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# Guideline

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**Subject: Capital Adequacy Requirements (CAR)**

**No: A-1                      Effective Date: January 2012**

Subsection 485(1) of the *Bank Act* (BA) and subsection 473(1) of the *Trust and Loan Companies Act* (TLCA) require banks and trust and loan companies to maintain adequate capital. The CAR Guideline is not made pursuant to subsection 485(1) of the BA or to subsection 473(1) of the TLCA. However, the capital standards set out in this guideline provide the framework within which the Superintendent assesses whether a bank or a trust or loan company maintains adequate capital pursuant to the acts. For this purpose, the Superintendent has established two minimum standards: assets to capital multiple, and risk-based capital ratio. The first test provides an overall measure of the adequacy of an institution's capital. The second measure focuses on risk faced by the institution. Notwithstanding that a bank or a trust or loan company may meet these standards, the Superintendent may direct a bank to increase its capital under subsection 485(3) of the BA, or a trust or loan company to increase its capital under subsection 473(3) of the TLCA.

Canada, as a member of the Basel Committee on Banking Supervision, participated in the development of the framework, *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version* (June 2006). This domestic guidance is based on the Basel II framework. It also encompasses and updates relevant parts of the 1988 Basel Accord and the 1996 amendment to the Accord that sets out a framework for calculating the capital requirements for market risk. This guideline reflects changes to both the Basel II and market risk frameworks that have occurred since their original implementation.

Certain parts of the Guideline reference the Basel II framework document directly. These segments contain boxed-in text (called OSFI Notes) setting out if, or how, the requirement is to be implemented by Canadian banks and trust or loan companies.

From time to time, OSFI will issue capital implementation notes to clarify supervisors' expectations on compliance with the technical provisions of the internal ratings approach set out in chapter 5 of this Guideline.



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# Chapter 1      Overview

Outlined below is an overview of capital adequacy requirements for banks and federally regulated trust or loan companies and for bank holding companies incorporated or formed under Part XV of the *Bank Act*, collectively referred to as institutions.

Whenever the term “provision” is encountered in this guideline, it should be read as “allowance for credit loss” with the exception of chapter 7 where it should be read as “charge for impairment”. Similarly, the term "specific allowance" should be read as "individual allowance," and the term "general allowance" as "collective allowance."

## 1.1.    Scope of application

These capital adequacy requirements apply on a consolidated basis. The consolidated entity includes all subsidiaries (entities that are controlled and joint ventures where generally accepted accounting principles permit pro-rata consolidation) except insurance subsidiaries or other regulated financial institutions whose leverage is inappropriate for a deposit-taking institution and that, because of their size, would have a material impact on the leverage of the consolidated entity.

## 1.2.    The assets to capital multiple

Institutions are expected to meet an assets to capital multiple test and to operate at or below their authorized multiple on a continuous basis. The assets to capital multiple is calculated by dividing the institution’s total assets, including specified off-balance sheet items, by the sum of its adjusted net tier 1 capital and adjusted tier 2 capital as defined in section 2.5 of this guideline. All items that are deducted from capital are excluded from total assets. Tier 3 capital is excluded from the test.

Off-balance sheet items for this test are direct credit substitutes<sup>1</sup>, including letters of credit and guarantees, transaction-related contingencies, trade-related contingencies and sale and repurchase agreements, as described in chapter 3. These are included at their notional principal amount. In the case of derivative contracts, where institutions have legally binding netting agreements (meeting the criteria established in chapter 3, Netting of Forwards, Swaps, Purchased Options and Other Similar Derivatives) the resulting on-balance sheet amounts can be netted for the purpose of calculating the assets to capital multiple.

On conversion to International Financial Reporting Standards (IFRSs), institutions may exclude from total assets:

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<sup>1</sup> When an institution, acting as an agent in a securities lending transaction, provides a guarantee to its client, the guarantee does not have to be included as a direct credit substitute for the assets to capital multiple if the agent complies with the collateral requirements of Guideline B-4, Securities Lending.

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- mortgages securitized through CMHC Programs<sup>2</sup> up to and including March 31, 2010
  - all existing and future reinvestments related to Canada Mortgage Bond/Insured Mortgage Purchase Program transactions completed up to and including March 31, 2010

Under this test, total assets should be no greater than 20 times capital, although this multiple can be exceeded with the Superintendent's prior approval to an amount no greater than 23 times. Alternatively, the Superintendent may prescribe a lower multiple. In setting the assets to capital multiple for individual institutions, the Superintendent will consider such factors as operating and management experience, strength of parent, earnings, diversification of assets, type of assets and appetite for risk.

OSFI will consider applications for authorized multiples in excess of 20 times from institutions that demonstrate that, in substance, they:

- meet or exceed their risk-based capital targets (e.g., 7% and 10%)<sup>3</sup>
- have total capital<sup>4</sup> of a significant size (e.g., \$100 million) and have well-managed operations that focus primarily on a very low risk market segment
- have a four-quarter average ratio of adjusted risk-weighted assets to adjusted net on- and off-balance sheet assets<sup>5</sup> that is less than 60%
- have adequate capital management processes and procedures<sup>6</sup>
- have been at “stage 0”<sup>7</sup> for at least four consecutive quarters
- have no undue risk concentrations

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<sup>2</sup> CMHC Programs comprise the following programs of the Canada Mortgage and Housing Corporation: National Housing ACT Mortgage-Backed Securities (NHA MBS); Canada Mortgage Bond Program and the Insured Mortgage Purchase Program.

<sup>3</sup> Refer to footnote 8.

<sup>4</sup> Total capital as reported on Schedule 3.

<sup>5</sup> The adjusted ratio of risk-weighted assets to net on- and off-balance sheet assets is used as a proxy for asset quality and is calculated by dividing:

Total risk-weighted assets by Net on- and off-balance sheet assets per Schedule 1 + Exposure at default of OTC derivatives contracts per Schedule 40 (this includes contracts subject to and contracts not subject to permissible netting).

The ratio should be calculated using data from the four previous consecutive quarters.

<sup>6</sup> Institutions with adequate capital management processes and procedures can demonstrate that they have management reports that allow tracking of compliance with the assets to capital multiple and risk-based capital ratio targets between quarter ends.

<sup>7</sup> Refer to the *Guide to Intervention for Federal Financial Institutions* for further details. “Stage 0” means: “No problems/Normal activities -- Routine supervisory and regulatory activities pursuant to mandates of OSFI and CDIC. In addition, both agencies conduct research and analyze industry-wide issues and trends, appropriate to their respective functions”

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Requests for increases for particular institutions should be addressed to the Legislation and Approvals Division in Ottawa and should also include a business case that, at minimum, sets out:

- the institution's own assessment of its risk profile and general financial condition, and an explanation of why these factors justify a higher assets to capital multiple
- growth projections by business line
- what percentage of total assets these business lines are expected to account for
- the expected impact of the projected growth on profitability and risk-based capital ratios

Increased authorized multiples will not exceed 23 times capital.

If an institution exceeds its increased authorized multiple or allows its risk-based capital ratios to drop below the OSFI risk-based capital targets, OSFI will reduce the institution's authorized multiple and will require the institution to file with OSFI an action plan for achieving the reduced multiple. The institution will be required to operate at or below the original level for four consecutive quarters before being reconsidered for an increase to its multiple.

For two years after an institution receives an increase to its authorized multiple, it will be expected to be able to provide, at the request of the OSFI relationship manager, information demonstrating that:

- It continues to meet the six pre-conditions required for the initial application.
- Its risk profile, including the balance sheet structure, remains essentially the same as that shown in the business case used to justify the increase.

### 1.3. Calculation of minimum capital requirements

Institutions are expected to meet minimum risk-based capital requirements for exposure to credit risk, operational risk and, where they have significant trading activity, market risk. Total risk-weighted assets are determined by multiplying the capital requirements for market risk and operational risk by 12.5 (i.e., the reciprocal of the minimum capital ratio of 8%) and adding the resulting figures to risk-weighted assets for credit risk. The capital ratio is calculated by dividing regulatory capital by total risk-weighted assets. The minimum capital requirements, which must be maintained on a continuous basis, are a tier 1 capital ratio of 4% and a total capital ratio of 8%. The Superintendent may set higher industry-wide target capital ratios.<sup>8</sup>

#### **Risk Based Capital Ratio**

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<sup>8</sup> The Superintendent established target minimum capital ratios of 7% tier 1 and 10% total capital in a letter dated January 28, 1999.



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## Capital

$$\text{Credit RWA}_{\text{Standardized}} + 1.06 \times \text{Credit RWA}_{\text{IRB}} + 12.5 \times \text{Operational Risk} + 12.5 \times \text{Market Risk}$$

Where:

Capital = Adjusted net tier 1 capital per section 2 if calculating the tier 1 capital ratio, or total capital per section 2 after applying all deductions and limitations if calculating the total capital ratio.

$\text{Credit RWA}_{\text{Standardized}}$  = Risk-weighted assets for credit risk determined using the Standardized approach in chapter 3.

$\text{Credit RWA}_{\text{IRB}}$  = Risk-weighted assets for credit risk determined using the Internal Ratings Based (IRB) approaches in chapter 5.

Operational Risk = The operational risk capital charge calculated using one of the approaches in chapter 7.

Market Risk = The market risk capital charge using one or a combination of the standardized or internal models approaches set out in chapter 8.

### 1.4. Regulatory capital

The three primary considerations for defining the consolidated capital of an institution for purposes of measuring capital adequacy are:

- its permanence
- its being free of mandatory fixed charges against earnings
- its subordinated legal position to the rights of depositors and other creditors of the institution

Total capital comprises three tiers. Tier 1 (core capital) comprises the highest quality capital elements. Tier 2 elements (supplementary capital) fall short in meeting either of the first two capital properties listed above, but contribute to the overall strength of a company as a going concern. The definition of tier 2 capital differentiates between what are referred to as hybrid (tier 2A) and limited life (tier 2B) instruments. Tier 3 capital is used only to meet market risk capital requirements.

The capital elements comprising the three tiers, as well as the various limits, restrictions and deductions to which they are subject, are described in chapter 2.

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## 1.5. Total risk weighted assets

### 1.5.1. *Credit risk approaches*

#### 1.5.1.1. Internal ratings based (IRB) approaches

Institutions that have total regulatory capital (net of deductions) in excess of CAD \$5 billion, or that have greater than 10% of total assets or greater than 10% of total liabilities that are international<sup>9</sup>, are expected to use an Advanced Internal Ratings Based Approach for all material portfolios and credit businesses in Canada and the United States. Under this approach, described in chapter 5, risk weights are a function of four variables and the type of exposure (corporate, retail, small to medium sized enterprise and so on). The variables are:

- Probability of default (PD) of the borrower
- Loss given default (LGD)
- Maturity
- Exposure at default (EAD)

Under the Foundation Internal Ratings Based Approach (FIRB), institutions determine PDs, while other variables are determined by OSFI. Under the Advanced Internal Ratings Based Approach (AIRB), institutions determine all variables.

Under the IRB approaches, EAD is determined gross of all specific allowances. For items that are reported at fair value on the balance sheet but for which changes in value due to market fluctuations are not reflected in regulatory capital (e.g. available-for-sale debt securities and loans), the carrying amount used in the calculation of EAD should be amortized cost rather than book value.

#### 1.5.1.2. Standardized approach

Smaller institutions may use the standardized approach as described in chapter 3. Under this approach, assessments from qualifying rating agencies are used to determine risk weights for:

- Claims on sovereigns and central banks
- Claims on non-central government public sector entities (PSEs)
- Claims on multilateral development banks (MDBs)
- Claims on banks and securities firms
- Claims on corporates

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<sup>9</sup> This includes assets and liabilities booked outside of Canada as well as assets and liabilities of non-residents booked in Canada.

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On-balance sheet exposures under the standardized approach are measured at book value, with the exception of:

- loans fair valued under fair value option, fair value hedge, and available for sale accounting,
- debt securities valued under available for sale accounting, and
- own-use property, plant and equipment

Fair valued loans and debt securities valued under available for sale accounting should instead be measured at amortized cost for capital adequacy purposes. All exposures subject to the standardized approach are risk-weighted net of specific allowances.

For own-use property that is accounted for using the revaluation model, reported exposures should be based on book value reversing the impact of:

- the balance of any revaluation surplus included in Other Comprehensive Income; and
- accumulated net after-tax revaluation losses that are reflected in retained earnings at conversion to IFRS or as a result of subsequent revaluations

For own-use property that is accounted for using the cost model, and where the deemed value of the property was determined at conversion to IFRS by using fair value, reported exposures should be based on book value reversing the impact of:

- after-tax unrealized fair value gains and losses reflected in retained earnings at conversion to IFRS

### **1.5.2. Operational risk approaches**

There are three approaches to operational risk: the Basic Indicator Approach, the Standardized Approach and the Advanced Measurement Approach.

The Basic Indicator Approach requires institutions to calculate operational risk capital requirements by applying a factor of 15% to a three-year average of positive annual gross income.

The Standardized Approach divides institutions' activities into eight business lines. The capital requirement is calculated by applying a factor to a three-year average of annual gross income for each business line. Individual business line requirements are added to arrive at the capital requirement for operational risk.

Under the Advanced Measurement Approach, the operational risk capital requirement is based on the institution's internal operational risk measurement system. Institutions using an IRB approach to credit risk are expected to implement, over time, an Advanced Measurement Approach to operational risk.

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### 1.5.3. *Market risk*

Market risk requirements apply only to institutions where the greater of the value of trading book assets or the value of trading book liabilities is at least 10% of total assets; and exceeds \$1 billion. Market risk requirements may be calculated using Standardized Approach or the Internal Models Approach, both of which are described in chapter 8.

OSFI retains the right to apply the framework to other institutions, on a case by case basis, if trading activities are a large proportion of overall operations.

The Standardized Approach is a building block approach where the capital charge for each risk category is determined separately.

Alternatively, institutions may use their own internal risk management models to calculate specific risk and general market risk exposures, providing they meet:

- Certain general criteria concerning the adequacy of the risk management system
- Qualitative standards for internal oversight of the use of models
- Guidelines for specifying an appropriate set of market factors
- Quantitative standards setting out the use of common minimum statistical parameters for measuring risk
- Guidelines for stress testing and back testing
- Validation procedures for external oversight and the use of models

## 1.6. **Approval to use the advanced approaches**

Institutions must receive explicit prior approval from OSFI in order to use any of the following approaches for regulatory capital purposes: the Foundation and Advanced IRB Approaches to credit risk, Advanced Measurement Approaches to operational risk and Internal Models Approach to market risk. OSFI will issue Implementation Notes outlining the steps involved in the approval of these approaches.

OSFI will consider AIRB approval with conditions for those institutions that have made a substantial effort and are close to being ready for parallel reporting consistent with the rollout plan but are not completely ready. Institutions that do not get approval will be required to employ a form of the Standardized Approach to credit risk and either the Basic Indicator or Standardized Approach to operational risk.

An institution achieving approval with conditions will be allowed to use the IRB approach but may be required to adhere to a higher initial floor. Once it achieves full compliance with IRB rollout and data requirements, and OSFI has agreed, the institution may proceed to the 90% and 80% floors described in section 1.7. In either case, OSFI will not rule out the possibility of requiring floors on individual asset classes or reviewing approval conditions based on implementation progress.

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Besides meeting the qualitative and quantitative requirements for an IRB rating system, institutions will need, at a minimum, to satisfy the following requirements to obtain approval with conditions (with a possibly higher initial floor):

- The institution is able to provide parallel reporting for at least two quarters – at least one without material manual intervention.
- The institution is meeting the IRB use test.
- On implementation the institution will have rolled out IRB to approximately 80% of its consolidated credit exposures, as of the end of the fiscal year prior to the fiscal year in which the institution first applies to use the IRB approach, measured in terms of notional exposure and Basel I risk-weighted exposures.

An institution will remain in the approval with conditions category until it meets both the qualitative and quantitative requirements for an IRB rating system set out in this Guideline and the requirements listed below:

- The institution adheres to its agreed rollout plan and conditions.
- Internal audit provides an opinion as to the design and effectiveness of the internal controls, including those for material manual intervention, that ensure data quality and integrity.
- The institution has a functioning capital management program that makes use of stress testing. An institution should be able to demonstrate the potential cross-cycle sensitivity of its capital ratios and minimum capital requirements and how the institution intends to manage this within its broader capital planning process.

Once an institution meets the above requirements, it may proceed to full approval subject to the 90% and 80% floors described in section 1.7. OSFI will require assurance from the CEO that the institution has used the IRB systems and data for one full year before the institution proceeds to the 80% floor, but there is no specific requirement in terms of the form of this confirmation.

### **1.7. Transitional arrangements – advanced approaches**

For institutions using the IRB approach for credit risk or the Advanced Measurement Approaches (AMA) for operational risk, there will be a capital floor on their minimum risk-based capital requirement for a transition period.

Affected institutions must calculate the difference between

- (i) the floor as defined in section 1.7.1, and
- (ii) an adjusted capital requirement as defined in section 1.7.2.

If the floor amount is larger than the adjusted capital requirement (i.e. the difference is positive), institutions are required to add 12.5 times the difference to the total risk-weighted assets otherwise calculated under this guideline. This adjusted risk-weighted asset figure must be used as the denominator in the calculation of the risk-based capital ratios.

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### *1.7.1. The capital floor*

The capital floor is determined under Guideline A-3 – Calculation of Transitional Capital Floors (November 2007), which is a modified version of the Capital Adequacy Requirements Guideline that was in effect prior to the issuance of this Guideline. The floor is derived by applying an adjustment factor to the net total of the following amounts:

- (i) 8% of total risk-weighted assets, plus
- (ii) all Tier 1 and Tier 2 deductions, less
- (iii) the amount of any general allowance that may be recognized in Tier 2.

For institutions receiving full approval to use the IRB approach, an adjustment factor of 90% will apply initially, followed by an adjustment factor of 80%. OSFI will conduct annual reviews of institutions' compliance with conditions outlined in the Approval with Conditions Letters to determine when individual IRB institutions may begin to apply an adjustment factor of 80%.

### *1.7.2. Adjusted capital requirement*

The adjusted capital requirement, calculated during the years in which a floor applies, is based on application of this guideline and is equal to the net total of the following amounts:

- (i) 8% of total risk-weighted assets, plus
- (ii) all Tier 1 and 2 deductions, less
- (iii) excess provisions included in Tier 2, less
- (iv) the amount of general allowances that may be recognized in Tier 2 in respect of exposures for which the standardized approach is used.

### *1.7.3. Transition period*

The transition period for advanced approaches will continue pending review of new international capital standards in 2012.

## **1.8. Transition to International Financial Reporting Standards (IFRS)**

Institutions may elect to phase in the net impact of IFRS 1 to retained earnings. The election is irrevocable and must be made at the time of conversion to IFRS. Institutions must disclose the election and its impact on capital available for purposes of the Basel Capital Adequacy Return (BCAR) in the notes to their audited financial statements.

The phase-in period begins at the date of conversion to IFRS and must be completed by the quarter ending on or after December 31, 2012. Where an institution elects to use a phase-in, it will be reflected via an adjustment to reported retained earnings in BCAR. The amount to be phased in is the difference between year end 2010 retained earnings for BCAR purposes calculated under the previous accounting standards and year end 2010 retained earnings for BCAR calculated using IFRS. Phase –in is made on a straight line basis.

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The amount to be phased in:

- includes the impact associated with any reversal of prior period gains on sales associated with CMHC Programs, as well as any losses resulting from bringing assets back on balance sheet when previously securitized assets are no longer derecognized.
- excludes impacts related to
  - own use property as set out in 1.5.1.2 above
  - reversals of gains related to the securitizations other than CMHC Programs.

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## Chapter 2      Definition of Capital

For capital adequacy purposes, the reported values of liabilities and capital instruments (including preferred shares, innovative instruments and subordinated debt) should not reflect the effects of changes in an institution's own creditworthiness that have occurred subsequent to issuance. Consistent with the treatment of liabilities and capital instruments, the amount of retained earnings reported for capital adequacy purposes should exclude accumulated after-tax fair value gains or losses arising from changes to an institution's own credit risk under the Fair Value Option.

### 2.1. Tier 1 capital

Tier 1 capital is restricted to the following elements, subject to requirements established by the Superintendent:

- Common shareholders' equity, defined as common shares, contributed surplus<sup>10</sup>, and retained earnings<sup>11</sup>
- Qualifying non-cumulative perpetual preferred shares
- Qualifying innovative instruments
- Qualifying non-controlling interests arising on consolidation from tier 1 capital instruments
- Accumulated net after-tax foreign currency translation adjustment reported in Other Comprehensive Income (OCI)
- Accumulated net after-tax unrealized loss on available-for-sale equity securities reported in OCI

For capital adequacy purposes, the following are reversed from reported retained earnings:

- Accumulated net after-tax fair value gains/(losses) arising from changes to the institution's own credit risk under the Fair Value Option
- After-tax fair value gains (losses) on own-use property on conversion to IFRS where the cost model is used

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<sup>10</sup> Where repayment is subject to the Superintendent's approval.

<sup>11</sup> Unrealized fair value gains and losses for assets meeting the criteria in OSFI's Accounting Guideline D-10 Accounting for Financial Instruments Designated as Fair Value Option will be included in the determination of tier 1 capital through retained earnings. Institutions are expected to meet OSFI's criteria in Accounting Guideline D-10, which includes the Basel Committee on Banking Supervision's guidance. Institutions are expected to have in place appropriate risk management systems prior to initial application of the Fair Value Option for a particular activity or purpose and on an ongoing basis per the Basel Committee on Banking Supervision's guidance. Consistent with the treatment of liabilities and capital instruments, the amount of retained earnings reported for capital adequacy purposes should exclude accumulated after-tax fair value gains or losses arising from changes to an institution's own credit risk under the Fair Value Option.



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- Accumulated net after-tax revaluation loss on own use property accounted for using the revaluation model
  - Accumulated net after-tax fair value gain on investment property

Tier 1 capital instruments are intended to be permanent. Where tier 1 preferred shares provide for redemption by the issuer after five years with supervisory approval, OSFI would not normally prevent such redemptions by healthy and viable institutions, when the instrument is or has been replaced by equal or higher quality capital, including an increase in retained earnings, or if the institution is downsizing. The redemption or purchase for cancellation of tier 1 capital instruments requires the prior approval of the Superintendent.

#### *2.1.1. Preferred shares (Tier 1)*

Preferred shares will be judged to qualify as tier 1 instruments based on whether, in form and in substance, they are:

- subordinated
- permanent
- free of mandatory fixed charges

##### *2.1.1.1. Subordination*

Preferred shares must be subordinated to depositors and unsecured creditors of the institution. If preferred shares are issued by a subsidiary or intermediate holding company for the funding of the institution and are to qualify for capital at the consolidated entity (non-controlling interest), the terms and conditions of the issue, as well as the intercompany transfer, must ensure that investors are placed in the same position as if the instrument was issued by the institution.

##### *2.1.1.2. Permanence*

To ensure that preferred shares are permanent in nature, the following features are **not** permitted:

- retraction by the holder
- obligation for the issuer to redeem shares
- redemption within the first five years of issuance
- any step-up<sup>12</sup> representing a pre-set increase at a future date in the dividend (or distribution) rate

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<sup>12</sup> An increase over the initial rate after taking into account any swap spread between the original reference index and the new reference index.

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Any conversion other than to common shares of the issuer or redemption is subject to supervisory approval and:

- redemption can only be for cash or the equivalent.
- conversion privileges cannot be structured to effectively provide either a redemption of or return on the original investment.

For example, an issue would not be considered non-cumulative if it had a conversion feature that compensates for undeclared dividends or provides a return of capital.

#### 2.1.1.3. Free of mandatory fixed charges

Preferred shares included in tier 1 capital are **not** permitted to offer the following features:

- cumulative dividends
- dividends influenced by the credit standing of the institution
- compensation to preferred shareholders other than a dividend
- sinking or purchase funds

In addition, the non-declaration of a dividend shall not trigger restrictions on the issuer other than the need to seek approval of the holders of the preferred shares before paying dividends on other shares or before retiring other shares. Non-declaration of a dividend would not preclude the issuer from making the preferred shares voting or, with the prior approval of the Superintendent, making payment in common shares.

To conform to accepted practice, in the event of non-declaration of a dividend, institutions may seek the approval of the holders of preferred shares before:

- paying dividends on any shares ranking junior to the preferred shares (other than stock dividends in any shares ranking junior to the preferred shares)
- redeeming, purchasing, or otherwise retiring any share ranking junior to the preferred shares (except out of the net cash proceeds of a substantially concurrent issue of shares ranking junior to the preferred shares)
- redeeming, purchasing or otherwise retiring less than all such preferred shares
- except pursuant to any purchase obligation, sinking fund, retraction privilege or mandatory redemption provisions attached to any series of preferred shares, redeeming, purchasing or otherwise retiring any shares ranking on a parity with such preferred shares

#### 2.1.1.4. Examples of acceptable features

Outlined below are examples of certain preferred share features that may be acceptable in tier 1 capital instruments:

- 
- a simple call feature that allows the issuer to call the instrument, provided the issue cannot be redeemed in the first five years and, after that, only with prior supervisory approval
  - a dividend that floats at some fixed relationship to an index or the highest of several indices, as long as the index or indices are linked to general market rates and not to the financial condition of the borrower
  - a dividend rate that is fixed for a period of years and then shifts to a rate that floats over an index, plus an additional amount tied to the increase in common share dividends if the index is not based on the institution's financial condition and the increase is not automatic, not a step-up, nor of an exploding rate nature
  - conversion of preferred shares to common shares where the minimum conversion value or the way it is to be calculated is established at the date of issue. Examples of conversion prices are: a specific dollar price; a ratio of common to preferred share prices; and a value related to the common share price at time of conversion.

#### 2.1.1.5. Examples of unacceptable features

Examples of preferred share features that will not be acceptable in tier 1 capital are:

- an exploding rate preferred share, where the dividend rate is fixed or floating for a period and then sharply increases to an uneconomically high level
- an auction rate preferred share or other dividend reset mechanism in which the dividend is reset periodically based, in whole or part, on the issuer's credit rating or financial condition
- a dividend-reset mechanism that does not specify a cap, consistent with the institution's credit quality at the original date of issue

#### 2.1.2. *Qualifying innovative instruments (Tier 1)*

Refer to Appendix 2-I as well as advisories issued in April 2003, July 2003 and February 2004.

## 2.2. Tier 2 capital

Tier 2 capital instruments must not contain restrictive covenants or default clauses that would allow the holder to trigger acceleration of repayment in circumstances other than the insolvency, bankruptcy or winding-up of the issuer. Further, the debt agreement must normally be subject to Canadian law. However, OSFI may waive this requirement, in whole or in part, provided the institution can show that an equivalent degree of subordination can be achieved as under Canadian law. In all cases, the prior consent of OSFI must be obtained where law other than Canadian law will apply. Instruments issued prior to year-end 1994 are grandfathered. Tier 2 capital instruments with a purchase for cancellation clause will be deemed to mature on the date this clause becomes effective unless the purchase requires the prior approval of the Superintendent.

