculate the CCP's hypothetical capital requirement due to its CCR exposures to all of its clearing members³². This is calculated using the formula for K_{CCP} :

$$K_{CCP} = \sum_{\substack{\text{clearing} \\ \text{members } i}} \max(EBRM_i - IM_i - DF_i; 0) * RW * \text{Capital Ratio}$$

Where

- RW is a risk weight of 20%³³
- Capital Ratio means 8%
- $\max(EBRM_i - IM_i - DF_i; 0)$ is the exposure amount of the CCP to CM 'i', with all values relating to the valuation at the end of the day before the margin called on the final margin call of that day is exchanged, and:
 - $EBRM_i$ denoting the exposure value to clearing member 'i' before risk mitigation under the CEM for derivatives or under the comprehensive approach of Chapter 5 – Credit Risk Mitigation, Section 5.1.2 *The comprehensive approach, Adjustment for different holding periods and non daily mark-to-market remargining* and for SFTs under Section 5.1.3 *Treatment of repo-style transactions covered under master netting agreement*; where, for purposes of this calculation, variation margin that has been

³² K_{CCP} is a hypothetical capital requirement for a CCP, calculated on a consistent basis for the sole purpose of determining the capitalisation of clearing member default fund contributions; it does not represent the actual capital requirements for a CCP which may be determined by a CCP and its supervisor.

³³ The 20% risk weight is a minimum requirement. As with other parts of the capital adequacy framework, the national supervisor of a bank may increase the risk weight. An increase in such risk weight would be appropriate if, for example, the clearing members in a CCP are not highly rated. Any such increase in risk weight is to be communicated by the affected banks to the person completing this calculation.

exchanged (before the margin called on the final margin call of that day) enters into the mark-to-market value of the transactions;

- IM_i being the initial margin collateral posted by the clearing member with the CCP;
- DF_i being the prefunded default fund contribution by the clearing member that will be applied upon such a clearing member's default, either along with or immediately following such member's initial margin, to reduce CCP loss.

As regards the calculation in this first step:

- a. for clarity, each exposure amount is the CCR exposure amount a CCP has to a clearing member, calculated as a bilateral trade exposure for OTC derivatives and exchange traded derivatives either using the Current Exposure Method (CEM) in Section 4.1.6, or under Chapter 5 – Credit Risk Mitigation, Section 5.1.3 Collateral, standard supervisory haircuts for SFTs. The holding periods for SFT calculations in Chapter 5 – Credit Risk Mitigation remain even if more than 5000 trades are within one netting set, i.e. the first bullet point of paragraph 48 will not apply in this context.;
- b. for the purposes of calculating K_{CCP} via CEM the formula is:

$$ANet = 0.15 * AGross + 0.85 * NGR * AGross.$$

Where, for the purposes of this calculation, the numerator of the NGR is $EBRM_i$ - as described above - without the CEM add-on in case of OTC derivatives, and the denominator is the gross replacement cost.³⁴ Moreover, for the purposes of this calculation, the NGR must be calculated on a counterparty by counterparty basis (i.e. the other option in paragraph 108 does not apply).

Further, if NGR cannot be calculated according to paragraph 108, a transitional default value NGR value of 0.30 shall be applied for this calculation, until 31 March 2013. After this transitional period, the fallback approach established in paragraph 143 will apply.

The PFE calculation under the CEM for options and swaptions that are transacted through a CCP is adjusted by multiplying the notional amount of the contract by the absolute value of the option's delta, which is calculated according to paragraphs 1 and 2 Appendix 4-1 of this chapter.

The netting sets that are applicable to regulated clearing members are the same as those referred to in paragraph 127. For all other clearing members, they need to follow the netting rules as laid out by the CCP based upon notification of each of its clearing members. The national supervisor can demand more granular netting sets than laid out by the CCP.

³⁴ If the minimum variation margin settlement frequency is daily, but a CCP calls margin intraday, then NGR is to be calculated just before margin is actually exchanged at the end of the day. NGR is expected to be non-zero.