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### 2.2.1. *Hybrid capital instruments (Tier 2A)*

Hybrid capital includes instruments that are essentially permanent in nature and that have certain characteristics of both equity and debt, including:

- Cumulative perpetual preferred shares
- Qualifying 99-year debentures
- Qualifying non-controlling interests arising on consolidation from tier 2 hybrid capital instruments
- General allowances (see section 2.2.2.)

Hybrid capital instruments must, at a minimum, have the following characteristics:

- unsecured, subordinated and fully paid up
- not redeemable at the initiative of the holder
- may be redeemable by the issuer after an initial term of five years with the prior consent of the Superintendent
- available to participate in losses without triggering a cessation of ongoing operations or the start of insolvency proceedings
- allow service obligations to be deferred (as with cumulative preferred shares) where the profitability of the institution would not support payment

Where hybrid instruments provide for redemption by the issuer after five years with supervisory approval, OSFI would not normally prevent such redemptions by healthy and viable institutions when the instrument is or has been replaced by equal or higher quality capital, including an increase in retained earnings, or if the institution is downsizing.

Hybrid capital instruments issued in conjunction with a repackaging arrangement that are deemed by the Superintendent to be an effective amortization are to be treated as limited life instruments subject to their conforming with the criteria for tier 2B instruments. Repackaging arrangements vary, but normally involve above-market coupons and a step-down in interest rates after a specified period. Economically, therefore, they can be regarded as involving disguised capital repayment. To qualify for tier 2A, capital should not have a limited life.

Perpetual<sup>13</sup> debentures meeting the criteria for hybrid capital instruments<sup>14</sup> and with the following characteristics will be eligible for tier 2A capital:

- unsecured, subordinated and fully paid up

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<sup>13</sup> Perpetual includes debentures with a 99-year term.

<sup>14</sup> Bank debentures meeting the criteria of former guideline G-14 continue to be eligible for tier 2A capital.

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- not redeemable at the initiative of the holder. They may be redeemed at the initiative of the issuer after an initial term of five years with the prior consent of the Superintendent.
  - available to participate in losses while the issuer is still a going concern. Therefore, if the retained earnings of the issuer are negative, then the principal amount of the debt and unpaid interest must automatically convert to common or perpetual preferred shares.
  - must allow the issuer to defer principal and interest payments if the issuer does not report a net profit for the most recent combined four quarters and the issuer eliminates cash dividends on its common and preferred stock. Under no circumstances will the deferral of interest be allowed to compound.
  - must not contain provisions for any form of compensation in respect of any unpaid payments, except subject to prior approval of the Superintendent.
  - free from special restrictive covenants or default clauses that would allow the holder to trigger acceleration of repayment in circumstances other than insolvency

#### 2.2.1.1. Step-ups in tier 2A capital

OSFI defines a step-up as a pre-set increase at a specified future date in the dividend or distribution rate to be paid on a capital instrument. It would be acceptable to include in Tier 2A capital preferred shares or perpetual subordinated debentures with moderate step-ups, provided the following conditions are met:

- The step-up cannot result in an increase of more than 100 basis points over the initial rate.
- The step-up must be calculated using the “swap spread” methodology outlined in Appendix 2-1.
- The step-up cannot occur before 10 years from the date on which the capital is issued.
- The terms of the instrument must not provide for more than one step-up over the life of the instrument.
- The step-up cannot be combined with any other feature that causes an economic incentive to redeem.
- The instrument meets all of the other conditions for Tier 2A treatment set out above.

#### 2.2.2. *General allowances (Tier 2A)*

##### 2.2.2.1. Banks using the standardized approach

- include general allowances in tier 2A capital to a limit of 1.25% of credit risk-weighted assets with prior written approval from OSFI

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#### 2.2.2.2. Banks using an IRB approach

- calculate a provisioning excess or shortfall as follows: (1) general provisions, plus (2) all other provisions, minus (3) the expected loss amount
- deduct provisioning shortfalls from capital, 50% from tier 1 capital and 50% from tier 2 capital
- include provisioning excess in tier 2A capital up to a limit of the lower of 0.6% of IRB credit risk-weighted assets or the amount of general allowances
- deduct expected loss amount for equities (see section 5.5.1 (ii)) under the PD/LGD approach, 50% from Tier 1 and 50% from Tier 2

#### 2.2.2.3. Banks that have partially implemented an IRB approach

- split general allowances proportionately based on credit risk-weighted assets calculated under the Standardized Approach and the IRB Approach
- include general allowances allocated to the Standardized Approach in tier 2A capital up to a limit of 1.25% of credit risk weighted assets calculated using the Standardized Approach
- calculate a provisioning excess or shortfall on the IRB portion of the bank as set out above
- deduct provisioning shortfalls on the IRB portion of the bank from capital, 50% from tier 1 capital and 50% from tier 2 capital
- include excess provisions calculated for the IRB portion of the bank in tier 2A capital up to a limit of the lower of 0.6% of IRB credit risk-weighted assets or the amount of general allowances allocated to the IRB portion of the bank
- deduct expected loss amount for equities (see section 5.5.1 (ii)) under the PD/LGD approach for the IRB portion of the bank, 50% from Tier 1 and 50% from Tier 2

#### 2.2.3. ***Unrealized gains on available-for-sale equity securities and investment property (Tier 2A)***

Tier 2A includes accumulated net after-tax unrealized gains on:

- available-for-sale equity securities; and
- investment property.

#### 2.2.4. ***Limited life instruments (Tier 2B)***

Limited life instruments are not permanent and include:

- limited life redeemable preferred shares

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- qualifying capital instruments issued in conjunction with a repackaging arrangement
  - other debentures and subordinated debt
  - qualifying non-controlling interests arising on consolidation from tier 2 limited life instruments

Limited life capital instruments must, at a minimum, have the following characteristics:

- subordination to deposit obligations and other senior creditors
- an initial minimum term greater than, or equal to, five years

Redemption at the option of the issuer is permitted in the first five years with the prior written consent of OSFI. Such redemptions by healthy and viable institutions would not normally be prevented when the instrument is or has been replaced by equal or higher quality capital, including an increase in retained earnings, or if the institution is downsizing.

Term subordinated debt and term preferred shares with imbedded step-ups may be included in tier 2B capital, subject to the following requirements:

- The step-up must be calculated using the “swap spread” methodology.
- The step-up cannot be combined with any other feature that causes an economic incentive to redeem.
- The terms of the instrument must not provide for more than one step-up over the life of the instrument.
- The instrument must not have a step-up of any amount in the first five years.
- Capital instruments with step-ups greater than 100 basis points will be treated for amortization purposes as term debt that matures at the date the step-up comes into effect.

In the case of trust or loan companies, limited life debt instruments issued to a parent company, either directly or indirectly, will be included in tier 2B capital only with the prior approval of the Superintendent. Before granting approval, the Superintendent will consider the rationale provided by the parent for not providing equity capital or not raising tier 2B capital from external sources. The Superintendent will also want to be assured that the interest rate is reasonable and that failure to meet debt servicing obligations on the tier 2B debt provided by the parent would not, either now or in the future, be likely to result in the parent company being unable to meet its own debt servicing obligations<sup>15</sup>, and would not trigger cross-default clauses under the covenants of other borrowing agreements of either the institution or the parent.

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<sup>15</sup> Including the principal amount of debt owed.

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### 2.3. Tier 3 capital

Tier 3 capital may only be used to satisfy a portion of the market risk capital requirements.

Tier 3 capital is subordinated debt that is subject to the following conditions:

- minimum original maturity of two years
- payment of either interest or principal (even at maturity) shall be deferred if such payment would cause the institution to fall below the minimum capital requirement
- not redeemable before maturity without prior approval by OSFI

In addition, tier 3 capital instruments must not contain restrictive covenants or default clauses that would allow the holder to trigger acceleration of repayment in circumstances other than the insolvency, bankruptcy or winding-up of the issuer. Further, the debt agreement must normally be subject to Canadian law. However, OSFI may waive this requirement, in whole or in part, provided the institution can show that an equivalent degree of subordination can be achieved as under Canadian law. In all cases, the prior consent of OSFI must be obtained where law other than Canadian law will apply.

OSFI would not normally expect to give consent to any repayment or redemption of subordinated debt within two years from the date of issuance. Repayment or redemption will only be granted when OSFI is satisfied that the institution's capital will be adequate after repayment and is likely to remain so. Unlike tier 2 capital, tier 3 subordinated debt does not have to be amortized over its life.

### 2.4. Qualifying non-controlling interests

Non-controlling interests, including subordinated debt issued to independent investors, arising on consolidation will be included in the respective categories, provided:

- The instruments meet the criteria applicable to that category.
- They do not effectively rank equally or ahead of the deposits of the institution due to a parent company guarantee or by any other contractual means.

If a subsidiary issues capital instruments for the funding of the institution or that are substantially in excess of its own requirements, the terms and conditions of the issue, as well as the intercompany transfer, must ensure that investors are placed in the same position as if the instrument was issued by the institution in order for it to qualify as capital on consolidation. This can only be achieved by the subsidiary using the proceeds of the issue to purchase a similar instrument from the parent. Since subsidiaries cannot buy shares in the parent, it is likely that this treatment will only be applicable to subordinated debt. In addition, to qualify as capital for the consolidated entity, the debt held by third parties cannot effectively be secured by other assets, such as cash, held by the subsidiary.



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## 2.5. Deductions/limitations

All items that are deducted from capital are excluded from total assets in calculating the assets to capital multiple and are risk-weighted at 0% in the risk-based capital adequacy framework. If changes in the balance sheet value of a deducted item have not been recognized in regulatory capital, the amount deducted for the item should be its amortized cost rather than the value reported on the balance sheet.

### 2.5.1. *Deductions from tier 1 capital*

- Goodwill related to consolidated subsidiaries, subsidiaries deconsolidated for regulatory capital purposes, and the proportional share of goodwill in joint ventures subject to proportional consolidation
- Designated intangible assets in excess of 5% of gross tier 1 capital. For the purposes of this rule, designated intangible assets comprise intangible purchased directly or acquired in conjunction with or arising from the acquisition of a business. These include, but are not limited to, trademarks, core deposit intangibles, mortgage servicing rights and purchased credit card relationships. These do not include computer software classified as intangible assets under the requirements of CICA Handbook Section 3064 or IAS 38. For purposes of determining amounts in excess of the 5% threshold, institutions should include designated intangible assets related to consolidated subsidiaries and subsidiaries deconsolidated for regulatory capital purposes.

Net tier 1 capital is defined as gross tier 1 capital less the above two deductions.

- 50% of investments in unconsolidated entities, including joint ventures carried on the equity method of accounting, in which the institution has a substantial investment<sup>16</sup>
- 50% of investments in subsidiaries deconsolidated for regulatory capital purposes, net of goodwill and identified intangibles that were deducted from tier 1 capital<sup>17</sup>

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<sup>16</sup> The term “substantial investment” as used in this guideline means an investment that falls within either or both of the following categories:

- investments that are defined to be a substantial investment under section 10 of the *Bank Act* or the *Trust and Loan Companies Act*
- investments in common equity and other tier 1 qualifying instruments of a financial institution that, taken together, represent ownership of greater than 25 percent of that financial institution’s total outstanding tier 1 qualifying instruments

Goodwill related to substantial investments in unconsolidated entities that is not otherwise deducted for regulatory purposes represents a diminution in the quality of tier 1 capital and will be subject to supervisory scrutiny in the assessment of the strength of capital ratios against industry wide target ratios. Institutions will not be required to report goodwill related to substantial investments on a regular basis, but must be able to produce this information if requested by OSFI.

<sup>17</sup> Refer to OSFI’s January 2008 Advisory, Transition for Certain Definition of Capital Elements in Basel II for transition measures regarding this deduction.

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- 50% of other facilities that are treated as capital by unconsolidated subsidiaries and by unconsolidated entities in which the institution has a substantial investment
  - Back-to-back placements of new tier 1 capital, arranged either directly or indirectly, between financial institutions
  - 50% of provisioning shortfalls calculated under IRB Approaches to credit risk
  - 50% of expected loss amount for equities under the PD/LGD approach
  - 50% of payments made under non-DvP trades plus replacement costs where contractual payment or delivery is late by five days or more (see Annex 3)
  - Deductions from tier 2 capital in excess of total tier 2 capital available (see section 2.5.2)

#### 2.5.1.1. Securitization-related deductions – all banks

- Increases in equity capital resulting from securitization transactions (e.g., capitalized future margin income, gains on sale)
- 50% of credit-enhancing interest-only strips, net of any increases in equity capital resulting from securitization transactions

#### 2.5.1.2. Securitization-related Deductions – Banks using the Standardized Approach

- For third party investors, 50% of investments in securitization exposures with long-term credit ratings B+ and below, and in unrated exposures
- For third party investors, 50% of investments in securitization exposures with short-term credit ratings below A-3/P-3/R-3 and in unrated exposures
- For originating banks, 50% of retained securitization exposures that are rated below investment grade (below BBB-), or that are unrated
- Exceptions to the requirement to deduct unrated securitization exposures are made for the most senior exposure in a securitization, exposures that are in a second loss position or better in asset-backed commercial paper (ABCP) programmes, and eligible liquidity facilities. Refer to chapter 6, paragraphs 571 to 579 for requirements.

#### 2.5.1.3. Securitization-related deductions – banks using IRB approaches

- 50% of investments in securitization exposures with long-term credit ratings below BB- and in unrated exposures
- 50% of investments in securitization exposures with short-term ratings below A-3/P-3/R-3 and in unrated short-term exposures
- 50% of securitization exposures with risk-weights of 1250% derived using the Supervisory Formula

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- 50% of retained securitizations, or parts thereof, that absorb losses at or below the level of K<sub>IRB</sub><sup>18</sup>

Adjusted net tier 1 capital is defined as gross tier 1 capital less all tier 1 deductions.

### 2.5.2. *Deductions from tier 2 capital*

- 50% of investments in unconsolidated entities, including joint ventures carried on the equity method of accounting, in which the institution has a substantial investment
- 50% of investments in subsidiaries deconsolidated for regulatory capital purposes, net of goodwill and identified intangibles that were deducted from tier 1 capital<sup>19</sup>
- 50% of other facilities that are treated as capital by unconsolidated subsidiaries and by unconsolidated entities in which the institution has a substantial investment
- Back-to-back placements of new tier 2 capital, arranged either directly or indirectly, between financial institutions
- 50% of provisioning shortfalls calculated under IRB Approaches to credit risk
- 50% of expected loss amount for equities under the PD/LGD approach
- 50% of payments made under non-DvP trades plus replacement costs where contractual payment or delivery is late by five days or more (see Annex 3)

#### 2.5.2.1. Securitization-related deductions – all banks

- 50% of credit-enhancing interest-only strips, net of any increases in equity capital resulting from securitization transactions

#### 2.5.2.2. Securitization-related deductions – banks using the standardized approach

- For third party investors, 50% of investments in securitization exposures with long-term credit ratings B+ and below, and in unrated exposures
- For third party investors, 50% of investments in securitization exposures with short-term credit ratings below A-3/P-3/R-3 and in unrated exposures
- For originating banks, 50% of retained securitization exposures that are rated below investment grade (below BBB-), or that are unrated

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<sup>18</sup> K<sub>IRB</sub> is the ratio of the IRB capital requirement including the EL portion for the underlying exposure in the pool to the exposure amount of the pool (e.g., the sum of the drawn amounts related to securitized exposures plus the EAD associated with undrawn commitments related to securitized exposures). Refer to Chapter 6, paragraph 627.

<sup>19</sup> Refer to OSFI's January 2008 Advisory, Transition for Certain Definition of Capital Elements in Basel II for transition measures regarding this deduction.

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### 2.5.2.3. Securitization-related deductions – banks using IRB approaches

- 50% of investments in securitization exposures with long-term credit ratings below BB- and in unrated exposures
- 50% of investments in securitization exposures with short-term ratings below A-3/P-3/R-3 and in unrated short-term exposures
- 50% of securitization exposures with risk-weights of 1250% derived using the Supervisory Formula
- 50% of retained securitizations, or parts thereof, that absorb losses at or below the level of  $K_{IRB}$

Adjusted tier 2 capital is defined to be tier 2 capital less all tier 2 deductions, but may not be lower than zero. If the total of all tier 2 deductions exceeds tier 2 capital available, the excess must be deducted from tier 1.

### 2.5.3. *Limitations*

Common shareholders' equity (i.e., common shares and retained earnings) should be the predominant form of an institution's tier 1 capital.

The following limitations will apply to capital elements after the specified deductions and adjustments:

- A strongly capitalized institution should not have innovative instruments and non-cumulative perpetual preferred shares that, in aggregate, exceed 40% of net tier 1 capital.
- Innovative instruments shall not, at the time of issuance, comprise more than 15% of net tier 1 capital. If at any time this limit is breached, the institution must immediately notify OSFI and provide an acceptable plan showing how the institution proposes to quickly eliminate the excess.
- The amount of capital, net of amortization, included in tier 2 and used to meet credit and operational risk capital requirements shall not exceed 100% of net tier 1 capital.
- Limited life instruments, net of amortization, included in tier 2B capital shall not exceed a maximum of 50% of net tier 1 capital.
- Tier 2 and tier 3 capital used to meet the market risk capital requirements must not – in total – exceed 200% of the net tier 1 capital used to meet the market risk capital requirements.
- Tier 2 and tier 3 capital cannot – in total – normally exceed 100% of the institution's net tier 1 capital. This limit cannot be exceeded without OSFI's express permission, which will only normally be granted where an institution engages mainly in business that is subject to the market risk capital charge.

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Any capital instruments and limited life instruments issued in excess of these limitations will not be counted as capital for the purpose of these tests; however, they will be taken into account when reviewing the overall strength of the institution.

## **2.6. Early redemption**

Redemption of a tier 1 preferred share or a tier 2A hybrid instrument at the option of the issuer is not permitted within the first five years of issuance.<sup>20</sup> There are, however, certain circumstances under which OSFI would consider redemption during this period. These circumstances are limited to:

- tax laws change, adversely affecting the tax advantage of the preferred shares/hybrid instrument
- OSFI's capital adequacy requirements change, such that the preferred shares/hybrid instrument could no longer be included in calculating the risk-based capital of the institution on a consolidated basis
- a restructuring resulting from a major acquisition or merger where the instrument is immediately exchanged for a capital-qualifying instrument of the continuing institution with identical terms and conditions and capital attributes

Superintendent approval is required for redemption at any time.

## **2.7. Hedging of subordinated debentures**

When an institution issues subordinated debentures and fully hedges (both in terms of duration and amount) these debentures against movements in another currency and the hedge is subordinate to the interest of the depositors, the institution should report the Canadian dollar value of the instrument, net of the accrued receivable or payable on the hedge. For limited life subordinated debentures (tier 2B), a hedge to within the last three years to maturity will qualify as a full hedge; hedges to a call date or to a period greater than three years before maturity will not.

In addition, the institution should disclose information of the hedging arrangement, the amount of the translation gains/losses and the accounting treatment accorded the translation gains/losses in a note to the capital adequacy return.

Subordinated debentures denominated in a foreign currency that are not fully hedged, or where the hedge is not subordinated, should be translated into Canadian dollars at the value at the time of reporting.

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<sup>20</sup> As noted above, redemption of tier 2B instruments at the option of the issuer is permitted in the first five years with the prior written consent of OSFI.

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## 2.8. Amortization

Tier 2 capital components are subject to straight-line amortization in the final five years prior to maturity or the effective dates governing holders' retraction rights. Hence, as redeemable preferred shares and subordinated debentures of the institution or non-controlling interest preferred shares and qualifying subsidiary debt instruments approach maturity, redemption or retraction, such outstanding balances are to be amortized based on the following criteria:

<i>Years to Maturity</i>	<i>Included in Capital</i>
5 years or more	100%
4 years and less than 5 years	80%
3 years and less than 4 years	60%
2 years and less than 3 years	40%
1 year and less than 2 years	20%
Less than 1 year	0%

Similarly, for capital instruments that have sinking funds, amortization of the amount paid into the sinking fund should begin five years before it is made. This is required because the amount in the sinking fund is not subordinated to the rights of depositors.

### Note:

Where the redemption is not subject to the Superintendent's approval, amortization should begin after year 5 for a 20-year debenture or share that can be redeemed at the institution's option any time after the first 10 years. This would not apply when redemption requires the Superintendent's approval.

Where there is an option for the issuer to redeem an instrument subject to the Superintendent's approval, the instrument would be subject to straight-line amortization in the final five years to maturity.

Amortization should be computed at the end of each fiscal quarter based on the "years to maturity" schedule (above). Thus, amortization would begin during the first quarter that ends within five calendar years of maturity. For example, if an instrument matures on October 31, 2000, 20% amortization of the issue would occur November 1, 1995 and be reflected in the January 31, 1996 capital adequacy return. An additional 20% amortization would be reflected in each subsequent January 31 return.

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## Annex 1 - The 15% of Tier 1 Limit on Innovative Instruments

1. This annex is meant to clarify the calculation of the 15% limit on innovative instruments agreed by the Committee in its press release of October 1998.
2. Innovative instruments will be limited to 15% of Tier 1 capital, net of goodwill. To determine the allowable amount of innovative instruments, banks and supervisors should multiply the amount of non-innovative Tier 1 by 17.65%. This number is derived from the proportion of 15% to 85% (i.e.  $15\%/85\% = 17.65\%$ ).
3. As an example, take a bank with €75 of common equity, €15 of non-cumulative perpetual preferred stock, €5 of minority interest in the common equity account of a consolidated subsidiary, and €10 of goodwill. The net amount of non-innovative Tier 1 is  $€75+€15+€5-€10 = €85$ .
4. The allowable amount of innovative instruments this bank may include in Tier 1 capital is  $€85 \times 17.65\% = €15$ . If the bank issues innovative Tier 1 instruments up to its limit, total Tier 1 will amount to  $€85 + €15 = €100$ . The percentage of innovative instruments to total Tier 1 would equal 15%.

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## Annex 2 - Principles Governing Inclusion of Innovative Instruments in Tier 1 Capital

### A. *Application*

The principles in this Appendix take effect immediately. Given the nature of the subject matter covered in this Appendix, OSFI will continue to review the principles in light of any issues arising from their application to specific transactions. OSFI plans to revisit the Appendix as its experience develops. Subsequent amendments to the principles, if any, will not disqualify approvals granted under this Appendix.

For the purposes of this Appendix, “innovative instrument” means an instrument issued by a Special Purpose Vehicle (SPV), which is a consolidated non-operating entity whose primary purpose is to raise capital. A non-operating entity cannot have depositors or policyholders.

This Appendix applies to indirect issues done through an SPV. To qualify as capital, direct issues must meet the conditions set out in the Office’s Guidelines on *Minimum Continuing Capital and Surplus Requirements (MCCSR)* or *Capital Adequacy Requirements (CAR)*, as applicable. Note that step-ups are not permitted in directly issued Tier 1 instruments.

In this Appendix, FRFI means:

- the operating federally regulated life insurance company that has policyholders (Life Company); or
- the operating bank or the operating federally regulated trust or loan company that has depositors (DTI) and with whom the SPV is consolidated.

In this Appendix, an Asset-Based Structure is one where the assets of the SPV do not include an instrument issued by the FRFI. A Loan-Based Structure is one where the SPV’s primary asset is an instrument issued by the FRFI.

### B. *Limits on innovative instruments in tier 1 capital*

**Principle #1: OSFI expects FRFIs to meet capital requirements without undue reliance on innovative instruments.**

**Common shareholders' equity (i.e., common shares, retained earnings and participating account surplus, as applicable) should be the predominant form of a FRFI's Tier 1 capital.**

1(a) Innovative instruments must not, at the time of issuance, make up more than 15% of a FRFI’s net Tier 1 capital. Any excess cannot be included in regulatory capital.

If, at any time after issuance, a FRFI’s ratio of innovative instruments to net Tier 1 capital exceeds 15%, the FRFI must immediately notify OSFI. The FRFI must also provide a plan, acceptable to OSFI, showing how the FRFI proposes to eliminate the excess



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quickly. A FRFI will generally be permitted to include such excesses in its Tier 1 capital until such time as the excess is eliminated in accordance with its plan.

- 1(b) A strongly capitalized FRFI should not have innovative instruments and perpetual non-cumulative preferred shares that, in aggregate, exceed 40% of its net Tier 1 capital. Tier 1-qualifying preferred shares issued in excess of this limit can be included in Tier 2 capital.
- 1(c) For the purposes of this principle, “net Tier 1 capital” means Tier 1 capital available after deductions for goodwill etc., as set out in OSFI’s MCCSR or CAR Guideline, as applicable.

### **C. *General principles for innovative instruments***

Innovative instruments may be included in Tier 1 capital (subject to the limits set out in Principle #1), provided they meet certain requirements. The following principles will govern their inclusion:

**Principle #2: The nature of inter-company instruments issued by the FRFI in connection with the raising of Tier 1 capital by way of innovative instruments must not compromise the Tier 1 qualities of the innovative instrument.**

- 2 (a) An SPV should not, at any time, hold assets that materially exceed the amount of the innovative instrument. For Asset-Based Structures, OSFI will consider the excess to be material if it exceeds 25% of the innovative instrument(s) and, for Loan-Based Structures, the excess will be considered to be material if it exceeds 3% of the innovative instrument(s). Amounts in excess of these thresholds require the Superintendent’s approval.
- 2 (b) The following minimum standards apply to inter-company instruments issued by the FRFI when raising Tier 1 capital by way of an innovative instrument:
  - (g) Inter-company instruments must be permanent; they may contain a maturity date provided the term to maturity is at least 30 years. If, at maturity, the proceeds are not used to repay the innovative instrument, the SPV must reinvest the proceeds in assets acquired from the FRFI.

Failure to make payments or to meet covenants must not cause acceleration of repayment of the inter-company instrument.

The inter-company instrument must not be secured or covered by a guarantee or other arrangement that legally or economically results in a priority ahead of the claims of policyholders/depositors.

- 2 (c) Life Companies wishing to include an Asset-Based Structure in Tier 1 capital pursuant to this Appendix must satisfy OSFI that, after the assets have been transferred to the SPV,

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there will be sufficient cash flows available to support actuarial liabilities within the FRFI and the valuation of the FRFI's actuarial liabilities will not be materially affected.

**Principle #3: Innovative instruments must allow FRFIs to absorb losses within the FRFIs on an ongoing basis.**

- 3 (a) Innovative instruments must enable the FRFIs to absorb losses without triggering the cessation of ongoing operations or the start of insolvency proceedings. The ability to absorb losses must be present well before there is any serious deterioration in the FRFI's financial position.
- 3 (b) The method used to achieve loss absorption within the FRFI must be transparent and must not raise any uncertainty about the availability of capital for this purpose. Any of the following mechanisms would be acceptable, provided OSFI receives a high degree of assurance that they will function appropriately:
- (g) Mandatory write-down of the innovative instrument.

Automatic conversion into Tier 1-qualifying preferred shares of the FRFI. Automatic conversion must occur, at a minimum, upon the occurrence of any of the following events (Loss Absorption Events):

- (i) an application for a winding-up order in respect of the FRFI pursuant to the *Winding-up and Restructuring Act (Canada)* is filed by the Attorney General of Canada or a winding-up order in respect of the FRFI pursuant to that Act is granted by a court; or
- (i) the Superintendent advises the FRFI in writing that the Superintendent has taken control of the FRFI or its assets pursuant to the *Insurance Companies Act, Bank Act* or *Trust & Loan Companies Act*, as applicable; or
- (i) the Superintendent advises the FRFI in writing that the Superintendent is of the opinion that, in the case of a Life Company, it has a net Tier 1 capital ratio of less than 75% or a MCCR ratio of less than 120%<sup>21</sup>, or, in the case of an institution, it has a Tier 1 capital ratio of less than 5.0% or a Total Capital ratio of less than 8.0%; or
- (i) the FRFI's Board of Directors advises the Superintendent in writing that, in the case of a Life Company, the FRFI has a net Tier 1 capital ratio of less than 75% or an MCCR ratio of less than 120%, or, in the case of an institution, it has a Tier 1 capital ratio of less than 5.0% or a Total Capital ratio of less than 8.0%; or
- (i) the Superintendent directs the FRFI, pursuant to the *Insurance Companies Act, Bank Act* or *Trust & Loan Companies Act*, as applicable, to increase its capital or provide additional liquidity and the FRFI elects to

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<sup>21</sup> Tier 1 capital ratio is calculated as:  $(\text{Tier 1 capital available after tier 1 deductions} \div \text{Total capital required}) \times 100$ . MCCR Ratio is calculated as:  $(\text{Total capital available} \div \text{Total capital required}) \times 100$ .

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cause the exchange as a consequence of the issuance of such direction or the FRFI does not comply with such direction to the satisfaction of the Superintendent within the time specified.

If the Tier 1-qualifying preferred shares issued pursuant to an automatic conversion contain a feature allowing the holder to convert into common shares at future market values, such a feature must be structured to ensure that the investors would absorb losses. Accordingly, the right to convert must be structured to ensure that the holder cannot exercise the conversion right while a Loss Absorption Event is continuing.

The dividend rate on the Tier 1-qualifying preferred shares issued pursuant to the automatic conversion must be established at the time the innovative instrument is issued and must not exceed the market rate for such shares as at that date.

Another method that is consistent with Principle #4 and approved by the Superintendent.

**Principle #4: Innovative instruments must absorb losses in liquidation.**

- 4 (a) Innovative instruments must achieve, through conversion or other means (for example, a mechanism that ensures investors will receive distributions consistent with preferred shareholders of the FRFI), a priority after the claims of policyholders/depositors, other creditors and subordinated debt holders of the FRFI in a liquidation.
- 4 (b) Innovative instruments must not be secured or covered by a guarantee or other arrangement that legally or economically results in a claim ranking equal to or prior to the claims of policyholders/depositors, other creditors and subordinated debt holders of the FRFI in a liquidation.

**Principle #5: Innovative instruments must not contain any feature that may impair the permanence of the instrument.**

- 5 (a) For the purposes of this principle, a step-up is defined as a pre-set increase at a future date in the dividend (or distribution) rate to be paid on an innovative instrument. Moderate step-ups in innovative instruments are permitted only if the moderate step-up occurs at least 10 years after the issue date and if it results in an increase over the initial rate not exceeding the greater of:
  - (g) 100 basis points, less the swap spread between the initial index basis and the stepped-up index basis; and

50 per cent of the initial credit spread, less the swap spread between the initial index basis and the stepped-up basis.

The terms of the innovative instrument should provide for no more than one rate step-up over the life of the instrument. The swap spread should be fixed as of the pricing date

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and should reflect the differential in pricing on that date between the initial reference security or rate and the stepped-up reference security or rate.

- 5 (b) A step-up feature cannot be combined with any other feature that creates an economic incentive to redeem.
- 5 (c) A redemption feature after an initial five-year period is acceptable in an innovative instrument on the condition that the redemption requires both the prior approval of the Superintendent and the replacement of the innovative instrument with capital of the same or better quality, unless the Superintendent determines that the FRFI has capital that is more than adequate to cover its risks.

An innovative instrument may be redeemed during the initial five-year period, with the Superintendent's approval, upon the occurrence of tax or regulatory (including legislative) changes affecting one or more components of the transaction. It is highly unlikely that the Superintendent would approve redemption of an innovative instrument in the initial five-year period due to a tax reassessment.

The purchase for cancellation of an innovative instrument requires the prior approval of the Superintendent.

- 5 (d) Innovative instruments must not contain a maturity date or other feature that requires the instrument to be paid in cash. The instrument may contain the right of holders, at their option, to exchange their innovative instrument for Tier 1-qualifying preferred shares of the FRFI, provided the dividend rate is established at the time the innovative instrument is issued and it does not exceed the market rate for such shares as at that date.
- 5 (e) An innovative instrument must not contain a feature allowing the holder to convert the innovative instrument directly into common shares of the FRFI or of other entities. Conversions into common shares are permitted only if the conversion occurs first into Tier 1-qualifying preferred shares of the FRFI which are then convertible into common shares of the FRFI or its OSFI-regulated holding company, and provided OSFI is satisfied that the innovative instrument is issued in a market where the conversion feature is widely accepted.

**Principle #6: Innovative instruments must be free from mandatory fixed charges.**

- 6 (a) The FRFI, through the SPV, must have discretion over the amount and timing of distributions. Rights to receive distributions must clearly be non-cumulative and must not provide for compensation in lieu of undeclared distributions. The FRFI must have full access to undeclared payments.
- 6 (b) Distributions may be paid only in cash.
- 6 (c) Distributions may not be reset based on the future credit standing of the FRFI.

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**Principle #7:** Innovative instruments must be issued and fully paid-for in money, or, with the approval of the Superintendent, in property.

**Principle #8:** Innovative instruments, even if not issued as shares, may be included in Tier 1 capital.

**Principle #9:** The main features of an innovative instrument must be easily understood and publicly disclosed.

9 (a) For the purposes of this principle, OSFI will consider the main features of an innovative instrument to be easily understood where:

(g) the legal (including tax) and regulatory risks arising out of the innovative instrument have been minimized to the satisfaction of the Superintendent. The likelihood of failing this test increases as the number of entities placed between the investors and the ultimate recipient of the proceeds increases, as the number of jurisdictions involved increases, and/or if the assets of the FRFI are transferred to an entity outside Canada; and

the manner by which the innovative instrument meets the Tier 1 capital requirements and the main features of the instrument are, in the opinion of the Superintendent, transparent to a reasonably sophisticated investor.

9 (b) The main features of innovative instruments, including those features designed to achieve Tier 1 capital status (for example, the triggers and mechanisms used to achieve loss absorption), must be publicly disclosed in the FRFI's annual report to shareholders.

#### ***D. Grandfathering***

**Principle #10:** For purposes of Principle #1, FRFIs exceeding the “25 per cent limit” as of the date of the release of this Appendix can continue to include the excess in Tier 1 capital if the excess also existed at July 30, 1999, but may only do so until July 30, 2004 unless otherwise permitted in writing by the Superintendent. Excesses created subsequent to July 30, 1999 are not grandfathered for purposes of Principle #1, unless otherwise permitted in writing by the Superintendent. All existing innovative instruments and Tier 1-qualifying preferred shares must continue to be included in the computation of a FRFI's position relative to the 15 per cent and 25 per cent limits going forward.

## Appendix 2-II - List of Advisories

Advisory	Date
Guidance Note – Investments by Federally Regulated Financial Institutions in Mutual Fund Entities	December 1999
Guidance Note – Capital Instruments – Guideline A, Capital Adequacy Requirements	June 2000
Guidance Note – Dividend Reset Features in Tier 1 Preferred Shares and Step-ups in Tier 2B Capital	May 2001
Tier 1 Capital Clarifications	April 2003
Innovative Tier 1 Instruments and Accounting Guideline 15 (AcG 15)	July 2003
Section 3860 of the CICA Handbook and the Regulatory Capital Treatment of Preferred Shares and Innovative Tier Instruments	February 2004
Moderate Step-ups in Tier 2A Capital and Automatic Conversion Triggers in Tier 2A – Qualifying Debentures	June 2004
Ruling 2005-01: Capital Structure – Conversion of subordinated debt	2005
Letter from Julie Dickson regarding Innovative Tier 1 and Other Regulatory Capital Quality Issues – Canadian Bankers Association	October 2005
Transition for Certain Definition of Capital Elements of Basel II	January 2008
Innovative Tier 1 and Other Capital Clarifications – Revised Version	December 2008
Innovative Tier 1 Instruments	December 2008
Interim Treatment of Capital Instruments	May 2010
Treatment of non-qualifying capital instruments	February 2011
Non-Viability Contingent Capital	August 2011

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## Chapter 3 Credit Risk - Standardized Approach

Note that all exposures subject to the standardized approach should be risk-weighted net of specific allowances.

### 3.1. Risk Weight Categories

*On-balance sheet and off-balance sheet credit equivalent amounts*

*Individual claims*

#### 3.1.1. Claims on sovereigns

Claims on sovereigns and their central banks are risk weighted as follows:

Credit Assessment <sup>22</sup>	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
Risk Weight	0%	20%	50%	100%	150%	100%

National supervisors may allow a lower risk weight to be applied to banks' exposures to their sovereign (or central bank) of incorporation denominated in domestic currency and funded<sup>23</sup> in that currency.<sup>24</sup> Institutions operating in Canada that have exposures to sovereigns meeting the above criteria may use the preferential risk weight assigned to those sovereigns by their national supervisors.

#### 3.1.2. Claims on unrated sovereigns

For claims on sovereigns that are unrated, institutions may use country risk scores assigned by Export Credit Agencies (ECAs). Consensus risk scores assigned by ECAs participating in the "Arrangement on Officially Supported Export Credits" and available on the OECD website<sup>25</sup>, correspond to risk weights as follows:

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

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<sup>22</sup> This notation refers to the methodology used by Standard and Poor's. Refer to section 3.7.2.1. to determine the applicable risk weight for other rating agency methodologies.

<sup>23</sup> This is to say that the bank would also have corresponding liabilities denominated in the domestic currency.

<sup>24</sup> This lower risk weight may be extended to the risk weighting of collateral and guarantees. See section 4.1.3. and 4.1.5.

<sup>25</sup> The consensus country risk classification is available on the OECD's website (<http://www.oecd.org>) in the Export Credit Arrangement web page of the Trade Directorate.

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

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

PSEs are defined as:

- entities directly and wholly-owned by a government,
- school boards, hospitals, universities and social service programs that receive regular government financial support, and
- municipalities.

Claims on PSEs receive a risk weight that is one category higher than the sovereign risk weight:

<b>Credit Assessment of sovereign</b>	<b>AAA to AA-</b>	<b>A+ to A-</b>	<b>BBB+ to BBB-</b>	<b>BB+ to B-</b>	<b>Below B-</b>	<b>Unrated</b>
<b>Sovereign Risk Weight</b>	0%	20%	50%	100%	150%	100%
<b>PSE risk weight</b>	20%	50%	100%	100%	150%	100%

There are two exceptions to the above:

(i) Claims on the following entities will receive the same risk weight as the Government of Canada:

- All provincial and territorial governments and agents of the federal, provincial or territorial government whose debts are, by virtue of their enabling legislation, obligations of the parent government

(ii) Claims on the following entities will be treated like claims on corporates:

- Entities that are, in the judgement of the host government, significantly in competition with the private sector. Institutions should look to the host government to confirm whether an entity is a PSE in competition with the private sector.

The PSE risk weight is meant for the financing of the PSE’s own municipal and public services. Where PSEs other than Canadian provincial or territorial governments provide guarantees or other



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support arrangements other than in respect of the financing of their own municipal or public services, the PSE risk weight may not be used.

PSEs in foreign jurisdictions should be given the same capital treatment as that applied by the national supervisor in the jurisdiction of origin.

#### 3.1.4. *Claims on multilateral development banks (MDBs)*

Claims on MDBs that meet the following criteria receive a risk weight of 0%:

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

MDBs currently eligible for 0% risk weight are:<sup>26</sup>

- International Bank for Reconstruction and Development (IBRD)
- International Finance Corporation (IFC)
- Asian Development Bank (ADB)
- African Development Bank (AfDB)
- European Bank for Reconstruction and Development (EBRD)
- Inter-American Development Bank (IADB)
- European Investment Bank (EIB)

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<sup>26</sup> In addition, OSFI will allow banks to apply a 0% risk weight to claims on the International Finance Facility for Immunisation (IFFIm) similar to the treatment for eligible multilateral development banks.

- European Investment Fund (EIF)
- Nordic Investment Bank (NIB)
- Caribbean Development Bank (CDB)
- Islamic Development Bank (IDB)
- Council of Europe Development Bank (CEDB)

Otherwise, the following risk weights apply:

Credit assessment of MDBs	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
<b>Risk weight</b>	20%	50%	50%	100%	150%	50%

### 3.1.5. *Claims on deposit taking institutions and banks*

Canadian deposit taking institutions (DTIs) include federally and provincially regulated institutions that take deposits and lend money. These include banks, trust or loan companies and co-operative credit societies.

The term bank refers to those institutions that are regarded as banks in the countries in which they are incorporated and supervised by the appropriate banking supervisory or monetary authority. In general, banks will engage in the business of banking and have the power to accept deposits in the regular course of business.

For banks incorporated in countries other than Canada, the definition of bank will be that used in the capital adequacy regulations of the host jurisdiction.

The risk weight applied to a claim on a bank is dependant on the credit assessment of the sovereign in the bank's country of incorporation. The bank risk weight is one notch less favourable than that which applies to its sovereign of incorporation. The following risk weights apply to claims on DTIs and banks:

Credit assessment of Sovereign	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated
<b>DTI/bank risk weight</b>	20%	50%	100%	100%	150%	100%

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Claims on parents of DTIs that are non-financial institutions are treated as corporate exposures.

### 3.1.6. *Claims on securities firms*

Claims on securities firms may be treated as claims on banks provided these firms are subject to supervisory and regulatory arrangements comparable to those under Basel II framework (including, in particular, risk-based capital requirements).<sup>27</sup> Otherwise, such claims would follow the rules for claims on corporates.

### 3.1.7. *Claims on corporates*

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

<b>Credit assessment of Corporate</b>	<b>AAA to AA-</b>	<b>A+ to A-</b>	<b>BBB+ to BB-</b>	<b>Below BB-</b>	<b>Unrated</b>
<b>Risk weight</b>	20%	50%	100%	150%	100%

Institutions may choose to apply a 100% risk weight to all corporate exposures. However, if an institution chooses to adopt this option, it must use the 100% risk weight for all of its corporate exposures.

### 3.1.8. *Claims included in the regulatory retail portfolios*

Retail claims are risk-weighted at 75%.

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

- Orientation criterion — the exposure is to an individual person or persons or to a small business.
- Product criterion — the exposure takes the form of any of the following: revolving credits and lines of credit (including credit cards and overdrafts), personal term loans and leases (e.g. instalment loans, auto loans and leases, student and educational loans, personal finance) and small business facilities and commitments. Securities (such as bonds and equities), whether listed or not, are specifically excluded from this category. Mortgage loans are excluded to the extent that they qualify for treatment as claims secured by residential property.

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<sup>27</sup> That is, capital requirements that are comparable to those applied to banks in this Framework. Implicit in the meaning of the word “comparable” is that the securities firm (but not necessarily its parent) is subject to consolidated regulation and supervision with respect to any downstream affiliates.

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- Granularity criterion — the supervisor must be satisfied that the regulatory retail portfolio is sufficiently diversified to a degree that reduces the risks in the portfolio, warranting the 75% risk weight.
  - Low value of individual exposures — the maximum aggregated retail exposure to one counterpart cannot exceed an absolute threshold of CAD \$1.25 million. Small business loans extended through or guaranteed by an individual are subject to the same exposure threshold.

Residential construction loans meeting the above criteria are risk-weighted at 75%. Residential construction loans that do not meet the above criteria must be treated as a corporate exposure subject to the risk weights in section 3.1.7.

### *3.1.9. Claims secured by residential property*

Mortgages on residential property that is or will be occupied by the borrower, or that is rented, are risk weighted at 35%.

Qualifying residential mortgages include:

- loans secured by first mortgages on individual condominium residences and one-to four-unit residences made to a person(s) or guaranteed by a person(s), provided that such loans are not 90 days or more past due and do not exceed a loan-to-value ratio of 80%, and
- collateral mortgages (first and junior) on individual condominium residences or one-to four-unit residential dwellings, provided that such loans are made to a person(s) or guaranteed by a person(s), where no other party holds a senior or intervening lien on the property to which the collateral mortgage applies and such loans are not more than 90 days past due and do not, collectively, exceed a loan-to-value ratio of 80%.

Investments in hotel properties and time-shares are excluded from the definition of qualifying residential property.

Uninsured collateral mortgages that would otherwise qualify as residential mortgages, except that their loan-to-value ratio exceeds 80%, receive a risk weight of 75%.

Residential mortgages insured under the NHA or equivalent provincial mortgage insurance programs are risk weighted at 0%. Where a mortgage is comprehensively insured by a private sector mortgage insurer that has a backstop guarantee provided by the Government of Canada (for example, a guarantee made pursuant to subsection 193(1) of the Budget Implementation Act of 2006), institutions may recognize the risk-mitigating effect of the guarantee by reporting the portion of the exposure that is covered by the Government of Canada backstop as if this portion were directly guaranteed by the Government of Canada. The remainder of the exposure should be treated as a corporate-guaranteed mortgage in accordance with the rules set out in chapter 4.

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### 3.1.10. *Reverse mortgages*

The Standardized Approach must be used for reverse mortgage exposures.

A reverse mortgage exposure<sup>28</sup> qualifies for a 35% risk weight provided that all of the following conditions are met:

- its initial loan to value ratio (LTV) is less than or equal to 40%
- its current LTV is less than or equal to 60%
- disposition costs on the mortgaged property and risk of appraisal error are not expected to exceed 15%-20% of the current appraised value
- the criteria for qualifying residential mortgages set out in section 3.1.9 of the CAR guideline are met (except that there is no requirement for recourse to the borrower for a deficiency)

Further, for a reverse mortgage to qualify for a 35% risk weight, the underwriting institution must have, at mortgage inception and at the time such risk weight is being considered, each of the following:

- documented and prudent underwriting standards, including systematic methods for estimating expected occupancy term (which should at minimum refer to standard mortality tables), future real estate appreciation / depreciation, future interest rates on the reverse mortgage and determining appropriate levels for maximum initial LTVs and a maximum dollar amount that may be lent
- documented procedures for monitoring loan to value ratios on an ongoing basis, based on outstanding loan amounts, including accrued interest, undrawn balances and up to date property values
- documented procedures for obtaining independent reappraisals of the properties at regular intervals, not less than once every five years, with more frequent appraisals as loan to value ratios approach 80%
- a documented process to ensure timely reappraisal of properties in a major urban centre where resale home prices in that urban centre decline by more than 10%
- documented procedures for ensuring that borrowers remain in compliance with loan conditions
- a rigorous method for stress testing the reverse mortgage portfolio that addresses expected occupancy, property value and interest rate assumptions

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<sup>28</sup> Reverse mortgage exposure means all advances, plus accrued interest and 50% of undrawn amounts, net of specific allowances. Undrawn amounts on reverse mortgages do not include future loan growth due to capitalizing interest. Undrawn amounts are treated as undrawn commitments and are subject to a credit conversion factor of 50% (i.e., commitments with an original maturity exceeding one year).

- ongoing monitoring of reverse mortgage stress testing that is incorporated in the institution's Pillar II Internal Capital Adequacy Assessment and capital planning processes

For purposes of calculating risk weighted assets, current LTV is defined as:

- the reverse mortgage exposure (as defined in the footnote) divided by:
- where the most recent appraisal is greater than the original appraisal, the greater of the original appraised value or 80% of the most recent appraised value of the property,

OR

- where the most recent appraisal is less than the original appraisal, the most recent appraised value of the property.

The following table sets out the risk weights that apply to reverse mortgage exposures:

<b>Initial LTV</b>		<b>Current LTV</b>	<b>Risk Weight</b>
≤ 40%	and	≤ 60%	35%
> 40%	and	≤ 60%	50%
		> 60% and ≤ 75%	75%
		>75% and ≤ 85%	100%
		>85%	Partial deduction

In particular:

- A reverse mortgage exposure that originally qualified for a 35% risk weight but now has a current LTV that is greater than 60%, but less than or equal to 75%, is risk weighted at 75%.
- A reverse mortgage exposure that had an initial LTV greater than 40% (but that otherwise would have qualified for a 35% risk weight) is risk weighted at 50%, provided its current loan to value ratio is less than or equal to 60%.
- All reverse mortgage exposures with current LTVs greater than 60% and less than or equal to 75%, except those that could not (regardless of original LTV) qualify for the 35% or 50% risk weight are risk weighted at 75%.
- All reverse mortgage exposures with current LTVs greater than 75% and less than or equal to 85%, and all reverse mortgages that could not (regardless of the original LTV) qualify for a 35% or 50% risk weight and which have a current LTV less than or equal to 85%, are risk weighted at 100%.

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- Where a reverse mortgage exposure has a current LTV greater than 85%, the exposure amount that exceeds 85% LTV is deducted from capital. The remaining amount is risk-weighted at 100%.

### **3.1.11. *Mortgage-backed securities***

#### *0% Risk weight*

- NHA mortgage-backed securities that are guaranteed by the Canada Mortgage and Housing Corporation (CMHC), in recognition of the fact that obligations incurred by CMHC are legal obligations of the Government of Canada.

#### *35% Risk weight*

- mortgage-backed securities that are fully and specifically secured against qualifying residential mortgages (see 3.1.9.).

#### *100% Risk weight*

- amounts receivable resulting from the sale of mortgages under NHA mortgage-backed securities programs.

### **3.1.12. *Pass-through type mortgage-backed securities***

Mortgage-backed securities that are of pass-through type and are effectively a direct holding of the underlying assets shall receive the risk-weight of the underlying assets, provided that all the following conditions are met:

- The underlying mortgage pool contains only mortgages that are fully performing when the mortgage-backed security is created.
- The securities must absorb their pro-rata share of any losses incurred.
- A special-purpose vehicle should be established for securitization and administration of the pooled mortgage loans.
- The underlying mortgages are assigned to an independent third party for the benefit of the investors in the securities who will then own the underlying mortgages.
- The arrangements for the special-purpose vehicle and trustee must provide that the following obligations are observed:
  - If a mortgage administrator or a mortgage servicer is employed to carry out administration functions, the vehicle and trustee must monitor the performance of the administrator or servicer.
  - The vehicle and/or trustee must provide detailed and regular information on structure and performance of the pooled mortgage loans.
  - The vehicle and trustee must be legally separate from the originator of the pooled mortgage loans.

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- The vehicle and trustee must be responsible for any damage or loss to investors created by their own or their mortgage servicer's mismanagement of the pooled mortgages.
  - The trustee must have a first priority charge on underlying assets on behalf of the holders of the securities.
  - The agreement must provide for the trustee to take clearly specified steps in cases when the mortgagor defaults.
  - The holder of the security must have a pro-rata share in the underlying mortgage assets or the vehicle that issues the security must have only liabilities related to the issuing of the mortgage-backed security.
  - The cash flows of the underlying mortgages must meet the cash flow requirements of the security without undue reliance on any reinvestment income.
  - The vehicle or trustee may invest cash flows pending distribution to investors only in short-term money market instruments (without any material reinvestment risk) or in new mortgage loans.

Mortgage-backed securities that do not meet these conditions will receive a risk-weight of 100%. Stripped mortgage-backed securities or different classes of securities (senior/junior debt, residual tranches) that bear more than their pro-rata share of losses will automatically receive a 100% risk weight.

Where the underlying pool of assets is comprised of assets that would attract different risk weights, the risk weight of the securities will be the highest risk weight associated with risk-weighted assets.

For the treatment of mortgage-backed securities issued in tranches, refer to chapter 6, Structured Products.

### **3.1.13.      *Repurchase and reverse repurchase agreements***

A securities repurchase (repo) is an agreement whereby a transferor agrees to sell securities at a specified price and repurchase the securities on a specified date and at a specified price. Since the transaction is regarded as a financing for accounting purposes, the securities remain on the balance sheet. Given that these securities are temporarily assigned to another party, the risk-weighted assets associated with this exposure should be the higher of risk-weighted assets calculated using:

- the risk weight of the security, or
- the risk weight of the counterparty to the transaction, recognizing any eligible collateral; see Chapter 4.

A reverse repurchase agreement is the opposite of a repurchase agreement, and involves the purchase and subsequent resale of a security. Reverse repos are treated as collateralised loans,



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reflecting the economic reality of the transaction. The risk is therefore to be measured as an exposure to the counterparty. If the asset temporarily acquired is a security that qualifies as eligible collateral per chapter 4, the risk-weighted exposure may be reduced accordingly.

#### **3.1.14.      *Securities lending***

In securities lending, institutions can act as a principal to the transaction by lending their own securities or as an agent by lending securities on behalf of their clients.

When the institution lends its own securities, the credit risk is based on the higher of:

- the credit risk of the instrument lent, and
- the counterparty credit risk of the borrower of the securities. This risk could be reduced if the institution held eligible collateral (refer to chapter 4). Where the institution lends securities through an agent and receives an explicit guarantee of the return of the securities, the institution's counterparty is the agent.

When the institution, acting as agent, lends securities on behalf of the client and guarantees that the securities lent will be returned or the institution will reimburse the client for the current market value, the credit risk is based on the counterparty credit risk of the borrower of the securities. This risk could be reduced if the institution held eligible collateral (see chapter 4).

#### **3.1.15.      *Claims secured by commercial real estate***

Commercial mortgages are risk-weighted at 100%.

#### **3.1.16.      *Past due loans***

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

- 150% risk weight when specific provisions are less than 20% of the outstanding amount of the loan.
- 100% risk weight when specific provisions are more than 20% and less than 100% of the outstanding amount of the loan.

For the purpose of defining the secured portion of the past due loan, eligible collateral and guarantees will be the same as for credit risk mitigation purposes (see chapter 4). For risk-weighting purposes, past due retail loans are to be excluded from the overall regulatory retail portfolio when assessing the granularity criterion specified in 3.1.6.

Qualifying residential mortgage loans that are past due for more than 90 days will be risk weighted at 100%, net of specific provisions.

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### 3.1.17. *Higher-risk categories*

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

- claims on sovereigns, PSEs, banks, and securities firms rated below B-,
- claims on corporates rated below BB-,
- past due loans as set out above, and
- securitisation tranches that are rated between BB+ and BB- will be risk weighted at 350% as set out in paragraph 567 in chapter 6 of this guideline.

### 3.1.18. *Other assets*

#### *0% Risk weight*

- cash and gold bullion held in the institution's own vaults or on an allocated basis to the extent backed by bullion liabilities,
- unrealized gains and accrued receivables on foreign exchange and interest rate-related off-balance sheet transactions where they have been included in the off-balance sheet calculations, and
- all deductions from capital, as specified in chapter 2.

#### *20% Risk weight*

- cheques and other items in transit.