(ii) second, calculate the aggregate capital requirement for all clearing members (prior to the concentration and granularity adjustment), assuming a scenario where two average clearing members default and, therefore, their default fund contributions are not available to mutualise losses. This scenario is incorporated in the following risk-sensitive formula:

$$K_{CM}^* = \begin{cases} c_2 * \mu * (K_{CCP} - DF') + c_2 * DF'_{CM} & \text{if } DF' < K_{CCP} & (i) \\ c_2 * (K_{CCP} - DF_{CCP}) + c_1 * (DF' - K_{CCP}) & \text{if } DF_{CCP} < K_{CCP} \leq DF' & (ii) \\ c_1 * DF'_{CM} & \text{if } K_{CCP} \leq DF_{CCP} & (iii) \end{cases}$$

Where

K_{CM}^* = Aggregate capital requirement on default fund contributions from all clearing members prior to the application of the granularity and concentration adjustment;

DF_{CCP} = **CCPs prefunded own resources** (e.g. contributed capital, retained earnings, etc.) which are required to be used by the CCP to cover its losses before clearing members' default fund contributions are used to cover losses;

DF_{CM}' = Prefunded **default fund contributions from surviving clearing members** available to mutualise losses under the assumed scenario. Specifically:

$$DF_{CM}' = DF_{CM} - 2 * \overline{DF}_i,$$

where \overline{DF}_i is the average default fund contribution;

DF' = **Total prefunded default fund contributions** available to mutualise losses under the assumed scenario. Specifically:

$$DF' = DF_{CCP} + DF_{CM}'$$

$c1$ = A decreasing capital factor, between 0.16% and 1.6%, applied to the excess prefunded default funds provided by clearing members (DF_{CM}):

$$c1 = \text{Max} \left\{ \frac{1.6\%}{\left(\frac{DF'}{K_{CCP}} \right)^{0.3}}; 0.16\% \right\}$$

$c2$ = 100%; a capital factor applied when a CCP's own resources (DF_{CCP}) are less than such CCP's hypothetical capital requirements (K_{CCP}), and, as a results, the clearing member default funds are expected to assist in the coverage of the CCP's hypothetical capital requirements (K_{CCP});

μ = 1.2; an exposure scalar of 1.2 is applied in respect of the unfunded part of a CCP's hypothetical capital requirements (K_{CCP}).

Equation (i) applies when a CCP's total prefunded default fund contributions (DF) are less than the CCP's hypothetical capital requirements (K_{CCP}). In such case, the clearing members unfunded default fund commitments are expected to bear such loss and the exposure for a clearing member bank is, due to the potential failure of other members to make additional default fund contributions when called, expected to be greater than the exposure if all default funds had been prefunded³⁵. Therefore, an exposure scalar (μ) of 1.2 is applied in respect of the unfunded part of K_{CCP} , to reflect the bank's greater exposure arising from reliance on unfunded default fund contributions. If a part of the CCP's own financial resources available to cover losses is used after all clearing members' default fund contributions (DF_{CM}) are used to cover losses, then this part of the CCP's contribution to losses should be included as part of the total default fund (DF).

Equation (ii) applies when a CCP's own resource contributions to losses (DF_{CCP}) and the clearing members' default contributions (DF_{CM}), are both required to cover the CCP's hypothetical capital (K_{CCP}), but are, in the aggregate, greater than the CCP's hypothetical capital requirements K_{CCP} . As noted in the above definition, for DF_{CCP} to be included in the total default fund available to mutualise losses (DF^*), the CCP's own resources must be used before DF_{CM} . If that is not the case and a part of CCP's own financial resources is used in combination, on a pro rata or formulaic basis, with the clearing members' default fund contributions (DF_{CM}) to cover CCP losses, then this equation needs to be adapted, in consultation with national supervisors, such that this part of CCP contribution is treated just like a clearing member's default fund contribution.

Equation (iii) applies when a qualifying CCP's own financial resource contribution to loss (DF_{CCP}) is used first in the waterfall, and is greater than the CCP's hypothetical capital (K_{CCP}), so that the CCP's own financial resources are expected to bear all of the CCP's losses before the clearing members' default fund contributions (DF_{CM}) are called upon to bear losses.

- (iii) finally, calculate the capital requirement for an individual clearing member 'i' (K_{CM_i}) by distributing K_{CM}^* to individual clearing members in proportion to the individual clearing member's share of the total prefunded default fund contributions,³⁶ and taking into account the CCP granularity (through the factor that accounts for the number of members 'N') and the CCP concentration (through the factor ' β ').

³⁵ Where a CCP's total prefunded default fund contributions (DF) are not sufficient to cover the CCP's hypothetical capital requirements (K_{CCP}), and clearing members do not have an obligation to contribute more default funds to offset a shortfall in CCP loss-absorbing resources, such clearing members are still subject to an additional capital charge. The reason is that their trade exposures to such CCP are, in fact, riskier than would be the case if the CCP had access to adequate resources to cover its hypothetical capital requirements. This reflects the underlying assumption that CCPs, through own resources and member default funds, are expected to have adequate loss-bearing, mutualised, financial resources to make defaults on their exposures highly unlikely.

³⁶ Such allocation method is based on the assumption that losses would be allocated proportionate to prefunded DF contributions of CMs. If the CCP practice differs, the allocation method should be adjusted in consultation with national supervisors.

$$K_{CM_i} = \left(1 + \beta * \frac{N}{N-2}\right) * \frac{DF_i}{DF_{CM}} * K_{CM}^*$$

Where

$\beta = \frac{A_{Net,1} + A_{Net,2}}{\sum_i A_{Net,i}}$, where subscript 1 and 2 denote the clearing members with the two largest A_{Net} values. For OTC derivatives A_{Net} is defined in paragraph 52; and SFTs, A_{Net} will be replaced by $E * H_e + C * (H_c + H_{fx})$, as defined in Chapter 5 – Credit Risk Mitigation, Section 5.1.3 (ii) The comprehensive approach.

$N =$ Number of clearing members;

$DF_i =$ Prefunded default fund contribution from an individual clearing member ‘i’;

$DF_{CM} =$ Prefunded default fund contributions from all clearing members (or any other member contributed financial resources that are available to bear mutualised CCP losses).

Alternatively, where the above allocation method fails because of the fact that the CCP does not have prefunded default fund contributions, the following hierarchy of conservative allocation method applies:

1. Allocate K_{CM}^* based upon each CM’s proportionate liability for default fund calls (i.e. unfunded DF commitment);
2. In the case such an allocation is not determinable; allocate K_{CM}^* based upon the size of each CM’s posted IM.

These allocation approaches would replace (DF_i / DF_{CM}) in the calculation of K_{CM_i} .
[BCBS, July 2012, Annex 4 par 123]

4.1.9.3. Alternative Approach

140. Clearing member banks may apply a risk-weight of 1250% to its default fund exposures to the CCP, subject to an overall cap on the risk-weighted assets from all its exposures to the CCP (i.e. including trade exposures) equal to 20% times the trade exposures to the CCP. More specifically, under this approach, the Risk Weighted Assets (RWA) for both bank i ’s trade and default fund exposures to CCP $_j$ are equal to:³⁷

$$\text{Min}\{(2\% * TE_i + 1250\% * DF_i); (20\% * TE_i)\}$$

³⁷ Under this approach the, 2% risk weight on trade exposures given by paragraph 125 does not apply as it is included in the equation in paragraph 140.

Where

- TE_i is bank I 's trade exposure to CCP $_j$, as measured by the bank according to paragraphs 125 to 127 in this chapter; and
- DF_i is bank I 's pre-funded contribution to CCP j 's default fund
[BCBS, July 2012, Annex 4 par 125]

141. The CCP, bank, supervisor or other body with access to the required data, must make a calculation of K_{CCP} , DF_{CM} , and DF_{CCP} in such a way to permit the supervisor of the CCP to oversee those calculations, and it must share sufficient information of the calculation results to permit each clearing member to calculate their capital requirement for the default fund and for the bank supervisor of such clearing member to review and confirm such calculations. K_{CCP} should be calculated on a quarterly basis at a minimum; although national supervisors may require more frequent calculations in case of material changes (such as the CCP clearing a new product). The CCP, bank, supervisor or other body that did the calculations should make available to the home supervisor of any bank clearing member sufficient aggregate information about the composition of the CCP's exposures to clearing members and information provided to the clearing member for the purposes of the calculation of K_{CCP} , DF_{CM} , and DF_{CCP} . Such information should be provided no less frequently than the home bank supervisor would require for monitoring the risk of the clearing member that it supervises. K_{CCP} and K_{CMi} must be recalculated at least quarterly, and should also be recalculated when there are material changes to the number or exposure of cleared transactions or material changes to the financial resources of the CCP. [BCBS, July 2012, Annex 4 par 124]

4.1.9.4. *Exposures to Non-qualifying CCPs*

142. Banks must apply the Standardised Approach for credit risk in the main framework, according to the category of the counterparty, to their trade exposure to a non-qualifying CCP.
[BCBS, July 2012, Annex 4 par 126]