#### *100% Risk weight*

- premises, plant and equipment and other fixed assets,
- real estate and other investments (including non-consolidated investment participation in other companies),
- investments in equity or regulatory capital instruments issued by banks or securities firms, unless deducted from capital as set out in chapter 2,
- future income tax assets,
- prepaid expenses such as property taxes and utilities,
- deferred charges such as mortgage origination costs, and
- all other assets.

## 3.2. **Categories of off-balance sheet instruments**

The definitions in this section apply to off-balance sheet instruments. The term “off-balance sheet instruments”, as used in this guideline, encompasses guarantees, commitments, derivatives, and similar contractual arrangements whose full notional principal amount may not necessarily be reflected on the balance sheet. Such instruments are subject to a capital charge irrespective of whether they have been recorded on the balance sheet at market value.

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Institutions should closely monitor securities, commodities, and foreign exchange transactions that have failed, starting the first day they fail. A capital charge for failed transactions should be calculated in accordance with Annex 3. With respect to unsettled securities, commodities, and foreign exchange transactions that are not processed through a delivery-versus-payment (DvP) or payment-versus-payment (PvP) mechanism, institutions should calculate a capital charge as set forth in Annex 3.

The credit equivalent amount of Securities Financing Transactions (SFT)<sup>29</sup> and OTC derivatives that expose a bank to counterparty credit risk<sup>30</sup> is to be calculated under the rules set forth in Annex 4<sup>31</sup>. Annex 4 applies to all OTC derivatives held in the trading book.

### 3.2.1. *Direct credit substitutes*

Direct credit substitutes include guarantees or equivalent instruments backing financial claims. With a direct credit substitute, the risk of loss to the institution is directly dependent on the creditworthiness of the counterparty.

Examples of direct credit substitutes include:

- guarantees given on behalf of customers to stand behind the financial obligations of the customer and to satisfy these obligations should the customer fail to do so; for example, guarantees of:
  - payment for existing indebtedness for services
  - payment with respect to a purchase agreement
  - lease, loan or mortgage payments
  - payment of uncertified cheques
  - remittance of (sales) tax to the government
  - payment of existing indebtedness for merchandise purchased
  - payment of an unfunded pension liability
  - reinsurance of financial obligations,

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<sup>29</sup> Securities Financing Transactions (SFT) are transactions such as repurchase agreements, reverse repurchase agreements, security lending and borrowing, and wholesale margin lending transactions, where the value of the transactions depends on the market valuations and the transactions are often subject to margin agreements.

<sup>30</sup> The counterparty credit risk is defined as the risk that the counterparty to a transaction could default before the final settlement of the transaction's cash flows. An economic loss would occur if the transactions or portfolio of transactions with the counterparty has a positive economic value at the time of default. Unlike an institution's exposure to credit risk through a loan, where the exposure to credit risk is unilateral and only the lending institution faces the risk of loss, the counterparty credit risk creates a bilateral risk of loss: the market value of the transaction can be positive or negative to either counterparty to the transaction. The market value is uncertain and can vary over time with the movement of underlying market factors.

<sup>31</sup> Annex 4 is based on the treatment of counterparty credit risk set out in Part 1 of the BCBS paper The Application of Basel II to Trading Activities and the Treatment of Double Default Effects (July 2005).

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- standby letters of credit or other equivalent irrevocable obligations, serving as financial guarantees, such as letters of credit supporting the issue of commercial paper,
  - risk participation in bankers' acceptances and risk participation in financial letters of credit. Risk participation constitutes guarantees by the participating institutions such that, if there is a default by the underlying obligor, they will indemnify the selling institution for the full principal and interest attributable to them,
  - securities lending transactions, where the institution is liable to its customer for any failure to recover the securities lent, and
  - credit derivatives in the banking book where a bank is selling credit protection.

### 3.2.2. *Transaction-related contingencies*

Transaction-related contingencies relate to the ongoing business activities of a counterparty, where the risk of loss to the reporting institution depends on the likelihood of a future event that is independent of the creditworthiness of the counterparty. Essentially, transaction-related contingencies are guarantees that support particular performance of non-financial or commercial contracts or undertakings, rather than supporting customers' general financial obligations. Performance-related guarantees specifically exclude items relating to non-performance of financial obligations.

Performance-related and non-financial guarantees include items such as:

- performance bonds, warranties and indemnities. Performance standby letters of credit represent obligations backing the performance of non-financial or commercial contracts or undertakings. These include arrangements backing:
  - subcontractors' and suppliers' performance
  - labour and material contracts
  - delivery of merchandise, bids or tender bonds
  - guarantees of repayment of deposits or prepayments in cases of non-performance,
- customs and excise bonds. The amount recorded for such bonds should be the reporting institution's maximum liability.

### 3.2.3. *Trade-related contingencies*

These include short-term, self-liquidating trade-related items such as commercial and documentary letters of credit issued by the institution that are, or are to be, collateralized by the underlying shipment.

Letters of credit issued on behalf of a counterparty back-to-back with letters of credit of which the counterparty is a beneficiary ("back-to-back" letters) should be reported as documentary letters of credit.

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Letters of credit advised by the institution for which the institution is acting as reimbursement agent should not be considered as a risk asset.

#### **3.2.4. *Sale and Repurchase Agreements***

A repurchase agreement is a transaction that involves the sale of a security or other asset with the simultaneous commitment by the seller that, after a stated period of time, the seller will repurchase the asset from the original buyer at a pre-determined price. A reverse repurchase agreement consists of the purchase of a security or other asset with the simultaneous commitment by the buyer that, after a stated period of time, the buyer will resell the asset to the original seller at a pre-determined price. In any circumstance where they are not reported on-balance sheet, they should be reported as an off-balance sheet exposure with a 100% credit conversion factor.

#### **3.2.5. *Forward Asset Purchases***<sup>32</sup>

A commitment to purchase a loan, security, or other asset at a specified future date, usually on prearranged terms.

#### **3.2.6. *Forward/Forward Deposits***

An agreement between two parties whereby one will pay and other receive an agreed rate of interest on a deposit to be placed by one party with the other at some pre-determined date in the future. Such deposits are distinct from future forward rate agreements in that, with forward/forwards, the deposit is actually placed.

#### **3.2.7. *Partly Paid Shares and Securities***

Transactions where only a part of the issue price or notional face value of a security purchased has been subscribed and the issuer may call for the outstanding balance (or a further installment), either on a date pre-determined at the time of issue or at an unspecified future date.

#### **3.2.8. *Note Issuance/Revolving Underwriting Facilities***

These are arrangements whereby a borrower may issue short-term notes, typically three to six months in maturity, up to a prescribed limit over an extended period of time, commonly by means of repeated offerings to a tender panel. If at any time the notes are not sold by the tender at an acceptable price, an underwriter (or group of underwriters) undertakes to buy them at a prescribed price.

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<sup>32</sup> This does not include a spot transaction that is contracted to settle within the normal settlement period.

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### 3.2.9. *Future/Forward Rate Agreements*

These are arrangements between two parties where at some pre-determined future date a cash settlement will be made for the difference between the contracted rate of interest and the current market rate on a pre-determined notional principal amount for a pre-determined period.

### 3.2.10. *Interest Rate Swaps*

In an interest rate swap, two parties contact to exchange interest service payments on the same amount of notional indebtedness. In most cases, fixed interest rate payments are provided by one party in return for variable rate payments from the other and vice versa. However, it is possible that variable interest payments may be provided in return for other variable interest rate payments.

### 3.2.11. *Interest Rate Options and Currency Options*

An option is an agreement between two parties where the seller of the option for compensation (premium/fee) grants the buyer the future right, but not the obligation, to buy from the seller, or to sell to the seller, either on a specified date or during a specified period, a financial instrument or commodity at a price agreed when the option is arranged. Other forms of interest rate options include interest rate cap agreements and collar (floor/ceiling) agreements.

Options traded on exchanges may be excluded where they are subject to daily margining requirements.

### 3.2.12. *Forward Foreign Exchange Contracts*

A forward foreign exchange contract is an agreement between an institution and a counterparty in which the institution agrees to sell to or purchase from the counterparty a fixed amount of foreign currency at a fixed rate of exchange for delivery and settlement on a specified date in the future or within a fixed optional period.

### 3.2.13. *Cross Currency Swaps*

A cross currency swap is a transaction in which two parties exchange currencies and the related interest flows for a period of time. Cross currency swaps are used to swap fixed interest rate indebtedness in different currencies.

### 3.2.14. *Cross Currency Interest Rate Swaps*

Cross currency interest rate swaps combine the elements of currency and interest rate swaps.

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### 3.2.15. *Financial and Foreign Currency Futures*

A future is a standardized contractual obligation to make or take delivery of a specified quantity of a commodity (financial instrument, foreign currency, etc.) on a specified future date at a specified future price established in a central regulated marketplace.

### 3.2.16. *Precious Metals Contracts and Financial Contracts on Commodities*

Precious metals contracts and financial contracts on commodities can involve spot, forward, futures and option contracts. Precious metals are mainly gold, silver, and platinum. Commodities are bulk goods such as grains, metals and foods traded on a commodities exchange or on the spot market. For capital purposes, gold contracts are treated the same as foreign exchange contracts.

### 3.2.17. *Non-equity Warrants*

Non-equity warrants include cash settlement options/contracts whose values are determined by the movements in a given underlying index, product, or foreign exchange over time. Where non-equity warrants or the hedge for such warrants expose the financial institution to counterparty credit risk, the credit equivalent amount should be determined using the current exposure method for exchange rate contracts.

## 3.3. **Credit conversion factors**

The face amount (notional principal amount) of off-balance sheet instruments does not always reflect the amount of credit risk in the instrument. To approximate the potential credit exposure of non-derivative instruments, the notional amount is multiplied by the appropriate credit conversion factor (CCF) to derive a **credit equivalent amount**<sup>33</sup>. The credit equivalent amount is treated in a manner similar to an on-balance sheet instrument and is assigned the risk weight appropriate to the counterparty or, if relevant, the guarantor or collateral. The categories of credit conversion factors are outlined below.

#### *100% Conversion factor*

- Direct credit substitutes (general guarantees of indebtedness and guarantee-type instruments, including standby letters of credit serving as financial guarantees for, or supporting, loans and securities),
- Acquisitions of risk participation in bankers' acceptances and participation in direct credit substitutes (for example, standby letters of credit),
- Sale and repurchase agreements,

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<sup>33</sup> See 3.4., “Forwards, Swaps, Purchased Options and Other Similar Derivatives”.

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- Forward agreements (contractual obligations) to purchase assets, including financing facilities with certain drawdown, and
  - Written put options on specified assets with the characteristics of a credit enhancement<sup>34</sup>.

#### *50% Conversion factor*

- Transaction-related contingencies (for example, bid bonds, performance bonds, warranties, and standby letters of credit related to a particular transaction),
- Commitments with an original maturity exceeding one year, including underwriting commitments and commercial credit lines, and
- Revolving underwriting facilities (RUFs), note issuance facilities (NIFs) and other similar arrangements.

#### *20% Conversion factor*

- Short-term, self-liquidating trade-related contingencies, including commercial/documentary letters of credit (Note: a 20% CCF is applied to both issuing and confirming banks),
- Commitments with an original maturity of one year or less, and

#### *0% Conversion factor*

- Commitments that are unconditionally cancellable at any time without prior notice.

### **3.4. Forwards, swaps, purchased options and other similar derivative contracts**

The treatment of forwards, swaps, purchased options and other similar derivatives needs special attention because institutions are not exposed to credit risk for the full face value of their contracts (notional principal amount), but only to the potential cost of replacing the cash flow (on contracts showing a positive value) if the counterparty defaults. The credit equivalent amounts are calculated using the current exposure method and are assigned the risk weight appropriate to the counterparty. As an alternative to the current exposure method, institutions may calculate the credit equivalent amount using the internal modelling method, subject to supervisory approval. See Annex 4 for details on these two methods.

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. Instruments traded on exchanges may be excluded where they are subject to daily receipt and payment of cash variation margin. Options purchased over the counter are included with the same conversion factors as other instruments.

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<sup>34</sup> Written put options (where premiums are paid upfront) expressed in terms of market rates for currencies or financial instruments bearing no credit or equity risk are excluded from the framework.



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Institutions should closely monitor securities, commodities, and foreign exchange transactions that have failed, starting the first day they fail. A capital charge for failed transactions should be calculated in accordance with Annex 3. With respect to unsettled securities, commodities, and foreign exchange transactions that are not processed through a delivery-versus-payment (DvP) or payment-versus-payment (PvP) mechanism, institutions should calculate a capital charge as set forth in Annex 3.

#### **3.4.1. Interest rate contracts**

*These include:*

- single-currency interest rate swaps
- basis swaps
- forward rate agreements and products with similar characteristics
- interest rate futures
- interest rate options purchased

#### **3.4.2. Foreign exchange rate contracts**

*These include:*

- gold contracts<sup>35</sup>
- cross-currency swaps
- cross-currency interest rate swaps
- outright forward foreign exchange contracts
- currency futures
- currency options purchased

#### **3.4.3. Equity contracts**

*These include:*

- futures
- forwards
- swaps
- purchased options
- similar contracts based on both individual equities as well as on equity indices

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<sup>35</sup> Gold contracts are treated the same as foreign exchange rate contracts for the purpose of calculating credit risk.

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#### 3.4.4. *Precious metals (i.e., silver, platinum, and palladium) contracts*

*These include:*

- futures
- forwards
- swaps
- purchased options
- similar contracts based on precious metals

#### 3.4.5. *Contracts on other commodities*

*These include:*

- futures
- forwards
- swaps
- purchased options
- similar derivatives contracts based on energy contracts, agricultural contracts, base metals (e.g., aluminium, copper, and zinc)
- other non-precious metal commodity contracts

### **3.5. Netting of forwards, swaps, purchased options and other similar derivatives**

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.

Institutions that wish to net transactions under either novation or another form of bilateral netting will need to satisfy OSFI<sup>36</sup> 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 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

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<sup>36</sup> If any supervisor is dissatisfied about enforceability under the laws of its country, neither counterparty can net the contracts for capital purposes.

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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.

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.

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 Annex 4. Cross-product netting of repo-style transactions against OTC derivative transactions is not permitted under the current exposure method.

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 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.

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.

The potential future credit exposure for netted transactions ( $A_{Net}$ ) equals the sum of: (i) 40% of the add-on as presently calculated ( $A_{Gross}$ )<sup>37</sup>; and (ii) 60% of the add-on multiplied by the ratio of net current replacement cost to positive current replacement cost (NPR)<sup>38</sup>.

Where

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

The calculation of NPR 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 NPR is calculated for each counterparty. On an aggregate basis, one NPR is calculated and applied to all counterparties.

### 3.5.1. *Steps for determining the credit equivalent amount of netted contracts*

- (g) 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.

Counterparty 1					
Transaction	Notional Principal Amount	Add-on Factor (ref. 4-3-2)	Potential Credit Exposure	Positive Replacement Cost	Negative Replacement Cost
	1	2	1 x 2 = 3	4	5
1					
2					
3					
Etc.					

<sup>37</sup>  $A_{Gross}$  equals the sum of the potential future credit exposures (i.e., notional principal amount of each transaction times the appropriate add-on factor from Annex 4) for all transactions subject to legally enforceable netting agreements.

<sup>38</sup> Positive replacement cost is referred to as gross replacement cost in BIS documents; similarly the NPR is referred to as the NGR.

<b>Total</b>			$A_{Gross}$	$R^+$	$R^-$
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Calculate the net replacement cost for each counterparty; it is equal to the greater of:

- zero; or
- the sum of the positive and negative replacement costs ( $R^+ + R^-$ ) (note: negative replacement costs for one counterparty cannot be used to offset positive replacement costs for another counterparty).

Calculate the NPR.

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

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

A simple example of calculating the NPR 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
Positive replacement cost ( $R^+$ )		10		10		1
Net replacement cost (NR)		5		10		0
NPR (per counterparty)	0.5		1		0	
NPR (aggregate)	$\sum NR / \sum R^+ = 15/21 = 0.71$					

Calculate  $A_{Net}$ .

$A_{Net}$  must be calculated for each counterparty subject to bilateral netting; however, the NPR 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  $> 0$

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$$(.4 * A_{\text{Gross}}) + (.6 * A_{\text{Gross}} * \text{NPR})$$

For netted contracts where the net replacement cost is = 0

$$.4 * A_{\text{Gross}}$$

Calculate the credit equivalent amount for each counterparty by adding the net replacement cost (step 2) and  $A_{\text{Net}}$  (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.

### 3.6. Commitments

Commitments are arrangements that obligate an institution, at a client's request, to:

- extend credit in the form of loans or participations in loans, lease financing receivables, mortgages, overdrafts, acceptances, letters of credit, guarantees or loan substitutes, or
- purchase loans, securities, or other assets

Normally, commitments involve a written contract or agreement and some form of consideration, such as a commitment fee.

#### 3.6.1. *Credit conversion factors*

The credit conversion factor applied to a commitment is dependent on its maturity. Longer maturity commitments are considered to be of higher risk because there is a longer period between credit reviews and less opportunity to withdraw the commitment if the credit quality of the drawer deteriorates.

Conversion factors apply to commitments as set out below.

##### *0% Conversion factor*

- Commitments that are unconditionally cancellable at any time by the institution without notice or that effectively provide for automatic cancellation due to deterioration in the borrower's creditworthiness. This implies that the institution conducts a formal review of the facility at least annually, thus giving it an opportunity to take note of any perceived deterioration in credit quality. Retail commitments are unconditionally cancellable if the term permits the institution to

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cancel them to the full extent allowable under consumer protection and related legislation.

*20% Conversion factor*

- Commitments with an original maturity of one year and under.

*50% Conversion factor*

- Commitments with an original maturity of over one year,
- NIFs and RUFs,
- the undrawn portion of a commitment to provide a loan that will be drawn down in a number of tranches, some less than and some over one year, and
- forward commitments (where the institution makes a commitment to issue a commitment) if the loan can be drawn down more than one year after the institution's initial undertaking is signed.

### 3.6.2. **Maturity**

Institutions should use original maturity (as defined below) to report these instruments.

#### 3.6.2.1. Original maturity

The maturity of a commitment should be measured from the date when the commitment was accepted by the customer, regardless of whether the commitment is revocable or irrevocable, conditional or unconditional, until the earliest date on which:

- the commitment is scheduled to expire, or
- the institution can, at its option, unconditionally cancel the commitment.

A material adverse change clause is not considered to give sufficient protection for a commitment to be considered unconditionally cancellable.

Where the institution commits to granting a facility at a future date (a forward commitment), the original maturity of the commitment is to be measured from the date the commitment is accepted until the final date that drawdowns are permitted.

#### 3.6.2.2. Renegotiations of a commitment

If both parties agree, a commitment may be renegotiated before its term expires. If the renegotiation process involves a credit assessment of the customer consistent with the institution's credit standards, and provides the institution with the total discretion to renew or extend the commitment and to change any other terms and conditions of the commitment, then on the date of acceptance by the customer of the revised terms and conditions, the original commitment may be deemed to have matured and a new commitment begun. If new terms are not reached, the original commitment will remain in force until its original maturity date.

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This process must be clearly documented.

In syndicated and participated transactions, a participating institution must be able to exercise its renegotiation rights independent of the other syndicate members.

Where these conditions are not met, the original start date of the commitment must be used to determine maturity.

### 3.6.3. *Specific types of commitments*

#### 3.6.3.1. Undated/open-ended commitments

A 0% credit conversion factor is applied to undated or open-ended commitments, such as unused credit card lines, personal lines of credit, and overdraft protection for personal chequing accounts that are unconditionally cancellable at any time.

#### 3.6.3.2. Evergreen commitments

Open-ended commitments that are cancellable by the financial institution at any time subject to a notice period do not constitute unconditionally cancellable commitments and are converted at 50%. Long-term commitments must be cancellable without notice to be eligible for the 0% conversion factor.

#### 3.6.3.3. Commitments drawn down in a number of tranches

A 50% credit conversion factor is applied to a commitment to provide a loan (or purchase an asset) to be drawn down in a number of tranches, some one year and under and some over one year. In these cases, the ability to renegotiate the terms of later tranches should be regarded as immaterial. Often these commitments are provided for development projects from which the institution may find it difficult to withdraw without jeopardizing its investment.

Where the facility involves unrelated tranches, and where conversions are permitted between the over- and under-one year tranches (i.e., where the borrower may make ongoing selections as to how much of the commitment is under one year and how much is over), then the entire commitment should be converted at 50%.

Where the facility involves unrelated tranches with no conversion between the over- and under-one year tranches, each tranche may be converted separately, depending on its maturity.

#### 3.6.3.4. Commitments for fluctuating amounts

For commitments that vary in amount over the life of the commitment, such as the financing of a business subject to seasonal variation in cash flow, the conversion factor should apply to the maximum unutilized amount that can be drawn under the remaining period of the facility.



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### 3.6.3.5. Commitment to provide a loan with a maturity of over one year

A commitment to provide a loan that has a maturity of over one year but that must be drawn down within a period of less than one year may be treated as an under-one-year instrument, as long as any undrawn portion of the facility is automatically cancelled at the end of the drawdown period.

However, if through any combination of options or drawdowns, repayments and redrawdowns, etc., the client can access a line of credit past one year, with no opportunity for the institution to unconditionally cancel the commitment within one year, the commitment shall be converted at 50%.

### 3.6.3.6. Commitments for off-balance sheet transactions

Where there is a commitment to provide an off-balance sheet item, institutions are to apply the lower of the two applicable credit conversion factors.

## 3.7. External credit assessments and the mapping process

This is an extract from the Basel II framework, *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version* (June 2006) that applies to Canadian institutions. The extract has been annotated to indicate OSFI's position on items of national discretion.

### 3.7.1. External credit assessments

#### 3.7.1.1. The recognition process

90. National supervisors are responsible for determining whether an external credit assessment institution (ECAI) meets the criteria listed in the paragraph below. The assessments of ECAIs may be recognised on a limited basis, e.g. by type of claims or by jurisdiction. The supervisory process for recognising ECAIs should be made public to avoid unnecessary barriers to entry.

#### OSFI Notes

OSFI conducted a process to determine which of the major international rating agencies would be recognized. It included completion of a self-assessment template and submission of data required to complete a mapping exercise (see paragraph 92). As a result of this process, OSFI will permit banks to recognize credit ratings from the following rating agencies for capital adequacy purposes:

- DBRS
- Moody's Investors Service
- Standard and Poor's (S&P)
- Fitch Rating Services

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### 3.7.1.2. Eligibility criteria

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

**Objectivity:** The methodology for assigning credit assessments must be rigorous, systematic, and subject to some form of validation based on historical experience. Moreover, assessments must be subject to ongoing review and responsive to changes in financial condition. Before being recognised by supervisors, an assessment methodology for each market segment, including rigorous backtesting, must have been established for at least one year and preferably three years.

**Independence:** An ECAI should be independent and should not be subject to political or economic pressures that may influence the rating. The assessment process should be as free as possible from any constraints that could arise in situations where the composition of the board of directors or the shareholder structure of the assessment institution may be seen as creating a conflict of interest.

**International access/Transparency:** The individual assessments should be available to both domestic and foreign institutions with legitimate interests and at equivalent terms. In addition, the general methodology used by the ECAI should be publicly available.

**Disclosure:** An ECAI should disclose the following information: its assessment methodologies, including the definition of default, the time horizon, and the meaning of each rating; the actual default rates experienced in each assessment category; and the transitions of the assessments, e.g. the likelihood of AA ratings becoming A over time.

**Resources:** An ECAI should have sufficient resources to carry out high quality credit assessments. These resources should allow for substantial ongoing contact with senior and operational levels within the entities assessed in order to add value to the credit assessments. Such assessments should be based on methodologies combining qualitative and quantitative approaches.

**Credibility:** To some extent, credibility is derived from the criteria above. In addition, the reliance on an ECAI's external credit assessments by independent parties (investors, insurers, trading partners) is evidence of the credibility of the assessments of an ECAI. The credibility of an ECAI is also underpinned by the existence of internal procedures to prevent the misuse of confidential information. In order to be eligible for recognition, an ECAI does not have to assess firms in more than one country.

### 3.7.2. Implementation considerations

#### 3.7.2.1. The mapping process

92. Supervisors will be responsible for assigning eligible ECAs' assessments to the risk weights available under the standardised risk weighting framework, i.e. deciding which assessment categories correspond to which risk weights. The mapping process should be objective and should result in a risk weight assignment consistent with that of the level of credit risk reflected in the tables above. It should cover the full spectrum of risk weights.

<b>Long-term rating</b>				
<b>Standardized Risk Weight Category</b>	<b>DBRS</b>	<b>Moody's</b>	<b>S&amp;P</b>	<b>Fitch</b>
<b>Long Term</b>				
<b>1 (AAA to AA-)</b>	AAA to AA(low)	Aaa to Aa3	AAA to AA-	AAA to AA-
<b>2 (A+ to A-)</b>	A(high) to A(low)	A1 to A3	A+ to A-	A+ to A-
<b>3 (BBB+ to BBB-)</b>	BBB(high) to BBB(low)	Baa1 to Baa3	BBB+ to BBB-	BBB+ to BBB-
<b>4 (BB+ to B-)</b>	BB(high) to B(low)	Ba1 to B3	BB+ to B-	BB+ to B-
<b>5 (Below B-)</b>	CCC or lower	Below B3	Below B-	Below B-

93. When conducting such a mapping process, factors that supervisors should assess include, among others, the size and scope of the pool of issuers that each ECAI covers, the range and meaning of the assessments that it assigns, and the definition of default used by the ECAI. In order to promote a more consistent mapping of assessments into the available risk weights and help supervisors in conducting such a process, Annex 2 of the revised Framework provides guidance as to how such a mapping process may be conducted.

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

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

### 3.7.2.2. Multiple assessments

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

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

98. If there are three or more assessments with different risk weights, the assessments corresponding to the two lowest risk weights should be referred to and the higher of those two risk weights will be applied.

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### 3.7.2.3. Issuer versus issues assessment

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

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

100. Whether the bank intends to rely on an issuer- or an issue-specific assessment, the assessment must take into account and reflect the entire amount of credit risk exposure the bank has with regard to all payments owed to it.<sup>39</sup>

101. In order to avoid any double counting of credit enhancement factors, no supervisory recognition of credit risk mitigation techniques will be taken into account if the credit enhancement is already reflected in the issue specific rating (see paragraph 114).

### 3.7.2.4. Domestic currency and foreign currency assessments

102. Where unrated exposures are risk weighted based on the rating of an equivalent exposure to that borrower, the general rule is that foreign currency ratings would be used for exposures in foreign currency. Domestic currency ratings, if separate, would only be used to risk weight claims denominated in the domestic currency.<sup>40</sup>

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<sup>39</sup> For example, if a bank is owed both principal and interest, the assessment must fully take into account and reflect the credit risk associated with repayment of both principal and interest.

<sup>40</sup> However, when an exposure arises through a bank's participation in a loan that has been extended, or has been guaranteed against convertibility and transfer risk, by certain MDBs, its convertibility and transfer risk can be considered by national supervisory authorities to be effectively mitigated. To qualify, MDBs must have preferred creditor status recognised in the market and be included in Chapter 3. In such cases, for risk weighting purposes, the borrower's domestic currency rating may be used instead of its foreign currency rating. In the case of a guarantee against convertibility and transfer risk, the local currency rating can be used only for the portion that has been guaranteed. The portion of the loan not benefiting from such a guarantee will be risk-weighted based on the foreign currency rating.

### 3.7.2.5. Short-term/long-term assessments

103. For risk-weighting purposes, short-term assessments are deemed to be issue-specific. They can only be used to derive risk weights for claims arising from the rated facility. They cannot be generalised to other short-term claims, except under the conditions of paragraph 105. In no event can a short-term rating be used to support a risk weight for an unrated long-term claim. Short-term assessments may only be used for short-term claims against banks and corporates. The table below provides a framework for banks' exposures to specific short-term facilities, such as a particular issuance of commercial paper:

<b>Credit assessment</b>	<b>A-1/P-1<sup>41</sup></b>	<b>A-2/P-2</b>	<b>A-3/P-3</b>	<b>Others<sup>42</sup></b>
<b>Risk weight</b>	20%	50%	100%	150%

<b>Short-term rating</b>				
<b>Standardized Risk Weight Category</b>	<b>DBRS</b>	<b>Moody's</b>	<b>S&amp;P</b>	<b>Fitch</b>
<b>Short Term</b>				
<b>1 (A-1/P-1)</b>	R-1(high) to R-1(low)	P-1	A-1+, A-1	F1+, F1
<b>2 (A-2/P-2)</b>	R-2(high) to R-2(low)	P-2	A-2	F2
<b>3 (A-3/P-3)</b>	R-3	P-3	A-3	F3
<b>4 Others</b>	Below R-3	NP	All short-term ratings below A-3	Below F3

104. If a short-term rated facility attracts a 50% risk-weight, unrated short-term claims cannot attract a risk weight lower than 100%. If an issuer has a short-term facility with an assessment that warrants a risk weight of 150%, all unrated claims, whether long-term or short-term, should

<sup>41</sup> The notations follow the methodology used by Standard & Poor and by Moody's Investors Service. The A-1 rating of Standard & Poor includes both A-1+ and A-1-.

<sup>42</sup> This category includes all non-prime and B or C ratings.

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also receive a 150% risk weight, unless the bank uses recognised credit risk mitigation techniques for such claims.

105. In cases where national supervisors have decided to apply option 2 under the standardised approach to short term interbank claims to banks in their jurisdiction, the interaction with specific short-term assessments is expected to be the following:

- The general preferential treatment for short-term claims, as defined under paragraphs 62 and 64, applies to all claims on banks of up to three months original maturity when there is no specific short-term claim assessment.
- When there is a short-term assessment and such an assessment maps into a risk weight that is more favourable (i.e. lower) or identical to that derived from the general preferential treatment, the short-term assessment should be used for the specific claim only. Other short-term claims would benefit from the general preferential treatment.
- When a specific short-term assessment for a short term claim on a bank maps into a less favourable (higher) risk weight, the general short-term preferential treatment for interbank claims cannot be used. All unrated short-term claims should receive the same risk weighting as that implied by the specific short-term assessment.

106. When a short-term assessment is to be used, the institution making the assessment needs to meet all of the eligibility criteria for recognising ECAs as presented in paragraph 91 in terms of its short-term assessment.

#### 3.7.2.6. Level of application of the assessment

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

#### 3.7.2.7. Unsolicited ratings

108. As a general rule, banks should use *solicited* ratings from eligible ECAs. National supervisory authorities may, however, allow banks to use *unsolicited* ratings in the same way as solicited ratings. However, there may be the potential for ECAs to use unsolicited ratings to put pressure on entities to obtain solicited ratings. Such behaviour, when identified, should cause supervisors to consider whether to continue recognising such ECAs as eligible for capital adequacy purposes.

### OSFI Notes

Banks may not rely on any unsolicited rating in determining an asset's risk weight.

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## Annex 3 - Capital treatment for failed trades and non-DvP transactions

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

### I. Overarching principles

1. 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.
2. Transactions settled through a delivery-versus-payment system (DvP)<sup>43</sup>, 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.
3. 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 that are subject to daily mark-to-market and payment of daily variation margins and that involve a mismatched trade. Repurchase and reverse-repurchase agreements as well as securities lending and borrowing that have failed to settle are excluded from this capital treatment<sup>44</sup>.
4. In cases of a system wide failure of a settlement or clearing system, a national supervisor may use its discretion to waive capital charges until the situation is rectified.
5. Failure of a counterparty to settle a trade in itself will not be deemed a default for purposes of credit risk under this guideline.
6. 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.

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<sup>43</sup> For the purpose of this guideline, DvP transactions include payment-versus-payment (PvP) transactions.

<sup>44</sup> 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 Annex 4 or the sections on credit risk mitigation of this guideline.



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## II. Capital requirements

7. 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

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

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.

8. 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 day<sup>45</sup>. 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.

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<sup>45</sup> 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.



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## Annex 4 - Treatment of counterparty credit risk and cross-product netting

1. 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.<sup>46</sup> 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 standardised method or the current exposure method.

### I. Definitions and general terminology

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

#### A. 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.

#### B. 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.

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<sup>46</sup> 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.

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C. *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 4 or the Cross-Product Netting Rules set forth in this annex. 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.
- **Risk Position** is a risk number that is assigned to a transaction under the CCR standardised method (set out in this annex) 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 38.
- **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 annex.
- **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.

D. *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.

*E. 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.

*F. CCR-related risks*

- **Rollover Risk** is the amount by which expected positive exposure is understated when future transactions with a counterpart are expected to be conducted on an ongoing basis, but the additional exposure generated by those future transactions is not included in calculation of expected positive exposure.

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- **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.

## II. Scope of application

3. 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 annex are applicable to SFTs and OTC derivatives.

4. 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 payments or an exchange of a financial instrument (including commodities) against payment.
- The transactions are undertaken with an identified counterparty against which a unique probability of default can be determined<sup>47</sup>.

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

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

6. An exposure value of zero for counterparty credit risk can be attributed to derivative contracts or SFTs that are outstanding with a central counterparty (e.g. a clearing house). This does not apply to counterparty credit risk exposures from derivative transactions and SFTs that have been rejected by the central counterparty. Furthermore, an exposure value of zero can be attributed to banks' credit risk exposures to central counterparties that result from the derivative transactions, SFTs or spot transactions that the bank has outstanding with the central counterparty. This exemption extends in particular to credit exposures from clearing deposits and from collateral posted with the central counterparty. A central counterparty is an entity that

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<sup>47</sup> 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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interposes itself between counterparties to contracts traded within one or more financial markets, becoming the legal counterparty such that it is the buyer to every seller and the seller to every buyer. In order to qualify for the above exemptions, the central counterparty CCR exposures with all participants in its arrangements must be fully collateralized on a daily basis, thereby providing protection for the central counterparty's CCR exposures. Assets held by a central counterparty as a custodian on the bank's behalf would not be subject to a capital requirement for counterparty credit risk exposure.

7. Under the two methods identified in this annex, 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.

8. 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.

9. Under the two methods identified in this annex, 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.

### **III. Cross-product netting rules<sup>48</sup>**

10. 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 recognizing a Cross-Product Netting Arrangement.

#### **3.7.3. Legal Criteria**

11. 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.

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<sup>48</sup> 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.

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12. 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 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.

13. 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.

14. 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.

15. 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.

16. 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 chapter 3, or (ii) credit risk mitigation techniques in chapter 4.

17. The bank maintains all required documentation in its files.

#### 3.7.4. *Operational Criteria*

18. 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.

19. 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.

### **IV. Approval to adopt an internal modelling method to estimate EAD**

20. 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



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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 V of this annex and must apply the method to all of its exposures that are subject to counterparty credit risk, except for long settlement transactions.

21. 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.

22. 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.

23. Exposures or EAD arising from long settlement transactions can be determined using any of the two methods identified in this document regardless of the methods chosen for treating OTC derivatives and SFTs. In computing capital requirements for long settlement transactions banks that hold permission to use the internal ratings-based approach may opt to apply the risk weights under the standardised approach for credit risk on a permanent basis and irrespective to the materiality of such positions.

24. 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.

## **V. Internal Model Method: measuring exposure and minimum requirements**

### *A. Exposure amount or EAD under the internal model method*

25. CCR exposure or EAD is measured at the level of the netting set as defined in Sections I and III of this annex. 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 paragraphs 146 and chapter 8 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.

26. 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

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facility. In other words, the bank would be required to use an LGD that does not include collateral that is already included in EAD.

27. 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.

28. 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.

29. When using an internal model, exposure amount or EAD is calculated as the product of alpha times Effective EPE, as specified below:

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

30. 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  $t_1, t_2, t_3 \dots$ <sup>49</sup> Specifically, “Effective EE” is computed recursively as

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

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

31. 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.

32. Alpha ( $\alpha$ ) is set equal to 1.4.

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<sup>49</sup> 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.



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33. 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.

*B. Own estimates for alpha*

34. 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).

35. In the denominator, EPE must be used as if it were a fixed outstanding loan amount.

36. 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.

37. 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.

*C. Maturity*

38. 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 paragraph 320 is replaced with the following:

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

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where  $df_k$  is the risk-free discount factor for future time period  $t_k$  and the remaining symbols are defined above. Similar to the treatment under corporate exposures, M has a cap of five years<sup>50</sup>.

39. For netting sets in which all contracts have an original maturity of less than one year, the formula for effective maturity (M) in paragraph 320 is unchanged and a floor of one year applies, with the exception of short-term exposures as described in paragraphs 321 to 323.

#### *D. Margin agreements*

40. 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.

41. 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. The method is a simple and conservative approximation to Effective EPE and sets Effective EPE for a margined counterparty equal to the lesser of:

- The threshold, if positive, under the margin agreement plus an add-on that reflects the potential increase in exposure over the margin period of risk. The add-on is computed as the expected increase in the netting set's exposure beginning from current exposure of zero over the margin period of risk.<sup>51</sup> A supervisory floor of five business days for netting sets consisting only of repo-style transactions subject to daily remarking and daily mark-to-market, and 10 business days for all other netting sets is imposed on the margin period of risk used for this purpose;
- Effective EPE without a margin agreement.

#### *E. Model validation*

42. Because counterparty exposures are driven by movements in market variables, the validation of an EPE model is similar to the validation of a Value-at-Risk (VaR) model that is used to measure market risk. Therefore, in principle, the qualitative standards of the Market Risk Amendment for the use of VaR models should be carried over to EPE models. However, an EPE model has additional elements that require validation:

- Interest rates, foreign exchange rates, equity prices, commodities, and other market risk factors must be forecast over long time horizons for measuring counterparty exposure. The performance of the forecasting model for market risk factors must be validated over a long time horizon. In contrast, VaR for market risk is measured over a short time horizon (typically, one to ten days).

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<sup>50</sup> 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.

<sup>51</sup> In other words, the add-on equals EE at the end of the margin period of risk assuming current exposure of zero. Since no roll-off of transactions would be occurring as part of this EE calculation, there would be no difference between EE and Effective EE.

- The pricing models used to calculate counterparty exposure for a given scenario of future shocks to market risk factors must be tested as part of the model validation process. These pricing models may be different from those used to calculate VaR over a short horizon. Pricing models for options must account for the nonlinearity 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.
- 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 minimum threshold 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 guideline's rules for collateral.

43. Static, historical backtesting on representative counterparty portfolios must be part of the model validation process. At regular intervals as directed by its supervisor, a bank must conduct such backtesting on a number of representative counterparty portfolios (actual or hypothetical). These representative portfolios must be chosen based on their sensitivity to the material risk factors and correlations to which the bank is exposed.

44. Starting at a particular historical date, backtesting of an EPE model would use the internal model to forecast each portfolio's probability distribution of exposure at various time horizons. Using historical data on movements in market risk factors, backtesting then computes the actual exposures that would have occurred on each portfolio at each time horizon assuming no change in the portfolio's composition. These realised exposures would then be compared with the model's forecast distribution at various time horizons. The above must be repeated for several historical dates covering a wide range of market conditions (e.g. rising rates, falling rates, quiet markets, volatile markets). Significant differences between the realised exposures and the model's 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. Unlike the backtesting requirement for VaR models prescribed under the Market Risk Amendment, no particular statistical test is specified for backtesting of EPE models.

45. Under the internal model method, a measure that is more conservative than Effective EPE (e.g., a measure based on peak rather than average exposure) for every counterparty may be used in place of alpha times Effective EPE in equation (1) with the prior approval of the supervisor. The degree of relative conservatism will be assessed upon initial supervisory approval and subject to periodic validation.

46. Banks using an EPE model or a VaR model (as described in paragraphs 178 to 181) must meet the above validation requirements.

#### *F. Operational requirements for EPE models*

47. 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

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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.

### 3.7.5. *Qualifying standards on CCR Management*

48. The bank must satisfy its supervisor that, in addition to meeting the operational requirements identified in paragraphs 49 to 69 below, it adheres to sound practices for CCR management.

### 3.7.6. *Use test*

49. 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.

50. 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.

51. 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.

52. 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.<sup>52</sup> 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

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<sup>52</sup> 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>.

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exposure (PFE), based on the distribution of exposures generated by the same model to compute EPE.

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

54. 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.

#### 3.7.7. *Stress testing*

55. 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.

56. The bank must stress test its counterparty exposures including jointly stressing market and credit risk factors. Stress tests of counterparty risk must consider concentration risk (to a single counterparty or groups of counterparties), correlation risk across market and credit risk (for example, a counterparty for which a large market move would result in a large exposure, a material deterioration in credit quality, or both), and the risk that liquidating the counterparty's positions could move the market. Such stress tests must also consider the impact on the firm's own positions of such market moves and integrate that impact in its assessment of counterparty risk.

#### 3.7.8. *Wrong-way risk*

57. Banks must be aware of exposures that give rise to a greater degree of general wrong-way risk.

58. A bank is said to be exposed to "specific wrong-way risk" if future exposure to a specific counterparty is expected to be high when the counterparty's probability of default is also high. 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.

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### 3.7.9. *Integrity of Modelling Process*

59. 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.

60. 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.

61. The internal model must employ current market data to compute current exposures. When using historical data to estimate volatility and correlations, at least three years of historical data must be used and must be updated quarterly or more frequently if market conditions warrant. The data should cover a full range of economic conditions, such as a full business cycle. A unit independent from the business unit must validate the price supplied by the business unit. The data must be acquired independently of the lines of business, must be fed into the internal model in a timely and complete fashion, and maintained in a secure database subject to formal and periodic audit. Banks must also have a well-developed data integrity process to scrub the data of erroneous and/or anomalous observations. To the extent that the internal model relies on proxy market data, for example for new products where three years of historical data may not be available, internal policies must identify suitable proxies and the bank must demonstrate empirically that the proxy provides a conservative representation of the underlying risk under adverse market conditions. If the internal model includes the effect of collateral on changes in the market value of the netting set, the bank must have adequate historical data to model the volatility of the collateral

62. 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.

63. 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.

64. 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.<sup>53</sup>

65. 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.

66. 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.

67. 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 chapters 3 and 4, or the Cross-Product Netting Rules set forth in this annex.

68. 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 4.

## VII. Current Exposure Method

91. Banks that do not have approval to apply the internal models method may use the current exposure method as identified in paragraphs 186, 187 and 317. 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 Annex or chapter 4.

92. 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.

Add-on Factors					
Residual Maturity	Interest Rate	Foreign Exchange Rate and Gold	Equity	Precious Metals Except Gold	Other Commodities

<sup>53</sup> *Amendment to the Capital Accord to Incorporate Market Risk*, Basel Committee on banking Supervision (1996), Part B.1., "General Criteria."

<b>Add-on Factors</b>					
<b>Residual Maturity</b>	<b>Interest Rate</b>	<b>Foreign Exchange Rate and Gold</b>	<b>Equity</b>	<b>Precious Metals Except Gold</b>	<b>Other Commodities</b>
One year or less	0.0%	1.0%	6.0%	7.0%	10.0%
Over one year to five years	0.5%	5.0%	8.0%	7.0%	12.0%
Over five years	1.5%	7.5%	10.0%	8.0%	15.0%

<b>Trading book – single name credit derivative</b>	
<b>Reference asset</b>	<b>Add-on factor</b>
Qualifying	5%
Non-qualifying	10%

**Note:** See section 8.7.1 for the add-on factors for counterparty credit risk in basket transactions.

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

<b>Type of Contract</b>	<b>Notional Principal Amount</b> 1	<b>Positive Replacement Cost (MTM)</b> 2	<b>Add-On Factor %</b> 3	<b>Potential Credit Exposure</b> 1 x 3 = 4	<b>Credit Equivalent</b> 2 + 4 = 5	<b>Risk Weight %</b> 6	<b>Risk-Weighted Equivalent</b> 5 x 6 = 7
<b>Interest Rate</b>							
≤ 1 year			0.0			0	
			0.0			20	
			0.0			50	
			0.0			100	
			0.0			150	
> 1 year ≤ 5 years			0.5			0	
			0.5			20	
			0.5			50	
			0.5			100	
			0.5			150	
>5 years			1.5			0	
			1.5			20	
			1.5			50	
			1.5			100	
			1.5			150	
<b>Foreign Exchange Rate and Gold</b>							
≤ 1 year			1.0			0	
			1.0			20	
			1.0			50	
			1.0			100	
			1.0			150	
> 1 year ≤ 5 years			5.0			0	
			5.0			20	
			5.0			50	



Type of Contract	Notional Principal Amount 1	Positive Replacement Cost (MTM) 2	Add-On Factor % 3	Potential Credit Exposure 1 x 3 = 4	Credit Equivalent 2 + 4 = 5	Risk Weight % 6	Risk-Weighted Equivalent 5 x 6 = 7
			5.0 5.0			100 150	
> 5 years			7.5 7.5 7.5 7.5 7.5			0 20 50 100 150	
<b>Equity</b>							
≤ 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	
<b>Precious Metals Except Gold</b>							
≤ 1 year			7.0 7.0 7.0 7.0 7.0			0 20 50 100 150	
> 1 year ≤ 5 years			7.0 7.0 7.0 7.0 7.0			0 20 50 100 150	
> 5 years			8.0 8.0 8.0 8.0 8.0			0 20 50 100 150	
<b>Other Commodities</b>							
≤ 1 year			10.0 10.0 10.0 10.0 10.0			0 20 50 100 150	
> 1 year ≤ 5 years			12.0 12.0 12.0 12.0 12.0			0 20 50 100 150	

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

**Notes to the matrix and worksheet:**

- Instruments traded on exchanges may be excluded where they are subject to daily margining requirements.
- 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 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 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 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.

93. Banks can obtain capital relief for collateral as defined in paragraphs 146 and chapter 8. The methodology for the recognition of eligible collateral follows that of the applicable approach for credit risk.

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94. 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 exposure add-on factors set out in chapter 8.

95. To determine capital requirements for hedged banking book exposures, the treatment for credit derivatives in this guideline applies to qualifying credit derivative instruments.

96. Where a credit derivative is an  $n^{\text{th}}$ -to-default transaction (such as a first-to-default transaction), the treatment specified in chapter 8 applies.

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## Chapter 4 Credit Risk Mitigation

### *Standardized and IRB Banks*

This chapter contains an extract from the Basel II framework, *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version* (June 2006) that applies to Canadian institutions. The extract has been annotated to indicate OSFI's position on items of national discretion.

Certain paragraphs have been moved for ease of use.

#### **4.1. Standardised approach**

##### *4.1.1. Overarching issues*

###### **(i) Introduction**

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

110. Where these techniques meet the requirements for legal certainty as described in paragraph 117 and 118 below, the revised approach to CRM allows a wider range of credit risk mitigants to be recognised for regulatory capital purposes than is permitted under the 1988 Accord.

###### **(ii) General remarks**

111. The framework set out in this chapter is applicable to the banking book exposures in the standardised approach and the IRB approach.

112. The comprehensive approach for the treatment of collateral (see paragraphs 130 to 138 and 145 to 181) will also be applied to calculate the counterparty risk charges for OTC derivatives and repo-style transactions booked in the trading book.

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

#### **OSFI Notes**

This limit on the capital requirement applies to collateralized and guaranteed transactions. It does not apply to repo-style transactions under the comprehensive approach for which both sides of the transaction (collateral received and posted) have been taken into account in calculating the exposure amount.

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114. The effects of CRM will not be double counted. Therefore, no additional supervisory recognition of CRM for regulatory capital purposes will be granted on claims for which an issue-specific rating is used that already reflects that CRM. As stated in paragraph 100 of the section on the standardised approach, principal-only ratings will also not be allowed within the framework of CRM.

115. While the use of CRM techniques reduces or transfers credit risk, it simultaneously may increase other risks (residual risks). Residual risks include legal, operational, liquidity and market risks. Therefore, it is imperative that banks employ robust procedures and processes to control these risks, including strategy; consideration of the underlying credit; valuation; policies and procedures; systems; control of roll-off risks; and management of concentration risk arising from the bank's use of CRM techniques and its interaction with the bank's overall credit risk profile. Where these risks are not adequately controlled, supervisors may impose additional capital charges or take other supervisory actions as outlined in Pillar 2.

116. The Pillar 3 requirements must also be observed for banks to obtain capital relief in respect of any CRM techniques.

### **(iii) Legal certainty**

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

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

## **4.1.2. Overview of Credit Risk Mitigation Techniques<sup>54</sup>**

### **(i) Collateralised transactions**

119. A collateralised transaction is one in which:

- banks have a credit exposure or potential credit exposure; and
- that credit exposure or potential credit exposure is hedged in whole or in part by collateral posted by a counterparty<sup>55</sup> or by a third party on behalf of the counterparty.

120. Where banks take eligible financial collateral (e.g. cash or securities, more specifically defined in paragraphs 145 and 146 below), they are allowed to reduce their credit exposure to a

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<sup>54</sup> See Annex 10 for an overview of methodologies for the capital treatment of transactions secured by financial collateral under the standardised and IRB approaches.

<sup>55</sup> In this section “counterparty” is used to denote a party to whom a bank has an on- or off-balance sheet credit exposure or a potential credit exposure. That exposure may, for example, take the form of a loan of cash or securities (where the counterparty would traditionally be called the borrower), of securities posted as collateral, of a commitment or of exposure under an OTC derivatives contract.

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counterparty when calculating their capital requirements to take account of the risk mitigating effect of the collateral.

*Overall framework and minimum conditions*

121. Banks may opt for either the simple approach, which, similar to the 1988 Accord, substitutes the risk weighting of the collateral for the risk weighting of the counterparty for the collateralised portion of the exposure (generally subject to a 20% floor), or for the comprehensive approach, which allows fuller offset of collateral against exposures, by effectively reducing the exposure amount by the value ascribed to the collateral. Banks may operate under either, but not both, approaches in the banking book, but only under the comprehensive approach in the trading book. Partial collateralisation is recognised in both approaches. Mismatches in the maturity of the underlying exposure and the collateral will only be allowed under the comprehensive approach.

**OSFI Notes**

Institutions using the Standardized and FIRB Approaches may use either the simple approach or the comprehensive approach using supervisory haircuts. The use of own estimates of haircuts for financial collateral or repos, or VaR modelling for repos-type transactions is restricted to institutions that have received approval to use the AIRB Approach.

122. However, before capital relief will be granted in respect of any form of collateral, the standards set out below in paragraphs 123 to 126 must be met under either approach.

123. In addition to the general requirements for legal certainty set out in paragraphs 117 and 118, the legal mechanism by which collateral is pledged or transferred must ensure that the bank has the right to liquidate or take legal possession of it, in a timely manner, in the event of the default, insolvency or bankruptcy (or one or more otherwise-defined credit events set out in the transaction documentation) of the counterparty (and, where applicable, of the custodian holding the collateral). Furthermore banks must take all steps necessary to fulfil those requirements under the law applicable to the bank's interest in the collateral for obtaining and maintaining an enforceable security interest, e.g. by registering it with a registrar, or for exercising a right to net or set off in relation to title transfer collateral.

**OSFI Notes**

For property taken as collateral, institutions may use title insurance in place of a title search to achieve compliance with paragraph 123. OSFI expects institutions that rely on title insurance to reflect the risk of non-performance on these insurance contracts in their estimates of LGD if this risk is material.

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

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125. Banks must have clear and robust procedures for the timely liquidation of collateral to ensure that any legal conditions required for declaring the default of the counterparty and liquidating the collateral are observed, and that collateral can be liquidated promptly.

126. Where the collateral is held by a custodian, banks must take reasonable steps to ensure that the custodian segregates the collateral from its own assets.

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

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

#### **OSFI Notes**

Transactions where a bank acts as an agent and provides a guarantee to the customer should be treated as a direct credit substitute unless the transaction is covered by a master netting arrangement.

#### *The simple approach*

129. In the simple approach the risk weighting of the collateral instrument collateralising or partially collateralising the exposure is substituted for the risk weighting of the counterparty. Details of this framework are provided in paragraphs 182 to 185.

#### *The comprehensive approach*

130. In the comprehensive approach, when taking collateral, banks will need to calculate their adjusted exposure to a counterparty for capital adequacy purposes in order to take account of the effects of that collateral. Using haircuts, banks are required to adjust both the amount of the exposure to the counterparty and the value of any collateral received in support of that counterparty to take account of possible future fluctuations in the value of either,<sup>56</sup> occasioned by market movements. This will produce volatility adjusted amounts for both exposure and collateral. Unless either side of the transaction is cash, the volatility adjusted amount for the exposure will be higher than the exposure and for the collateral it will be lower.

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

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<sup>56</sup> Exposure amounts may vary where, for example, securities are being lent.

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132. Where the volatility-adjusted exposure amount is greater than the volatility-adjusted collateral amount (including any further adjustment for foreign exchange risk), banks shall calculate their risk-weighted assets as the difference between the two multiplied by the risk weight of the counterparty. The framework for performing these calculations is set out in paragraphs 147 to 150.

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

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

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

136. For certain types of repo-style transactions (broadly speaking government bond repos as defined in paragraphs 170 and 171) supervisors may allow banks using standard supervisory haircuts or own-estimate haircuts not to apply these in calculating the exposure amount after risk mitigation.

137. The effect of master netting agreements covering repo-style transactions can be recognised for the calculation of capital requirements subject to the conditions in paragraph 173.

138. As a further alternative to standard supervisory haircuts and own-estimate haircuts banks may use VaR models for calculating potential price volatility for repo-style transactions and other similar SFTs, as set out in paragraphs 178 to 181(i) below. Alternatively, subject to supervisory approval, they may also calculate, for these transactions, an expected positive exposure, as set forth in Annex 4 of this guideline.

## **(ii) On-balance sheet netting**

139. Where banks have legally enforceable netting arrangements for loans and deposits they may calculate capital requirements on the basis of net credit exposures subject to the conditions in paragraph 188.

## **(iii) Guarantees and credit derivatives**

140. Where guarantees or credit derivatives are direct, explicit, irrevocable and unconditional, and supervisors are satisfied that banks fulfil certain minimum operational conditions relating to



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risk management processes they may allow banks to take account of such credit protection in calculating capital requirements.