143. Banks must apply a risk weight of 1250% to their default fund contributions to a non-qualifying CCP. For the purposes of this paragraph, the default fund contributions of such banks will include both the funded and the unfunded contributions which are liable to be paid should the CCP so require. Where there is a liability for unfunded contributions (i.e. unlimited binding commitments) the national supervisor should determine in its Pillar 2 assessments the amount of unfunded commitments to which a 1250% risk weight should apply. [BCBS, July 2012, Annex 4 par 127]

4.2. **Capital treatment for failed trades and non-DvP transactions**

[previously Annex 3]

144. 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.

4.2.1. Overarching principles

145. Banks 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. [BCBS June 2006 Annex 3 par 1]

146. Transactions settled through a delivery-versus-payment system (DvP)³⁸, 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. [BCBS June 2006 Annex 3 par 2]

147. 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 recognised clearing houses and central counterparties that are subject to daily mark-to-market and payment of daily variation margins and that involve a mismatched trade³⁹. Repurchase and reverse-repurchase agreements as well as securities lending and borrowing that have failed to settle are excluded from this capital treatment⁴⁰. [BCBS June 2006 Annex 3 par 3] and [BCBS July 2012, Annex 3, par 3]

148. 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 [BCBS July 2012, Annex 3, par 4]

149. Failure of a counterparty to settle a trade in itself will not be deemed a default for purposes of credit risk under this guideline. [BCBS June 2006 Annex 3 par 5]

150. In applying a risk weight to failed free-delivery exposures, banks 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. Banks 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, banks using the IRB approach may opt to apply the standardised approach risk weights or a 100% risk weight. [BCBS June 2006 Annex 3 par 6]

³⁸ For the purpose of this guideline, DvP transactions include payment-versus-payment (PvP) transactions.

³⁹ 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 collateralised on a daily basis.

⁴⁰ All repurchase and reverse-repurchase agreements as well as securities lending and borrowing, including those that have failed to settle, are treated in accordance with Section 4.1 or the sections on credit risk mitigation of this guideline.

4.2.2. Capital requirements

151. 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 1 below.

Table 1

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%

152. A reasonable transition period may be allowed for firms to upgrade their information system to be able to track the number of days after the agreed settlement date and calculate the corresponding capital charge. [BCBS June 2006 Annex 3 par 7]

153. For non-DvP transactions (i.e. free deliveries), after the first contractual payment/delivery leg, the bank that has made the payment will treat its exposure as a loan if the second leg has not been received by the end of the business day⁴¹. This means that a bank 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, banks under the standardised approach will use the standardised risk weights set forth in this guideline. However, when exposures are not material, banks may choose to apply a uniform 100% risk-weight to these exposures, in order to avoid the burden of a full credit assessment. If five business days after the second contractual payment/delivery date the second leg has not yet effectively taken place, the bank that has made the first payment leg will 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. [BCBS June 2006 Annex 3, par 8]

⁴¹ 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.

Appendix 4-1

1. For OTC derivative with non-linear risk profiles (including options and swaptions), for which the underlying is a debt instrument or a payment leg, the size of the risk position is equal to the delta equivalent effective notional value of the financial instrument or payment leg multiplied by the modified duration of the debt instrument or payment leg. [BCBS, June 2006, Annex 4, paragraph 77]
2. Banks may use the following formulas to determine the size and sign of a risk position:
 - a) for all but debt instruments:

effective notional value, or delta equivalent notional value =

$$p_{ref} \frac{\partial V}{\partial p}$$

where

p_{ref} price of the underlying instrument, expressed in the reference currency

v value of the financial instrument (in case of an option: option price; in case of a transaction with a linear risk profile: value of the underlying instrument itself)

p price of the underlying instrument, expressed in the same currency as v

- b) for debt instruments and the payment legs of all transactions:

effective notional value multiplied by the modified duration, or delta equivalent in notional value multiplied by the modified duration

$$\frac{\partial V}{\partial r}$$

where

v value of the financial instrument (in the case of an option: option price; in the case of a transaction with a linear risk profile: value of the underlying instrument itself or of the payment leg, respectively)

r interest level

If v is denominated in a currency other than the reference currency, the derivative must be converted into the reference currency by multiplication with the relevant exchange rate.

[BCBS, June 2006, Annex 4, paragraph 78]