141. A range of guarantors and protection providers are recognised. As under the 1988 Accord, a substitution approach will be applied. Thus only guarantees issued by or protection provided by entities with a lower risk weight than the counterparty will lead to reduced capital charges since the protected portion of the counterparty exposure is assigned the risk weight of the guarantor or protection provider, whereas the uncovered portion retains the risk weight of the underlying counterparty.

142. Detailed operational requirements are given below in paragraphs 189 to 193.

**(iv) Maturity mismatch**

143. Where the residual maturity of the CRM is less than that of the underlying credit exposure a maturity mismatch occurs. Where there is a maturity mismatch and the CRM has an original maturity of less than one year, the CRM is not recognised for capital purposes. In other cases where there is a maturity mismatch, partial recognition is given to the CRM for regulatory capital purposes as detailed below in paragraphs 202 to 205. Under the simple approach for collateral maturity mismatches will not be allowed.

**(v) Miscellaneous**

144. Treatments for pools of credit risk mitigants and first- and second-to-default credit derivatives are given in paragraphs 206 to 210 below.

**4.1.3. Collateral**

**(i) Eligible financial collateral**

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

- 
- |     |   |
|-----|---|
| (a) | Cash (as well as certificates of deposit or comparable instruments issued by the lending bank) on deposit with the bank which is incurring the counterparty exposure. <sup>57, 58</sup> |
| (b) | Gold.   |
| (c) | Debt securities rated by a recognised external credit assessment institution where these are either:  |
|     | <ul style="list-style-type: none"><li>• at least BB- when issued by sovereigns or PSEs that are treated as sovereigns by the national supervisor; or</li></ul>                          |
- 

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<sup>57</sup> Cash funded credit linked notes issued by the bank against exposures in the banking book which fulfil the criteria for credit derivatives will be treated as cash collateralised transactions.

<sup>58</sup> When cash on deposit, certificates of deposit or comparable instruments issued by the lending bank are held as collateral at a third-party bank in a non-custodial arrangement, if they are openly pledged/assigned to the lending bank and if the pledge/assignment is unconditional and irrevocable, the exposure amount covered by the collateral (after any necessary haircuts for currency risk) will receive the risk weight of the third-party bank.

- 
- at least BBB- when issued by other entities (including banks and securities firms); or
  - at least A-3/P-3 for short-term debt instruments.
- 

(d) Debt securities not rated by a recognised external credit assessment institution where these are:

- issued by a bank; and
  - listed on a recognised exchange; and
  - classified as senior debt; and
  - all rated issues of the same seniority by the issuing bank must be rated at least BBB- or A-3/P-3 by a recognised external credit assessment institution; and
  - the bank holding the securities as collateral has no information to suggest that the issue justifies a rating below BBB- or A-3/P-3 (as applicable) and
  - the supervisor is sufficiently confident about the market liquidity of the security.
- 

(e) Equities (including convertible bonds) that are included in a main index.

(f) Undertakings for Collective Investments in Transferable Securities (UCITS) and mutual funds where:

- a price for the units is publicly quoted daily; and
  - the UCITS/mutual fund is limited to investing in the instruments listed in this paragraph.<sup>59</sup>
- 

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

- 
- (a) All of the instruments in paragraph 145;
  - (b) Equities (including convertible bonds) which are not included in a main index but which are listed on a recognised exchange;
  - (c) UCITS/mutual funds which include such equities.
- 

## (ii) The comprehensive approach

### *Calculation of capital requirement*

147. For a collateralised transaction, the exposure amount after risk mitigation is calculated as follows:

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<sup>59</sup> However, the use or potential use by a UCITS/mutual fund of derivative instruments solely to hedge investments listed in this paragraph and paragraph 146 shall not prevent units in that UCITS/mutual fund from being eligible financial collateral.

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

where:

$E^*$  = the exposure value after risk mitigation

$E$  = current value of the exposure

$H_e$  = haircut appropriate to the exposure

$C$  = the current value of the collateral received

$H_c$  = haircut appropriate to the collateral

$H_{fx}$  = haircut appropriate for currency mismatch between the collateral and exposure

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

149. The treatment for transactions where there is a mismatch between the maturity of the counterparty exposure and the collateral is given in paragraphs 202 to 205.

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

#### *Standard supervisory haircuts*

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

Issue rating for debt securities	Residual Maturity	Sovereigns <sup>60, 61</sup>	Other issuers <sup>62</sup>
AAA to AA-/A-1	≤ 1 year	0.5	1
	>1 year, ≤ 5 years	2	4
	> 5 years	4	8
A+ to BBB-/	≤ 1 year	1	2
	>1 year, ≤ 5 years	3	6
A-2/A-3/P-3 and unrated bank securities per para. 145(d)	> 5 years	6	12
BB+ to BB-	All	15	
Main index equities (including convertible bonds) and Gold		15	
Other equities (including convertible bonds) listed on a recognised exchange		25	
UCITS/Mutual funds		Highest haircut applicable to any security in which the fund can invest	
Cash in the same currency <sup>63</sup>		0	

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

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

*Adjustment for different holding periods and non daily mark-to-market or remargining*

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

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

Transaction type	Minimum holding period	Condition
Repo-style transaction	five business days	daily remargining
Other capital market transactions	ten business days	daily remargining

<sup>60</sup> Includes PSEs which are treated as sovereigns by the national supervisor.

<sup>61</sup> Multilateral development banks receiving a 0% risk weight will be treated as sovereigns.

<sup>62</sup> Includes PSEs which are not treated as sovereigns by the national supervisor.

<sup>63</sup> Eligible cash collateral specified in paragraph 145 (a).

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

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

where:

$H$  = haircut

$H_M$  = haircut under the minimum holding period

$T_M$  = minimum holding period for the type of transaction

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

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

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

$T_N$  = holding period used by the bank for deriving  $H_N$

$H_N$  = haircut based on the holding period  $T_N$

169. For example, for banks using the standard supervisory haircuts, the 10-business day haircuts provided in paragraph 151 will be the basis and this haircut will be scaled up or down depending on the type of transaction and the frequency of remargining or revaluation using the formula below:

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

where:

$H$  = haircut

$H_{10}$  = 10-business day standard supervisory haircut for instrument

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

$T_M$  = minimum holding period for the type of transaction

*Conditions for zero H*

170. For repo-style transactions where the following conditions are satisfied, and the counterparty is a *core market participant*, supervisors may choose not to apply the haircuts specified in the comprehensive approach and may instead apply a haircut of zero. This carve-out will not be available for banks using the modelling approaches as described in paragraphs 178 to 181(i).

- 
- (a) Both the exposure and the collateral are cash or a sovereign security or PSE security qualifying for a 0% risk weight in the standardised approach;<sup>64</sup>
- 
- (b) Both the exposure and the collateral are denominated in the same currency;
- 
- (c) Either the transaction is overnight or both the exposure and the collateral are marked-to-market daily and are subject to daily remargining;
- 
- (d) Following a counterparty's failure to remargin, the time that is required between the last mark-to-market before the failure to remargin and the liquidation<sup>65</sup> of the collateral is considered to be no more than four business days;
- 
- (e) The transaction is settled across a settlement system proven for that type of transaction;
- 
- (f) The documentation covering the agreement is standard market documentation for repo-style transactions in the securities concerned;
- 
- (g) The transaction is governed by documentation specifying that if the counterparty fails to satisfy an obligation to deliver cash or securities or to deliver margin or otherwise defaults, then the transaction is immediately terminable; and
- 
- (h) Upon any default event, regardless of whether the counterparty is insolvent or bankrupt, the bank has the unfettered, legally enforceable right to immediately seize and liquidate the collateral for its benefit.
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<sup>64</sup> Note that where a supervisor has designated domestic-currency claims on its sovereign or central bank to be eligible for a 0% risk weight in the standardised approach, such claims will satisfy this condition.

<sup>65</sup> This does not require the bank to always liquidate the collateral but rather to have the capability to do so within the given time frame.

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**OSFI Notes**

The carve-out applies for repos of Government of Canada securities and securities issued by Canadian provinces and territories subject to confirmation that the above criteria are met.

171. *Core market participants* may include, at the discretion of the national supervisor, the following entities:

- 
- (a) Sovereigns, central banks and PSEs;

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  - (b) Banks and securities firms;

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  - (c) Other financial companies (including insurance companies) eligible for a 20% risk weight in the standardised approach;

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  - (d) Regulated mutual funds that are subject to capital or leverage requirements;

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  - (e) Regulated pension funds; and

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  - (f) Recognised clearing organisations.

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**OSFI Notes**

OSFI recognises the entities listed above as “core market participants” for purposes of the carve-out.

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

**OSFI Notes**

Canadian banks may apply carve-outs permitted by other G-10 supervisors to repo-style transactions in securities issued by their domestic governments to business in those markets.

*Treatment of repo-style transactions covered under master netting agreements*

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

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

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

- 
- (a) All transactions are marked to market daily;<sup>66</sup> and
  - (b) The collateral instruments used in the transactions are recognised as eligible financial collateral in the banking book.
- 

175. The formula in paragraph 147 will be adapted to calculate the capital requirements for transactions with netting agreements.

176. For banks using the standard supervisory haircuts or own-estimate haircuts, the framework below will apply to take into account the impact of master netting agreements.

$$E^* = \max \{0, [(\sum(E) - \sum(C)) + \sum (E_s \times H_s) + \sum (E_{fx} \times H_{fx})]\}^{67}$$

where:

- $E^*$  = the exposure value after risk mitigation
- $E$  = current value of the exposure
- $C$  = the value of the collateral received
- $E_s$  = absolute value of the net position in a given security
- $H_s$  = haircut appropriate to  $E_s$

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<sup>66</sup> The holding period for the haircuts will depend as in other repo-style transactions on the frequency of margining.

<sup>67</sup> The starting point for this formula is the formula in paragraph 147 which can also be presented as the following:  
 $E^* = (E-C) + (E \times H_e) + (C \times H_c) + (C \times H_{fx})$ .



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Efx = absolute value of the net position in a currency different from the settlement currency

Hfx = haircut appropriate for currency mismatch

177. The intention here is to obtain a net exposure amount after netting of the exposures and collateral and have an add-on amount reflecting possible price changes for the securities involved in the transactions and for foreign exchange risk if any. The net long or short position of each security included in the netting agreement will be multiplied by the appropriate haircut. All other rules regarding the calculation of haircuts stated in paragraphs 147 to 172 equivalently apply for banks using bilateral netting agreements for repo-style transactions.

### **(iii) The simple approach**

#### *Minimum conditions*

182. For collateral to be recognised in the simple approach, the collateral must be pledged for at least the life of the exposure and it must be marked to market and revalued with a minimum frequency of six months. Those portions of claims collateralised by the market value of recognised collateral receive the risk weight applicable to the collateral instrument. The risk weight on the collateralised portion will be subject to a floor of 20% except under the conditions specified in paragraphs 183 to 185. The remainder of the claim should be assigned to the risk weight appropriate to the counterparty. A capital requirement will be applied to banks on either side of the collateralised transaction: for example, both repos and reverse repos will be subject to capital requirements.

#### *Exceptions to the risk weight floor*

183. Transactions which fulfil the criteria outlined in paragraph 170 and are with a core market participant, as defined in 171, receive a risk weight of 0%. If the counterparty to the transactions is not a core market participant the transaction should receive a risk weight of 10%.

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

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

- the collateral is cash on deposit as defined in paragraph 145 (a); or
- the collateral is in the form of sovereign/PSE securities eligible for a 0% risk weight, and its market value has been discounted by 20%.

### **(iv) Collateralised OTC derivatives transactions**

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

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

where:

RC = the replacement cost,

add-on = the amount for potential future exposure calculated under the 1988 Accord,

$C_A$  = the volatility adjusted collateral amount under the comprehensive approach prescribed in paragraphs 147 to 172, or zero if no eligible collateral is applied to the transaction, and

r = the risk weight of the counterparty.

187. When effective bilateral netting contracts are in place, RC will be the net replacement cost and the add-on will be  $A_{\text{Net}}$  as calculated under the 1988 Accord. The haircut for currency risk (Hfx) should be applied when there is a mismatch between the collateral currency and the settlement currency. Even in the case where there are more than two currencies involved in the exposure, collateral and settlement currency, a single haircut assuming a 10-business day holding period scaled up as necessary depending on the frequency of mark-to-market will be applied.

187 (j). As an alternative to the Current Exposure Method for the calculation of the counterparty credit risk charge, banks may also use (subject to supervisory approval) the Internal Model Method as set out in Annex 4 of this guideline.

#### 4.1.4. *On-balance sheet netting*

188. Where a bank,

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

it may use the net exposure of loans and deposits as the basis for its capital adequacy calculation in accordance with the formula in paragraph 147. Assets (loans) are treated as exposure and liabilities (deposits) as collateral. The haircuts will be zero except when a currency mismatch exists. A 10-business day holding period will apply when daily mark-to-market is conducted and all the requirements contained in paragraphs 151, 169, and 202 to 205 will apply.

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#### 4.1.5. *Guarantees and credit derivatives*

##### (i) **Operational requirements**

###### *Operational requirements common to guarantees and credit derivatives*

189. A guarantee (counter-guarantee) or credit derivative must represent a direct claim on the protection provider and must be explicitly referenced to specific exposures or a pool of exposures, so that the extent of the cover is clearly defined and incontrovertible. Other than non-payment by a protection purchaser of money due in respect of the credit protection contract it must be irrevocable; there must be no clause in the contract that would allow the protection provider unilaterally to cancel the credit cover or that would increase the effective cost of cover as a result of deteriorating credit quality in the hedged exposure.<sup>68</sup> It must also be unconditional; there should be no clause in the protection contract outside the direct control of the bank that could prevent the protection provider from being obliged to pay out in a timely manner in the event that the original counterparty fails to make the payment(s) due.

###### *Additional operational requirements for guarantees*

190. In addition to the legal certainty requirements in paragraphs 117 and 118 above, in order for a guarantee to be recognised, the following conditions must be satisfied:

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

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  - (b) The guarantee is an explicitly documented obligation assumed by the guarantor.

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  - (c) Except as noted in the following sentence, the guarantee covers all types of payments the underlying obligor is expected to make under the documentation governing the transaction, for example notional amount, margin payments etc. Where a guarantee covers payment of principal only, interests and other uncovered payments should be treated as an unsecured amount in accordance with paragraph 198.
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<sup>68</sup> Note that the irrevocability condition does not require that the credit protection and the exposure be maturity matched; rather that the maturity agreed *ex ante* may not be reduced *ex post* by the protection provider. Paragraph 203 sets forth the treatment of call options in determining remaining maturity for credit protection.

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*Additional operational requirements for credit derivatives*

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

- 
- (a) The credit events specified by the contracting parties must at a minimum cover:
- failure to pay the amounts due under terms of the underlying obligation that are in effect at the time of such failure (with a grace period that is closely in line with the grace period in the underlying obligation);
  - bankruptcy, insolvency or inability of the obligor to pay its debts, or its failure or admission in writing of its inability generally to pay its debts as they become due, and analogous events; and
  - restructuring of the underlying obligation involving forgiveness or postponement of principal, interest or fees that results in a credit loss event (i.e. charge-off, specific provision or other similar debit to the profit and loss account). When restructuring is not specified as a credit event, refer to paragraph 192.
- 
- (b) If the credit derivative covers obligations that do not include the underlying obligation, section (g) below governs whether the asset mismatch is permissible.
- 
- (c) The credit derivative shall not terminate prior to expiration of any grace period required for a default on the underlying obligation to occur as a result of a failure to pay, subject to the provisions of paragraph 203.
- 
- (d) Credit derivatives allowing for cash settlement are recognised for capital purposes insofar as a robust valuation process is in place in order to estimate loss reliably. There must be a clearly specified period for obtaining post-credit-event valuations of the underlying obligation. If the reference obligation specified in the credit derivative for purposes of cash settlement is different than the underlying obligation, section (g) below governs whether the asset mismatch is permissible.
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- (e) If the protection purchaser's right/ability to transfer the underlying obligation to the protection provider is required for settlement, the terms of the underlying obligation must provide that any required consent to such transfer may not be unreasonably withheld.
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- (f) The identity of the parties responsible for determining whether a credit event has occurred must be clearly defined. This determination must not be the sole responsibility of the protection seller. The protection buyer must have the right/ability to inform the protection provider of the occurrence of a credit event.
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- (g) A mismatch between the underlying obligation and the reference obligation under the credit derivative (i.e. the obligation used for purposes of determining cash settlement value or the deliverable obligation) is permissible if (1) the reference obligation ranks *pari passu* with or is junior to the underlying obligation, and (2) the underlying obligation and reference obligation share the same obligor (i.e. the same legal entity) and legally enforceable cross-default or cross-acceleration clauses are in place.
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- (h) A mismatch between the underlying obligation and the obligation used for purposes of determining whether a credit event has occurred is permissible if (1) the latter obligation ranks pari passu with or is junior to the underlying obligation, and (2) the underlying obligation and reference obligation share the same obligor (i.e. the same legal entity) and legally enforceable cross-default or cross-acceleration clauses are in place.
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192. When the restructuring of the underlying obligation is not covered by the credit derivative, but the other requirements in paragraph 191 are met, partial recognition of the credit derivative will be allowed. If the amount of the credit derivative is less than or equal to the amount of the underlying obligation, 60% of the amount of the hedge can be recognised as covered. If the amount of the credit derivative is larger than that of the underlying obligation, then the amount of eligible hedge is capped at 60% of the amount of the underlying obligation.<sup>69</sup>

193. Only credit default swaps and total return swaps that provide credit protection equivalent to guarantees will be eligible for recognition. The following exception applies. Where a bank buys credit protection through a total return swap and records the net payments received on the swap as net income, but does not record offsetting deterioration in the value of the asset that is protected (either through reductions in fair value or by an addition to reserves), the credit protection will not be recognised. The treatment of first-to-default and second-to-default products is covered separately in paragraphs 207 to 210.

194. Other types of credit derivatives will not be eligible for recognition at this time.<sup>70</sup>

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

195. Credit protection given by the following entities will be recognised:

- sovereign entities<sup>71</sup>, PSEs, banks<sup>72</sup> and securities firms with a lower risk weight than the counterparty;
- other entities rated A- or better. This would include credit protection provided by parent, subsidiary and affiliate companies when they have a lower risk weight than the obligor.

**OSFI Notes**

An institution may not reduce the risk weight of an exposure to a third party because of a guarantee or credit protection provided by a related party (parent, subsidiary or affiliate) of the institution. This treatment follows the principle that guarantees within a corporate group are not

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<sup>69</sup> The 60% recognition factor is provided as an interim treatment, which the Committee intends to refine prior to implementation after considering additional data.

<sup>70</sup> Cash funded credit linked notes issued by the bank against exposures in the banking book which fulfil the criteria for credit derivatives will be treated as cash collateralised transactions.

<sup>71</sup> This includes the Bank for International Settlements, the International Monetary Fund, the European Central Bank and the European Community, as well as those MDBs referred to in Chapter 3.

<sup>72</sup> This includes other MDBs.

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a substitute for capital in the regulated Canadian institution. An exception is made for self-liquidating trade-related transactions that have a tenure of 360 days or less, are market-driven and are not structured to avoid the requirements of OSFI guidelines. The requirement that the transaction be "market-driven" necessitates that the guarantee or letter of credit is requested and paid for by the customer and/or that the market requires the guarantee in the normal course.

**(iii) Risk weights**

196. The protected portion is assigned the risk weight of the protection provider. The uncovered portion of the exposure is assigned the risk weight of the underlying counterparty.

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

*Proportional cover*

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

*Tranched cover*

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

**(iv) Currency mismatches**

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

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

where:

G = nominal amount of the credit protection

$H_{FX}$  = haircut appropriate for currency mismatch between the credit protection and underlying obligation.

The appropriate haircut based on a 10-business day holding period (assuming daily marking-to-market) will be applied. If a bank uses the supervisory haircuts it will be 8%. The haircuts must

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be scaled up using the square root of time formula, depending on the frequency of revaluation of the credit protection as described in paragraph 168.

### **OSFI Notes**

A currency mismatch occurs when the currency a bank receives differs from the currency of the collateral held. A currency mismatch always occurs when a bank receives payments in more than one currency under a single contract.

#### **(v) Sovereign guarantees and counter-guarantees**

201. As specified in paragraph 54, a lower risk weight may be applied at national discretion to a bank's exposures to the sovereign (or central bank) where the bank is incorporated and where the exposure is denominated in domestic currency and funded in that currency. National authorities may extend this treatment to portions of claims guaranteed by the sovereign (or central bank), where the guarantee is denominated in the domestic currency and the exposure is funded in that currency. A claim may be covered by a guarantee that is indirectly counter-guaranteed by a sovereign. Such a claim may be treated as covered by a sovereign guarantee provided that:

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- (a) the sovereign counter-guarantee covers all credit risk elements of the claim;

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  - (b) both the original guarantee and the counter-guarantee meet all operational requirements for guarantees, except that the counter-guarantee need not be direct and explicit to the original claim; and

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  - (c) the supervisor is satisfied that the cover is robust and that no historical evidence suggests that the coverage of the counter-guarantee is less than effectively equivalent to that of a direct sovereign guarantee.
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#### **4.1.6. Maturity mismatches**

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

##### **(i) Definition of maturity**

203. The maturity of the underlying exposure and the maturity of the hedge should both be defined conservatively. The effective maturity of the underlying should be gauged as the longest possible remaining time before the counterparty is scheduled to fulfil its obligation, taking into account any applicable grace period. For the hedge, embedded options which may reduce the term of the hedge should be taken into account so that the shortest possible effective maturity is used. Where a call is at the discretion of the protection seller, the maturity will always be at the first call date. If the call is at the discretion of the protection buying bank but the terms of the



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arrangement at origination of the hedge contain a positive incentive for the bank to call the transaction before contractual maturity, the remaining time to the first call date will be deemed to be the effective maturity. For example, where there is a step-up in cost in conjunction with a call feature or where the effective cost of cover increases over time even if credit quality remains the same or increases, the effective maturity will be the remaining time to the first call.

**(ii) Risk weights for maturity mismatches**

204. As outlined in paragraph 143, hedges with maturity mismatches are only recognised when their original maturities are greater than or equal to one year. As a result, the maturity of hedges for exposures with original maturities of less than one year must be matched to be recognised. In all cases, hedges with maturity mismatches will no longer be recognised when they have a residual maturity of three months or less.

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

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

Where:

Pa = value of the credit protection adjusted for maturity mismatch

P = credit protection (e.g. collateral amount, guarantee amount) adjusted for any haircuts

t = min (T, residual maturity of the credit protection arrangement) expressed in years

T = min (5, residual maturity of the exposure) expressed in years

**4.1.7. Other items related to the treatment of CRM techniques**

**(i) Treatment of pools of CRM techniques**

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

**(ii) First-to-default credit derivatives**

207. There are cases where a bank obtains credit protection for a basket of reference names and where the first default among the reference names triggers the credit protection and the credit event also terminates the contract. In this case, the bank may recognise regulatory capital



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relief for the asset within the basket with the lowest risk-weighted amount, but only if the notional amount is less than or equal to the notional amount of the credit derivative.

208. With regard to the bank providing credit protection through such an instrument, if the product has an external credit assessment from an eligible credit assessment institution, the risk weight in paragraph 567 applied to securitisation tranches will be applied. If the product is not rated by an eligible external credit assessment institution, the risk weights of the assets included in the basket will be aggregated up to a maximum of 1250% and multiplied by the nominal amount of the protection provided by the credit derivative to obtain the risk-weighted asset amount.

### **(iii) Second-to-default credit derivatives**

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

210. For banks providing credit protection through such a product, the capital treatment is the same as in paragraph 208 above with one exception. The exception is that, in aggregating the risk weights, the asset with the lowest risk weighted amount can be excluded from the calculation.

## **4.2. Internal Ratings Based Approaches**

### **4.2.1. *Own estimates for haircuts***

154. Supervisors may permit banks to calculate haircuts using their own internal estimates of market price volatility and foreign exchange volatility. Permission to do so will be conditional on the satisfaction of minimum qualitative and quantitative standards stated in paragraphs 156 to 165. When debt securities are rated BBB-/A-3 or higher, supervisors may allow banks to calculate a volatility estimate for each category of security. In determining relevant categories, institutions must take into account (a) the type of issuer of the security, (b) its rating, (c) its residual maturity, and (d) its modified duration. Volatility estimates must be representative of the securities actually included in the category for that bank. For debt securities rated below BBB-/A-3 or for equities eligible as collateral (lightly shaded boxes in the above table), the haircuts must be calculated for each individual security.

155. Banks must estimate the volatility of the collateral instrument or foreign exchange mismatch individually: estimated volatilities for each transaction must not take into account the correlations between unsecured exposure, collateral and exchange rates (see paragraphs 202 to 205 for the approach to maturity mismatches).

### **4.2.2. *Quantitative criteria***

156. In calculating the haircuts, a 99<sup>th</sup> percentile, one-tailed confidence interval is to be used.

157. The minimum holding period will be dependent on the type of transaction and the frequency of remargining or marking to market. The minimum holding periods for different types

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of transactions are presented in paragraph 167. Banks may use haircut numbers calculated according to shorter holding periods, scaled up to the appropriate holding period by the square root of time formula.

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

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

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

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

#### 4.2.3. *Qualitative criteria*

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

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

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

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

- the integration of risk measures into daily risk management;
- the validation of any significant change in the risk measurement process;
- 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; and
- the accuracy and appropriateness of volatility assumptions.

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#### 4.2.4. *Use of models*

178. As an alternative to the use of standard or own-estimate haircuts, banks may be permitted to use a VaR models approach to reflect the price volatility of the exposure and collateral for repo-style transactions, taking into account correlation effects between security positions. This approach would apply to repo-style transactions covered by bilateral netting agreements on a counterparty-by-counterparty basis. At the discretion of the national supervisor, firms are also eligible to use the VaR model approach for margin lending transactions<sup>73</sup>, if the transactions are covered under a bilateral master netting agreement that meets the requirements of paragraphs 173 and 174. The VaR models approach is available to banks that have received supervisory recognition for an internal market risk model under the Market Risk Amendment. Banks which have not received supervisory recognition for use of models under the Market Risk Amendment can separately apply for supervisory recognition to use their internal VaR models for calculation of potential price volatility for repo-style transactions. Internal models will only be accepted when a bank can prove the quality of its model to the supervisor through the backtesting of its output using one year of historical data. Banks must meet the model validation requirement of paragraph 43 of Annex 4 to use VaR for repo-style and other SFTs. In addition, other transactions similar to repo-style transactions (like prime brokerage) and that meet the requirements for repo-style transactions, are also eligible to use the VaR models approach provided the model used meets the operational requirements set forth in Section V.F of Annex 4.

#### **OSFI Notes**

OSFI does not intend to conduct full VaR reviews and application processes for AIRB banks seeking to use internal models for secured lending and borrowing and repo-style transactions. An AIRB bank may use a VaR model for IRB portfolios provided that this model has already been approved for market risk. However OSFI may review the changes to the parameters required under the Basel II framework (i.e. holding periods).

179. The quantitative and qualitative criteria for recognition of internal market risk models for repo-style transactions and other similar transactions are in principle the same as under the Market Risk Amendment. With regard to the holding period, the minimum will be 5-business days for repo-style transactions, rather than the 10-business days under the Market Risk Amendment. For other transactions eligible for the VaR models approach, the 10-business day holding period will be retained. The minimum holding period should be adjusted upwards for market instruments where such a holding period would be inappropriate given the liquidity of the instrument concerned.

181. The calculation of the exposure  $E^*$  for banks using their internal model will be the following:

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

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<sup>73</sup> Restricted to institutions that have received approval to use the AIRB approach.

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

181 (i) Subject to supervisory approval, instead of using the VaR approach, banks may also calculate an expected positive exposure for repo-style and other similar SFTs, in accordance with the Internal Model Method set out in Annex 4 of this guideline.

#### 4.2.5. *Rules for Corporate, Sovereign and Bank Exposures*

##### *Collateral under the foundation approach*

289. In addition to the eligible financial collateral recognised in the standardised approach, under the foundation IRB approach some other forms of collateral, known as eligible IRB collateral, are also recognised. These include receivables, specified commercial and residential real estate (CRE/RRE), and other collateral, where they meet the minimum requirements set out in paragraphs 509 to 524.<sup>74</sup> For eligible financial collateral, the requirements are identical to the operational standards as set out in chapter 4 beginning with paragraph 111.

##### *Methodology for recognition of eligible financial collateral under the foundation approach*

290. The methodology for the recognition of eligible financial collateral closely follows that outlined in the comprehensive approach to collateral in the standardised approach in paragraphs 147 to 181. The simple approach to collateral presented in the standardised approach will not be available to banks applying the IRB approach.

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

- LGD is that of the senior unsecured exposure before recognition of collateral (45%);
- E is the current value of the exposure (i.e. cash lent or securities lent or posted);
- E\* is the exposure value after risk mitigation as determined in paragraphs 147 to 150 of the standardised approach. This concept is only used to calculate LGD\*. Banks must continue to calculate EAD without taking into account the presence of any collateral, unless otherwise specified.

$$\text{LGD}^* = \text{LGD} \times (\text{E}^* / \text{E})$$

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<sup>74</sup> The Committee, however, recognises that, in exceptional circumstances for well-developed and long-established markets, mortgages on office and/or multi-purpose commercial premises and/or multi-tenanted commercial premises may have the potential to receive alternative recognition as collateral in the corporate portfolio. The LGD applied to the collateralised portion of such exposures, subject to the limitations set out in paragraphs 119 to 181 (i) of the standardised approach, will be set at 35%. The LGD applied to the remaining portion of this exposure will be set at 45%. In order to ensure consistency with the capital charges in the standardised approach (while providing a small capital incentive in the IRB approach relative to the standardised approach), supervisors may apply a cap on the capital charge associated with such exposures so as to achieve comparable treatment in both approaches.

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292. Banks that qualify for the foundation IRB approach may calculate  $E^*$  using any of the ways specified under the comprehensive approach for collateralised transactions under the standardised approach.

293. Where repo-style transactions are subject to a master netting agreement, a bank may choose not to recognise the netting effects in calculating capital. Banks that want to recognise the effect of master netting agreements on such transactions for capital purposes must satisfy the criteria provided in paragraph 173 and 174 of the standardised approach. The bank must calculate  $E^*$  in accordance with paragraphs 176 and 177 or 178 to 181 and equate this to EAD. The impact of collateral on these transactions may not be reflected through an adjustment to LGD.

*Carve out from the comprehensive approach*

294. As in the standardised approach, for transactions where the conditions in paragraph 170 are met, and in addition, the counterparty is a core market participant as specified in paragraph 171, supervisors may choose not to apply the haircuts specified under the comprehensive approach, but instead to apply a zero H.

*Methodology for recognition of eligible IRB collateral*

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

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

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

### Minimum LGD for secured portion of senior exposures

	Minimum LGD	Required minimum collateralisation level of the exposure (C*)	Required level of over-collateralisation for full LGD recognition (C**)
Eligible Financial collateral	0%	0%	n.a.
Receivables	35%	0%	125%
CRE/RRE	35%	30%	140%
Other collateral <sup>75</sup>	40%	30%	140%

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

#### *Methodology for the treatment of pools of collateral*

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

- In the case where a bank has obtained multiple forms of CRM, it will be required to subdivide the adjusted value of the exposure (after the haircut for eligible financial collateral) into portions each covered by only one CRM type. That is, the bank must divide the exposure into the portion covered by eligible financial collateral, the portion covered by receivables, the portion covered by CRE/RRE collateral, a portion covered by other collateral, and an unsecured portion, where relevant.
- Where the ratio of the sum of the value of CRE/RRE and other collateral to the reduced exposure (after recognising the effect of eligible financial collateral and receivables collateral) is below the associated threshold level (i.e. the minimum degree of collateralisation of the exposure), the exposure would receive the appropriate unsecured LGD value of 45%.
- The risk-weighted assets for each fully secured portion of exposure must be calculated separately.

<sup>75</sup> Other collateral excludes physical assets acquired by the bank as a result of a loan default.

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### *LGD under the advanced approach*

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

298. The minimum requirements for the derivation of LGD estimates are outlined in paragraphs 468 to 473.

### *Treatment of certain repo-style transactions*

299. Banks that want to recognise the effects of master netting agreements on repo-style transactions for capital purposes must apply the methodology outlined in paragraph 293 for determining E\* for use as the EAD. For banks using the advanced approach, own LGD estimates would be permitted for the unsecured equivalent amount (E\*).

### *Treatment of guarantees and credit derivatives*

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

301. Under either approach, CRM in the form of guarantees and credit derivatives must not reflect the effect of double default (see paragraph 482). As such, to the extent that the CRM is recognised by the bank, the adjusted risk weight will not be less than that of a comparable direct exposure to the protection provider. Consistent with the standardised approach, banks may choose not to recognise credit protection if doing so would result in a higher capital requirement.

### *Recognition under the foundation approach*

302. For banks using the foundation approach for LGD, the approach to guarantees and credit derivatives closely follows the treatment under the standardised approach as specified in paragraphs 189 to 201. The range of eligible guarantors is the same as under the standardised approach except that companies that are internally rated and associated with a PD equivalent to A- or better may also be recognised under the foundation approach. To receive recognition, the requirements outlined in paragraphs 189 to 194 must be met.

303. Eligible guarantees from eligible guarantors will be recognised as follows:

- For the covered portion of the exposure, a risk weight is derived by taking:
  - the risk-weight function appropriate to the type of guarantor, and
  - the PD appropriate to the guarantor's borrower grade, or some grade between the underlying obligor and the guarantor's borrower grade if the bank deems a full substitution treatment not to be warranted.



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- The bank may replace the LGD of the underlying transaction with the LGD applicable to the guarantee taking into account seniority and any collateralisation of a guaranteed commitment.

### **OSFI Notes**

Although the PD component may be adjusted to lie somewhere between those of the guarantor and the obligor if the guarantor's PD is not appropriate, note that LGD may only be substituted and may not be adjusted.

Paragraph 301 establishes a floor on the recognition of a guarantee. Therefore, the PD and LGD used for the covered portion of an exposure under the foundation approach must not result in a risk weight that is lower than that of a comparable direct exposure to the guarantor. While substituting both the PD and LGD of the guarantor for those of the borrower will result in a risk weight equal to that of a direct exposure to the guarantor, replacing or adjusting only one of these components could result in a risk weight that is lower. Paragraph 303 notwithstanding, institutions are not permitted to combine a risk component of the guarantor with a component of the underlying obligation in the risk weight formula if doing so results in a risk weight lower than that of a comparable direct exposure to the guarantor.

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

305. Where partial coverage exists, or where there is a currency mismatch between the underlying obligation and the credit protection, it is necessary to split the exposure into a covered and an uncovered amount. The treatment in the foundation approach follows that outlined in the standardised approach in paragraphs 198 to 200, and depends upon whether the cover is proportional or tranching.

#### *Recognition under the advanced approach*

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

### **OSFI Notes**

Under all circumstances, with the exception of transactions qualifying for double default treatment, the risk weight of a guaranteed exposure cannot be lower than that of a comparable direct claim on the guarantor. This assumes that any claim on the guarantor will be net of any recovery from the collateral pledged by the borrower, and reflects the Basel Committee's explanation of why it prohibits the recognition of double recovery in the double default framework.



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In determining the risk weight for a comparable direct exposure, banks should take into account both the seniority and the exposure at default of the direct exposure.

When an adjustment is made to PD, the risk weight function used for the guaranteed exposure should be that of the protection provider. However, when an adjustment is made to LGD the risk weight function used must be the one applicable to the original exposure.

307. A bank relying on own-estimates of LGD has the option to adopt the treatment outlined above for banks under the foundation IRB approach (paragraphs 302 to 305), or to make an adjustment to its LGD estimate of the exposure to reflect the presence of the guarantee or credit derivative. Under this option, there are no limits to the range of eligible guarantors although the set of minimum requirements provided in paragraphs 483 and 484 concerning the type of guarantee must be satisfied. For credit derivatives, the requirements of paragraphs 488 and 489 must be satisfied.<sup>76</sup>

*Operational requirements for recognition of double default*

307 (i) A bank using an IRB approach has the option of using the substitution approach in determining the appropriate capital requirement for an exposure. However, for exposures hedged by one of the following instruments the double default framework according to paragraphs 284 (i) to 284 (iii) may be applied subject to the additional operational requirements set out in paragraph 307 (ii). A bank may decide separately for each eligible exposure to apply either the double default framework or the substitution approach.

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- (a) Single-name, unfunded credit derivatives (e.g. credit default swaps) or single-name guarantees.

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  - (b) First-to-default basket products — the double default treatment will be applied to the asset within the basket with the lowest risk-weighted amount.

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  - (c)  $n^{\text{th}}$ -to-default basket products — the protection obtained is only eligible for consideration under the double default framework if eligible  $(n-1)^{\text{th}}$  default protection has also been obtained or where  $(n-1)$  of the assets within the basket have already defaulted.
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307 (ii) The double default framework is only applicable where the following conditions are met.

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- (a) The risk weight that is associated with the exposure prior to the application of the framework does not already factor in any aspect of the credit protection.
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<sup>76</sup> When credit derivatives do not cover the restructuring of the underlying obligation, the partial recognition set out in paragraph 192 applies.

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- (b) The entity selling credit protection is a bank<sup>77</sup>, investment firm or insurance company (but only those that are in the business of providing credit protection, including mono-lines, re-insurers, and non-sovereign credit export agencies<sup>78</sup>), referred to as a financial firm, that:
- is regulated in a manner broadly equivalent to that in this Framework (where there is appropriate supervisory oversight and transparency/market discipline), or externally rated as at least investment grade by a credit rating agency deemed suitable for this purpose by supervisors;
  - had an internal rating with a PD equivalent to or lower than that associated with an external A– rating at the time the credit protection for an exposure was first provided or for any period of time thereafter; and
  - has an internal rating with a PD equivalent to or lower than that associated with an external investment-grade rating.
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- (c) The underlying obligation is:
- a corporate exposure as defined in paragraphs 218 to 228 (excluding specialised lending exposures for which the supervisory slotting criteria approach described in paragraphs 275 to 282 is being used); or
  - a claim on a PSE that is not a sovereign exposure as defined in paragraph 229; or
  - a loan extended to a small business and classified as a retail exposure as defined in paragraph 231.
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- (d) The underlying obligor is **not**:
- a financial firm as defined in (b); or
  - a member of the same group as the protection provider.
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- (e) The credit protection meets the minimum operational requirements for such instruments as outlined in paragraphs 189 to 193.
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- (f) In keeping with paragraph 190 for guarantees, for any recognition of double default effects for both guarantees and credit derivatives a bank must have the right and expectation to receive payment from the credit protection provider without having to take legal action in order to pursue the counterparty for payment. To the extent possible, a bank should take steps to satisfy itself that the protection provider is willing to pay promptly if a credit event should occur.
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- (g) The purchased credit protection absorbs all credit losses incurred on the hedged portion of an exposure that arise due to the credit events outlined in the contract.
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<sup>77</sup> This does not include PSEs and MDBs, even though claims on these may be treated as claims on banks according to paragraph 230.

<sup>78</sup> By non-sovereign it is meant that credit protection in question does not benefit from any explicit sovereign counter-guarantee.

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- (h) If the payout structure provides for physical settlement, then there must be legal certainty with respect to the deliverability of a loan, bond, or contingent liability. If a bank intends to deliver an obligation other than the underlying exposure, it must ensure that the deliverable obligation is sufficiently liquid so that the bank would have the ability to purchase it for delivery in accordance with the contract.
- 
- (i) The terms and conditions of credit protection arrangements must be legally confirmed in writing by both the credit protection provider and the bank.
- 
- (j) In the case of protection against dilution risk, the seller of purchased receivables must not be a member of the same group as the protection provider.
- 
- (k) There is no excessive correlation between the creditworthiness of a protection provider and the obligor of the underlying exposure due to their performance being dependent on common factors beyond the systematic risk factor. The bank has a process to detect such excessive correlation. An example of a situation in which such excessive correlation would arise is when a protection provider guarantees the debt of a supplier of goods or services and the supplier derives a high proportion of its income or revenue from the protection provider.
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#### *Exposure at default (EAD)*

308. The following sections apply to both on and off-balance sheet positions. All exposures are measured gross of specific provisions or partial write-offs. The EAD on drawn amounts should not be less than the sum of (i) the amount by which a bank's regulatory capital would be reduced if the exposure were written-off fully, and (ii) any specific provisions and partial write-offs. When the difference between the instrument's EAD and the sum of (i) and (ii) is positive, this amount is termed a discount. The calculation of risk-weighted assets is independent of any discounts. Under the limited circumstances described in paragraph 380, discounts may be included in the measurement of total eligible provisions for purposes of the EL-provision calculation set out in section 5.7.

#### *Exposure measurement for on-balance sheet items*

309. On-balance sheet netting of loans and deposits will be recognised subject to the same conditions as under the standardised approach (see paragraph 188). Where currency or maturity mismatched on-balance sheet netting exists, the treatment follows the standardised approach, as set out in paragraphs 200 and 202 to 205.

#### **4.2.6. Rules for retail exposures**

##### *Recognition of guarantees and credit derivatives*

332. Banks may reflect the risk-reducing effects of guarantees and credit derivatives, either in support of an individual obligation or a pool of exposures, through an adjustment of either the PD or LGD estimate, subject to the minimum requirements in paragraphs 480 to 489. Whether

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adjustments are done through PD or LGD, they must be done in a consistent manner for a given guarantee or credit derivative type.

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

335. On-balance sheet netting of loans and deposits of a bank to or from a retail customer will be permitted subject to the same conditions outlined in paragraph 188 of the standardised approach. For retail off-balance sheet items, banks must use their own estimates of CCFs provided the minimum requirements in paragraphs 474 to 477 and 479 are satisfied.

#### 4.2.7. *Rules for purchased receivables*

373. Credit risk mitigants will be recognised generally using the same type of framework as set forth in paragraphs 300 to 307.<sup>79</sup> In particular, a guarantee provided by the seller or a third party will be treated using the existing IRB rules for guarantees, regardless of whether the guarantee covers default risk, dilution risk, or both.

- If the guarantee covers both the pool's default risk *and* dilution risk, the bank will substitute the risk weight for an exposure to the guarantor in place of the pool's total risk weight for default and dilution risk.
- If the guarantee covers only default risk or dilution risk, but not both, the bank will substitute the risk weight for an exposure to the guarantor in place of the pool's risk weight for the corresponding risk component (default or dilution). The capital requirement for the other component will then be added.
- If a guarantee covers only a portion of the default and/or dilution risk, the uncovered portion of the default and/or dilution risk will be treated as per the existing CRM rules for proportional or tranching coverage (i.e. the risk weights of the uncovered risk components will be added to the risk weights of the covered risk components).

#### 4.2.8. *Risk quantification*

*Minimum requirements for assessing effect of guarantees and credit derivatives. Standards for corporate, sovereign, and bank exposures where own estimates of LGD are used and standards for retail exposures.*

##### *Guarantees*

480. When a bank uses its own estimates of LGD, it may reflect the risk-mitigating effect of guarantees through an adjustment to PD or LGD estimates. The option to adjust LGDs is

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<sup>79</sup> At national supervisory discretion, banks may recognise guarantors that are internally rated and associated with a PD equivalent to less than A- under the foundation IRB approach for purposes of determining capital requirements for dilution risk.

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available only to those banks that have been approved to use their own internal estimates of LGD. For retail exposures, where guarantees exist, either in support of an individual obligation or a pool of exposures, a bank may reflect the risk-reducing effect either through its estimates of PD or LGD, provided this is done consistently. In adopting one or the other technique, a bank must adopt a consistent approach, both across types of guarantees and over time.

## **OSFI Notes**

The risk-mitigating benefits of collateral from both borrowers and guarantors can be recognized for capital purposes only if an institution can establish that it can simultaneously and independently realize on both the collateral and guarantee. A guarantee is normally obtained to perfect an interest in collateral. In this case, the risk mitigation effect of the collateral, not the guarantee will be recognized.

Any recognition of the mitigating effect of a guarantee arrangement under the Canada Small Business Financing Act must recognize the risk of non-performance by the guarantor due to a cap on the total claims that can be made on defaulted loans covered by the guarantee arrangement.

The following requirements will apply to banks that reflect the effect of guarantees through adjustments to LGD:

No recognition of double default: Paragraphs 306-307 of the Framework permit banks to adjust either PD or LGD to reflect guarantees, but paragraphs 306 and 482 stipulate that the risk weight resulting from these adjustments must not be lower than that of a comparable exposure to the guarantor. A bank using LGD adjustments must demonstrate that its methodology does not incorporate the effects of double default. Furthermore, the bank must demonstrate that its LGD adjustments do not incorporate implicit assumptions about the correlation of guarantor default to that of the obligor. (Although paragraphs 284 and 307 permit recognition of double default in some instances, they stipulate that it must be recognized through adjustments to PD, not LGD. LGD adjustments will not be permitted for exposures that are recognised under the double default framework).

No recognition of double recovery: Under the double default framework, banks are prohibited from recognizing double recovery from both collateral and a guarantee on the same exposure. Since collateral is reflected through an adjustment to LGD, a bank using a separate adjustment to LGD to reflect a guarantee must be able to distinguish the effects of the two sources of mitigation and to demonstrate that its methodology does not incorporate double recovery.

Requirement to track guarantor PDs: Any institution that measures credit risk comprehensively must track exposures to guarantors for the purpose of assessing concentration risk, and by extension must still track the guarantors' PDs.

Requirement to recognize the possibility of guarantor default in the adjustment: Any LGD adjustment must fully reflect the likelihood of guarantor default – a bank may not assume that the guarantor will always perform under the guarantee. For this purpose, it will not be sufficient

only to demonstrate that the risk weight resulting from an LGD adjustment is no lower than that of the guarantor.

Requirement for credible data: Any estimates used in an LGD adjustment must be based on credible, relevant data, and the relation between the source data and the amount of the adjustment should be transparent. Banks should also analyse the degree of uncertainty inherent in the source data and resulting estimates.

Use of consistent methodology for similar types of guarantees: Under paragraph 306, a bank must use the same method for all guarantees of a given type. This means that a bank will be required to have one single method for guarantees, one for credit default swaps, one for insurance, and so on. Banks will not be permitted to selectively choose the exposures having a particular type of guarantee to receive an LGD adjustment, and any adjustment methodology must be broadly applicable to all exposures that are mitigated in the same way.

481. In all cases, both the borrower and all recognised guarantors must be assigned a borrower rating at the outset and on an ongoing basis. A bank must follow all minimum requirements for assigning borrower ratings set out in this document, including the regular monitoring of the guarantor's condition and ability and willingness to honour its obligations. Consistent with the requirements in paragraphs 430 and 431, a bank must retain all relevant information on the borrower absent the guarantee and the guarantor. In the case of retail guarantees, these requirements also apply to the assignment of an exposure to a pool, and the estimation of PD.

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

#### *Eligible guarantors and guarantees*

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

#### **OSFI Notes**

An institution may not reduce the risk weight of an exposure to a third party on account of a guarantee or credit protection provided by a related party (parent, subsidiary or affiliate) of the institution. This treatment follows the principle that guarantees within a corporate group are not a substitute for capital. An exception is made for self-liquidating trade-related transactions that have a tenure of 360 days or less, are market-driven and are not structured to avoid the requirements of OSFI guidelines. The requirement that the transaction be "market-driven" necessitates that the guarantee or letter of credit is requested and paid for by the customer and/or that the market requires the guarantee in the normal course.



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

#### *Adjustment criteria*

485. A bank must have clearly specified criteria for adjusting borrower grades or LGD estimates (or in the case of retail and eligible purchased receivables, the process of allocating exposures to pools) to reflect the impact of guarantees for regulatory capital purposes. These criteria must be as detailed as the criteria for assigning exposures to grades consistent with paragraphs 410 and 411, and must follow all minimum requirements for assigning borrower or facility ratings set out in this document.

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

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

#### *Credit derivatives*

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

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

#### *For banks using foundation LGD estimates*

490. The minimum requirements outlined in paragraphs 480 to 489 apply to banks using the foundation LGD estimates with the following exceptions:

- (1) The bank is not able to use an 'LGD-adjustment' option; and

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- (2) The range of eligible guarantees and guarantors is limited to those outlined in paragraph 302.

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

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

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

**4.2.9. Other Collateral for IRB**

506. Banks under the foundation IRB approach, which do not meet the requirements for own-estimates of LGD and EAD, above, must meet the minimum requirements described in the standardised approach to receive recognition for eligible financial collateral (as set out in chapter 4). They must meet the following additional minimum requirements in order to receive recognition for additional collateral types.

**(i) Definition of eligibility of CRE and RRE as collateral**

507. Eligible CRE and RRE collateral for corporate, sovereign and bank exposures are defined as:

- Collateral where the risk of the borrower is not materially dependent upon the performance of the underlying property or project, but rather on the underlying capacity of the borrower to repay the debt from other sources. As such, repayment of the facility is not materially dependent on any cash flow generated by the underlying CRE/RRE serving as collateral;<sup>80</sup> and
- Additionally, the value of the collateral pledged must not be materially dependent on the performance of the borrower. This requirement is not intended to preclude

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<sup>80</sup> The Committee recognises that in some countries where multifamily housing makes up an important part of the housing market and where public policy is supportive of that sector, including specially established public sector companies as major providers, the risk characteristics of lending secured by mortgage on such residential real estate can be similar to those of traditional corporate exposures. The national supervisor may under such circumstances recognise mortgage on multifamily residential real estate as eligible collateral for corporate exposures.



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situations where purely macro-economic factors affect both the value of the collateral and the performance of the borrower.

508. In light of the generic description above and the definition of corporate exposures, income producing real estate that falls under the SL asset class is specifically excluded from recognition as collateral for corporate exposures.<sup>81</sup>

**(ii) Operational requirements for eligible CRE/RRE**

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

- *Legal enforceability:* any claim on a collateral taken must be legally enforceable in all relevant jurisdictions, and any claim on collateral must be properly filed on a timely basis. Collateral interests must reflect a perfected lien (i.e. all legal requirements for establishing the claim have been fulfilled). Furthermore, the collateral agreement and the legal process underpinning it must be such that they provide for the bank to realise the value of the collateral within a reasonable timeframe.
- *Objective market value of collateral:* the collateral must be valued at or less than the current fair value under which the property could be sold under private contract between a willing seller and an arm's-length buyer on the date of valuation.
- *Frequent revaluation:* the bank is expected to monitor the value of the collateral on a frequent basis and at a minimum once every year. More frequent monitoring is suggested where the market is subject to significant changes in conditions. Statistical methods of evaluation (e.g. reference to house price indices, sampling) may be used to update estimates or to identify collateral that may have declined in value and that may need re-appraisal. A qualified professional must evaluate the property when information indicates that the value of the collateral may have declined materially relative to general market prices or when a credit event, such as default, occurs.
- *Junior liens:* In some member countries, eligible collateral will be restricted to situations where the lender has a first charge over the property.<sup>82</sup> Junior liens may be taken into account where there is no doubt that the claim for collateral is legally enforceable and constitutes an efficient credit risk mitigant. When recognised, junior liens are to be treated using the C\*/C\*\* threshold, which is used for senior liens. In such cases, the C\* and C\*\* are calculated by taking into account the sum of the junior lien and all more senior liens.

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<sup>81</sup> As noted in footnote 68, in exceptional circumstances for well-developed and long-established markets, mortgages on office and/or multi-purpose commercial premises and/or multi-tenanted commercial premises may have the potential to receive recognition as collateral in the corporate portfolio.

<sup>82</sup> In some of these jurisdictions, first liens are subject to the prior right of preferential creditors, such as outstanding tax claims and employees' wages.

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## OSFI Notes

Residential and commercial real estate may be recognized as collateral for FIRB only when the institution's collateral interest is the first lien on the property, and there is no more senior or intervening claim. Junior liens are recognized as collateral only where the institution holds the senior lien and where no other party holds an intervening lien on the property.

510. Additional collateral management requirements are as follows:

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

### **(iii) Requirements for recognition of financial receivables**

#### *Definition of eligible receivables*

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

#### *Operational requirements*

#### *Legal certainty*

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

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

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

515. The collateral arrangements must be properly documented, with a clear and robust procedure for the timely collection of collateral proceeds. Banks' procedures should ensure that

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any legal conditions required for declaring the default of the customer and timely collection of collateral are observed. In the event of the obligor's financial distress or default, the bank should have legal authority to sell or assign the receivables to other parties without consent of the receivables' obligors.

### *Risk management*

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

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

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

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

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

### *Requirements for recognition of other collateral*

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

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

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

522. In order for a given bank to receive recognition for additional physical collateral, it must meet all the standards in paragraphs 509 and 510, subject to the following modifications.

- First Claim: With the sole exception of permissible prior claims specified in footnote 76, only first liens on, or charges over, collateral are permissible. As such, the bank must have priority over all other lenders to the realised proceeds of the collateral.
- The loan agreement must include detailed descriptions of the collateral plus detailed specifications of the manner and frequency of revaluation.
- The types of physical collateral accepted by the bank and policies and practices in respect of the appropriate amount of each type of collateral relative to the exposure amount must be clearly documented in internal credit policies and procedures and available for examination and/or audit review.
- Bank credit policies with regard to the transaction structure must address appropriate collateral requirements relative to the exposure amount, the ability to liquidate the collateral readily, the ability to establish objectively a price or market value, the frequency with which the value can readily be obtained (including a professional appraisal or valuation), and the volatility of the value of the collateral. The periodic revaluation process must pay particular attention to “fashion-sensitive” collateral to ensure that valuations are appropriately adjusted downward of fashion, or model-year, obsolescence as well as physical obsolescence or deterioration.
- In cases of inventories (e.g. raw materials, finished goods, dealers’ inventories of autos) and equipment, the periodic revaluation process must include physical inspection of the collateral.

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## **Annex 5 - Overview of Methodologies for the Capital Treatment of Transactions Secured by Financial Collateral under the Standardised and IRB Approaches**

1. The rules set forth in the standardised approach – Credit Risk Mitigation (CRM), for collateralised transactions generally determine the treatment under both the standardised and the foundation internal ratings-based (IRB) approaches for claims in the banking book that are secured by financial collateral of sufficient quality. Banks using the advanced IRB approach will typically take financial collateral on banking book exposures into account by using their own internal estimates to adjust the exposure's loss given default (LGD). One exception for a bank using the advanced IRB approach pertains to the recognition of repo-style transactions subject to a master netting agreement, as discussed below.
2. Collateralised exposures that take the form of repo-style transactions (i.e. repo/reverse repos and securities lending/borrowing) are subject to special considerations. Such transactions that are held in the trading book are subject to a counterparty risk capital charge as described below. Further, all banks, including those using the advanced IRB approach, must follow the methodology in the CRM section, which is outlined below, for repo-style transactions booked in either the banking book or trading book that are subject to master netting agreements if they wish to recognise the effects of netting for capital purposes.

### **Standardised and Foundation IRB Approaches**

3. Banks under the standardised approach may use either the simple approach or the comprehensive approach for determining the appropriate risk weight for a transaction secured by eligible financial collateral. Under the simple approach, the risk weight of the collateral substitutes for that of the counterparty. Apart from a few types of very low risk transactions, the risk weight floor is 20%. Under the foundation IRB approach, banks may only use the comprehensive approach.
4. Under the comprehensive approach, eligible financial collateral reduces the amount of the exposure to the counterparty. The amount of the collateral is decreased and, where appropriate, the amount of the exposure is increased through the use of haircuts, to account for potential changes in the market prices of securities and foreign exchange rates over the holding period. This results in an adjusted exposure amount,  $E^*$ . Banks may either use supervisory haircuts set by the Committee or, subject to qualifying criteria, rely on their "own" estimates of haircuts. Where the supervisory holding period for calculating the haircut amounts differs from the holding period set down in the rules for that type of collateralised transaction, the haircuts are to be scaled up or down as appropriate. Once  $E^*$  is calculated, the standardised bank will assign that amount a risk weight appropriate to the counterparty. For transactions secured by financial collateral other than repos subject to a master netting agreement, foundation IRB banks are to use  $E^*$  to adjust the LGD on the exposure.

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## Special Considerations for Repo-Style Transactions

5. Repo-style transactions booked in the trading book, will, like OTC derivatives held in the trading book, be subject to a counterparty credit risk charge. In calculating this charge, a bank under the standardised approach must use the comprehensive approach to collateral; the simple approach will not be available.

6. The capital treatment for repo-style transactions that are not subject to master netting agreements is the same as that for other collateralised transactions. However, for banks using the comprehensive approach, national supervisors have the discretion to determine that a haircut of zero may be used where the transaction is with a core market participant and meets certain other criteria (so-called carve-out treatment). Where repo-style transactions are subject to a master netting agreement whether they are held in the banking book or trading book, a bank may choose not to recognise the netting effects in calculating capital. In that case, each transaction will be subject to a capital charge as if there were no master netting agreement.

7. If a bank wishes to recognise the effects of master netting agreements on repo-style transactions for capital purposes, it must apply the treatment the CRM section sets forth in that regard on a counterparty-by-counterparty basis. This treatment would apply to all repo-style transactions subject to master netting agreements, regardless of whether the bank is under the standardised, foundation IRB, or advanced IRB approach and regardless of whether the transactions are held in the banking or trading book. Under this treatment, the bank would calculate  $E^*$  as the sum of the net current exposure on the contract plus an add-on for potential changes in security prices and foreign exchange rates. The add-on may be determined through the supervisory haircuts or, for those banks that meet the qualifying criteria, own estimate haircuts or an internal VaR model. The carve-out treatment for haircuts on repo-style transactions may not be used where an internal VaR model is applied.

8. The calculated  $E^*$  is in effect an unsecured loan equivalent amount that would be used for the exposure amount under the standardised approach and the exposure at default (EAD) value under both the foundation and advanced IRB approaches.  $E^*$  is used for EAD under the IRB approaches, thus would be treated in the same manner as the credit equivalent amount (calculated as the sum of replacement cost plus an add-on for potential future exposure) for OTC derivatives subject to master netting agreements.

## Appendix 4-I - Credit Derivatives -- Product Types

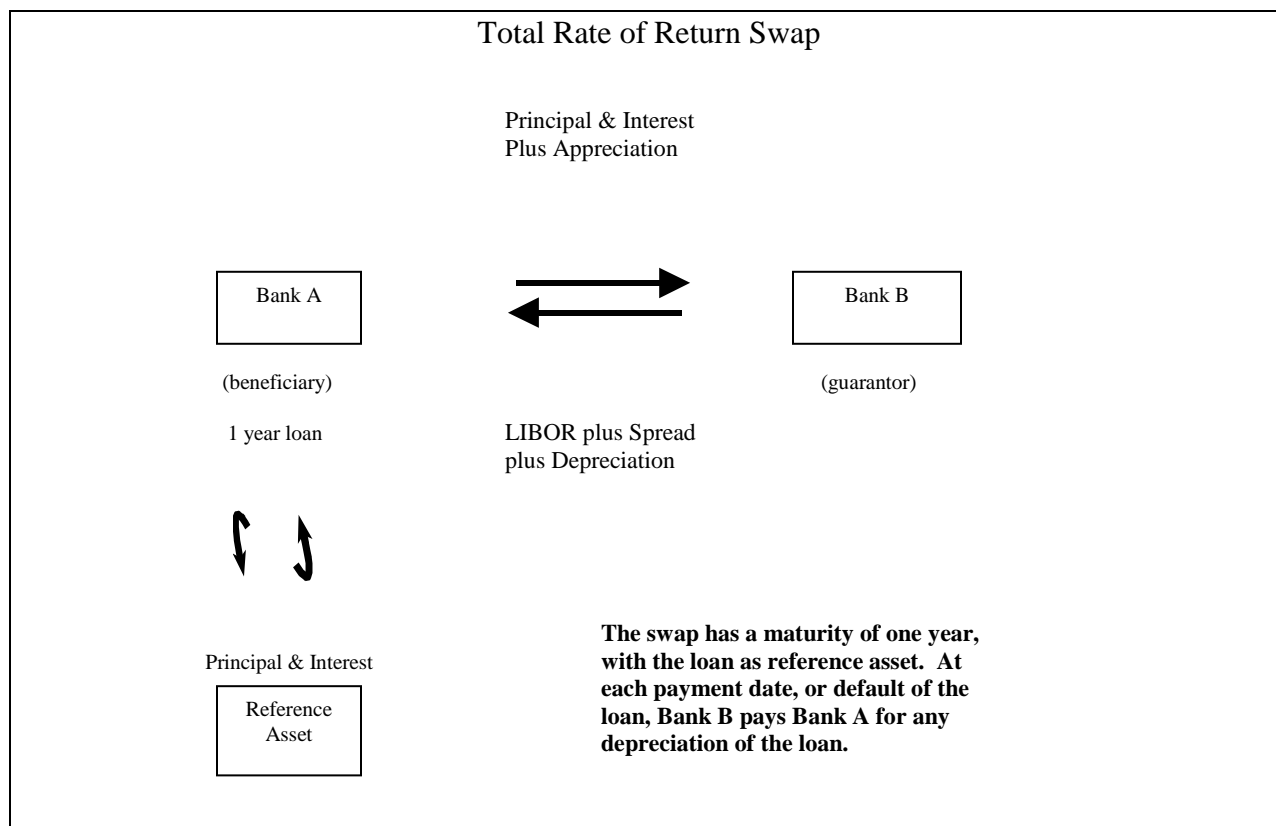
### *Description of Credit Derivatives*

The most widely used types of credit derivatives are credit default products and total rate-of-return (TROR) swaps. While the timing and structure of the cash flows associated with credit default and TROR swaps differ, the economic substance of both arrangements seek to transfer the credit risk of the asset(s) referenced in the transaction.

Another less common form of credit derivative is the credit-linked note, which is an obligation that is based on a reference asset. Credit-linked notes are similar to structured notes with embedded credit derivatives. Credit indicators on the reference asset rather than market price factors influence the payment of interest and principal. If there is a credit event, the repayment of the note's principal is based on the price of the reference asset.

### *Total Rate-of-Return Swap*

In a total rate-of-return (TROR) swap, illustrated below, the beneficiary (Bank A) agrees to pay the guarantor (Bank B) the total return on the reference asset, which consists of all contractual payments, as well as any appreciation in the market value of the reference asset. To complete the swap arrangement, the guarantor agrees to pay LIBOR plus a spread and any depreciation to the beneficiary. The guarantor in a TROR swap could be viewed as having synthetic ownership of the reference asset since it bears the risks and rewards of ownership over the term of the swap.





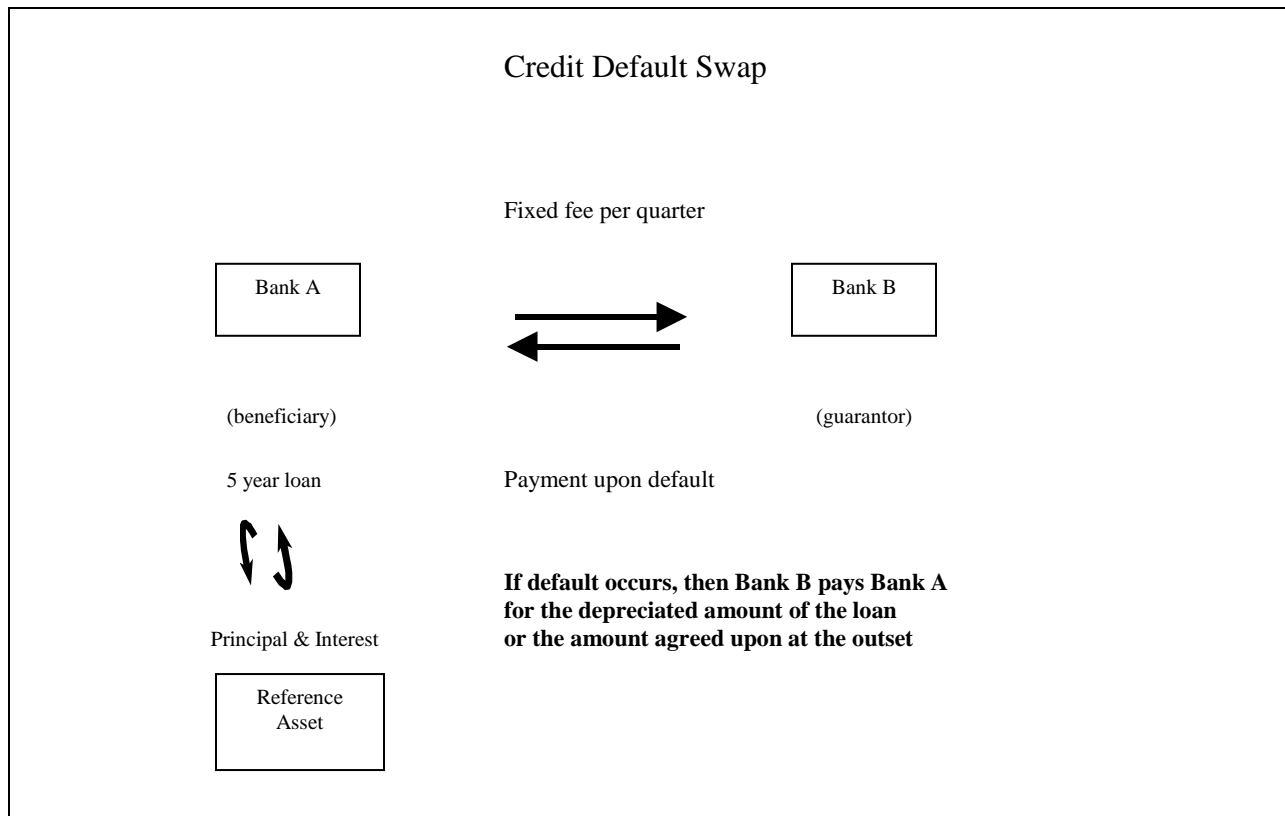
At each payment exchange date (including when the swap matures) -- or upon default, at which point the swap may terminate -- any depreciation or appreciation in the amortized value of the reference asset is calculated as the difference between the notional principal balance of the reference asset and the "dealer price."

The dealer price is generally determined either by referring to a market quotation source or by polling a group of dealers and reflects changes in the credit profile of the reference obligor and reference asset.

If the dealer price is less than the notional amount (i.e., the hypothetical original price of the reference asset) of the contract, then the guarantor must pay the difference to the beneficiary, absorbing any loss caused by a decline in the credit quality of the reference asset. Thus, a TROR swap differs from a standard direct credit substitute in that the guarantor is guaranteeing not only against default of the reference obligor, but also against a deterioration in that obligor's credit quality, which can occur even if there is no default.

### *Credit Default Swaps/Products*

The purpose of a credit default swap, as its name suggests, is to provide protection against credit losses associated with a default on a specified reference asset. The swap purchaser (beneficiary) swaps the credit risk with the provider of the swap (guarantor). While the transaction is called a swap, it is very similar to a guarantee.

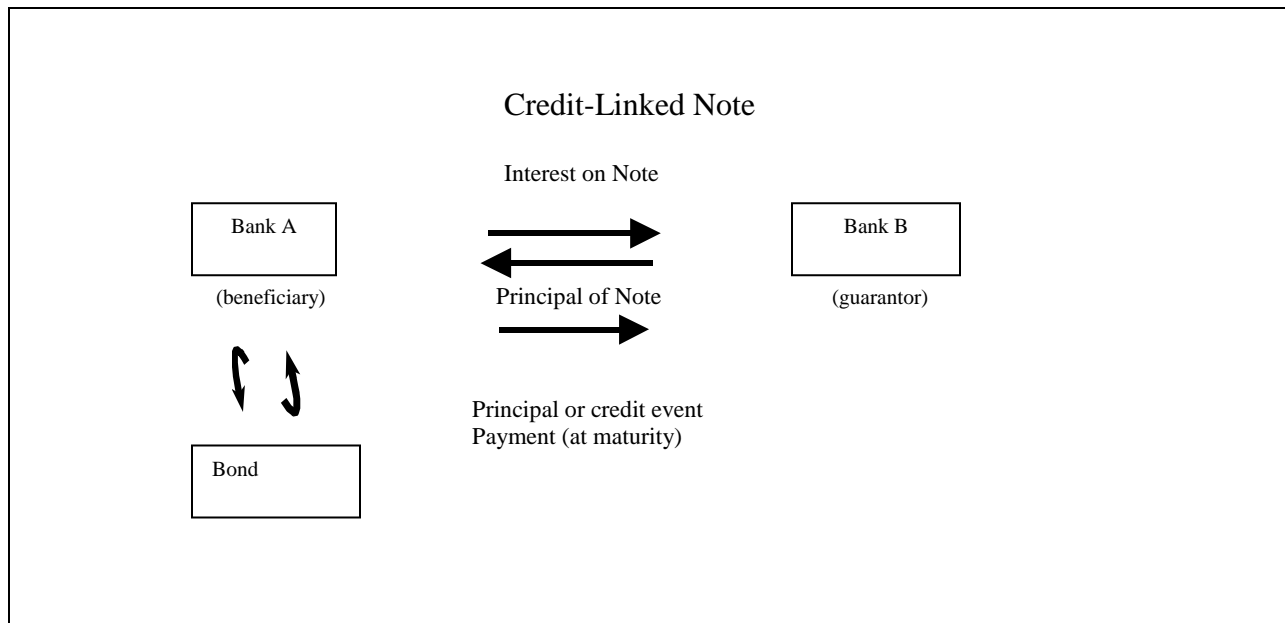




In a credit default swap, the beneficiary (Bank A) agrees to pay to the guarantor (Bank B) a fee typically amounting to a certain number of basis points on the par value of the reference asset, either quarterly or annually. In return, the guarantor agrees to pay the beneficiary an agreed upon, market-based, post-default amount or a predetermined fixed percentage of the value of the reference asset if there is a default. The guarantor makes no payment until there is a default. A default is strictly defined in the contract to include, for example, bankruptcy, insolvency, or payment default, and the default event must be publicly verifiable. In some instances, the guarantor need not make payments to the beneficiary until a pre-established amount of loss has been exceeded in conjunction with a default event. This event is often referred to as the maturity of the swap. The amount owed by the guarantor is the difference between the reference asset's initial principal (or notional) amount and the actual market value of the defaulted, reference asset. The method for establishing the post-default market value of the reference asset should be set out in the contract. Often, the market value of the defaulted reference asset may be determined by sampling dealer quotes. The guarantor may have the option to purchase the defaulted underlying asset and pursue a workout with the borrower directly. Alternatively, the swap may call for a fixed payment in the event of default, for example, 15 per cent of the notional value of the reference asset. The treatment of credit default swaps could differ from a guarantee depending upon the definition of default, the term, and the extent of coverage.

***Credit-Linked Notes***

In a credit-linked note, the beneficiary (Bank A) agrees to pay the guarantor (Bank B) the interest on an issued note referenced to a bond. The guarantor has in this case paid the principal on the note to the issuing bank. If there is no default on the reference bond, the note simply matures at the end of the period. If a credit event occurs on the bond, the note is redeemed, based on the default recovery.



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A credit-linked note is a securitized version of a credit default swap. The difference between a credit default swap and a credit-linked note is that the beneficiary bank receives the principal payment from the guarantor when the contract is originated.

Through the purchase of the credit-linked note, the guarantor (Bank B) assumes the risk of the bond and funds this exposure through the purchase of the note. The guarantor bank takes on the exposure to the beneficiary (Bank A) to the full amount of the funding it has provided. The beneficiary bank hedges its risk on the bond without acquiring any additional credit exposure. Many variations of this product are available.

### *Credit Spread Products*

Credit derivative products can also go beyond the credit transfer products described above to include various forms of credit spread products or index related products. These types of instruments tend not to be credit risk management vehicles but rather options that are traded on the credit quality or credit migration of the underlying assets. In these cases, the bank is not transferring or hedging its risk but rather attempting to profit from changes in spreads. These products should be treated identically to other option products under Chapter 8 Market Risk.

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## Chapter 5      Credit Risk – Internal Ratings Based Approach

This chapter contains an extract from the Basel II framework, *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version* (June 2006) that applies to Canadian institutions. The extract has been annotated to indicate OSFI's position on items of national discretion.

### 5.1. Overview

211. This section of the guideline describes the IRB approach to credit risk. Subject to certain minimum conditions and disclosure requirements, banks that have received supervisory approval to use the IRB approach may rely on their own internal estimates of risk components in determining the capital requirement for a given exposure. The risk components include measures of the probability of default (PD), loss given default (LGD), the exposure at default (EAD), and effective maturity (M). In some cases, banks may be required to use a supervisory value as opposed to an internal estimate for one or more of the risk components.

212. The IRB approach is based on measures of unexpected losses (UL) and expected losses (EL). The risk-weight functions produce capital requirements for the UL portion. Expected losses are treated separately, as outlined in sections 2.2.2.2 and 5.7.

213. In this section, the asset classes are defined first. Adoption of the IRB approach across all asset classes is also discussed early in this section, as are transitional arrangements. The risk components, each of which is defined later in this section, serve as inputs to the risk-weight functions that have been developed for separate asset classes. For example, there is a risk-weight function for corporate exposures and another one for qualifying revolving retail exposures. The treatment of each asset class begins with a presentation of the relevant risk-weight function(s) followed by the risk components and other relevant factors, such as the treatment of credit risk mitigants. The legal certainty standards for recognising CRM as set out in chapter 4 apply for both the foundation and advanced IRB approaches. The minimum requirements that banks must satisfy to use the IRB approach are presented at the end of this section starting at Section 5.8, paragraph 387.

### 5.2. Mechanics of the IRB approach

214. In this section, the risk components (e.g. PD and LGD) and asset classes (e.g. corporate exposures and retail exposures) of the IRB approach are defined. Section 5.2.2 provides a description of the risk components to be used by banks by asset class. Sections 5.2.3. and 5.2.4. discuss a bank's adoption of the IRB approach and transitional arrangements, respectively. In cases where an IRB treatment is not specified, the risk weight for those other exposures is 100%, except when a 0% risk weight applies under the standardised approach and the resulting risk-weighted assets are assumed to represent UL only.

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## OSFI Notes

For securities lent or sold under repurchase agreements or under securities lending and borrowing transactions, institutions are required to hold capital for both the original exposure per chapter 5 and the exposure to the counterparty of the repo-style transaction per chapter 4.

### 5.2.1. *Categorisation of exposures*

215. Under the IRB approach, banks must categorise banking-book exposures into broad classes of assets with different underlying risk characteristics, subject to the definitions set out below. The classes of assets are (a) corporate, (b) sovereign, (c) bank, (d) retail, and (e) equity. Within the corporate asset class, five sub-classes of specialised lending are separately identified. Within the retail asset class, three sub-classes are separately identified. Within the corporate and retail asset classes, a distinct treatment for purchased receivables may also apply provided certain conditions are met.

216. The classification of exposures in this way is broadly consistent with established bank practice. However, some banks may use different definitions in their internal risk management and measurement systems. While it is not the intention of the Committee to require banks to change the way in which they manage their business and risks, banks are required to apply the appropriate treatment to each exposure for the purposes of deriving their minimum capital requirement. Banks must demonstrate to supervisors that their methodology for assigning exposures to different classes is appropriate and consistent over time.

217. For a discussion of the IRB treatment of securitisation exposures, see chapter 6.

#### (i) **Definition of corporate exposures**

218. In general, a corporate exposure is defined as a debt obligation of a corporation, partnership, or proprietorship. Banks are permitted to distinguish separately exposures to small- and medium-sized entities (SME), as defined in paragraph 273.

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## OSFI Notes

Corporate exposures include debt obligations and obligations under derivatives contracts of corporations, partnerships, limited liability companies, proprietorships and special purpose entities (including those created specifically to finance and /or operate physical assets).

Loans to or derivative contracts with a pension fund, mutual fund, or similar counterparty are treated as corporate exposures unless the institution is able to use a look through approach. Pension/mutual/hedge funds and income trust contracts are also treated as corporate exposures.

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

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- The exposure is typically to an entity (often a special purpose entity (SPE)) which was created specifically to finance and/or operate physical assets;
  - The borrowing entity has little or no other material assets or activities, and therefore little or no independent capacity to repay the obligation, apart from the income that it receives from the asset(s) being financed;
  - The terms of the obligation give the lender a substantial degree of control over the asset(s) and the income that it generates; and
  - As a result of the preceding factors, the primary source of repayment of the obligation is the income generated by the asset(s), rather than the independent capacity of a broader commercial enterprise.

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

#### *Project finance*

221. Project finance (PF) is a method of funding in which the lender looks primarily to the revenues generated by a single project, both as the source of repayment and as security for the exposure. This type of financing is usually for large, complex and expensive installations that might include, for example, power plants, chemical processing plants, mines, transportation infrastructure, environment, and telecommunications infrastructure. Project finance may take the form of financing of the construction of a new capital installation, or refinancing of an existing installation, with or without improvements.

222. In such transactions, the lender is usually paid solely or almost exclusively out of the money generated by the contracts for the facility's output, such as the electricity sold by a power plant. The borrower is usually an SPE that is not permitted to perform any function other than developing, owning, and operating the installation. The consequence is that repayment depends primarily on the project's cash flow and on the collateral value of the project's assets. In contrast, if repayment of the exposure depends primarily on a well established, diversified, credit-worthy, contractually obligated end user for repayment, it is considered a secured exposure to that end-user.

#### *Object finance*

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

#### *Commodities finance*

224. Commodities finance (CF) refers to structured short-term lending to finance reserves, inventories, or receivables of exchange-traded commodities (e.g. crude oil, metals, or crops), where the exposure will be repaid from the proceeds of the sale of the commodity and the

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borrower has no independent capacity to repay the exposure. This is the case when the borrower has no other activities and no other material assets on its balance sheet. The structured nature of the financing is designed to compensate for the weak credit quality of the borrower. The exposure's rating reflects its self-liquidating nature and the lender's skill in structuring the transaction rather than the credit quality of the borrower.

225. The Committee believes that such lending can be distinguished from exposures financing the reserves, inventories, or receivables of other more diversified corporate borrowers. Banks are able to rate the credit quality of the latter type of borrowers based on their broader ongoing operations. In such cases, the value of the commodity serves as a risk mitigant rather than as the primary source of repayment.

#### *Income-producing real estate*

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

#### *High-volatility commercial real estate*

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

- Commercial real estate exposures secured by properties of types that are categorised by the national supervisor as sharing higher volatilities in portfolio default rates;
- Loans financing any of the land acquisition, development and construction (ADC) phases for properties of those types in such jurisdictions; and
- Loans financing ADC of any other properties where the source of repayment at origination of the exposure is either the future uncertain sale of the property or cash flows whose source of repayment is substantially uncertain (e.g. the property has not yet been leased to the occupancy rate prevailing in that geographic market for that type of commercial real estate), unless the borrower has substantial equity at risk. Commercial ADC loans exempted from treatment as HVCRE loans on the basis of certainty of repayment of borrower equity are, however, ineligible for the additional reductions for SL exposures described in paragraph 277.

#### **OSFI Notes**

Loans financing the construction of pre-sold one- to four-family residential properties are excluded from the ADC category.

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228. Where supervisors categorise certain types of commercial real estate exposures as HVCRE in their jurisdictions, they are required to make public such determinations. Other supervisors need to ensure that such treatment is then applied equally to banks under their supervision when making such HVCRE loans in that jurisdiction.

#### **OSFI Notes**

No specific Canadian property types fall into the HVCRE category. Thus, the optional risk weight choices in paragraphs 280, 282 and 283 do not apply in Canada.

The HVCRE risk weights apply to Canadian institution foreign operations' loans on properties in jurisdictions where the national supervisor has designated specific property types as HVCRE.

#### **(ii) Definition of sovereign exposures**

229. This asset class covers all exposures to counterparties treated as sovereigns under the standardised approach. This includes sovereigns (and their central banks), certain PSEs identified as sovereigns in the standardised approach, MDBs that meet the criteria for a 0% risk weight under the standardised approach, and the entities referred to in section 3.1.1.2.

#### **OSFI Notes**

To maintain some consistency between the treatment of high quality sovereign exposures in the Standardized and IRB Approaches, the same definition of sovereign applies. Claims on or directly guaranteed by the Government of Canada, the Bank of Canada, a Canadian province, a Canadian territorial government, foreign central governments, foreign central banks and qualifying Multilateral Development Banks are not subject to the 0.03% floor on PDs estimated by an institution.

#### **(iii) Definition of bank exposures**

230. This asset class covers exposures to banks and those securities firms outlined in section 3.1.4. Bank exposures also include claims on domestic PSEs that are treated like claims on banks under the standardised approach, and MDBs that do not meet the criteria for a 0% risk weight under the standardised approach.

#### **(iv) Definition of retail exposures**

231. An exposure is categorised as a retail exposure if it meets all of the following criteria:

*Nature of borrower or low value of individual exposures*

- Exposures to individuals – such as revolving credits and lines of credit (e.g. credit cards, overdrafts, and retail facilities secured by financial instruments) as well as personal term loans and leases (e.g. instalment loans, auto loans and leases, student and educational loans, personal finance, and other exposures with similar characteristics) – are generally



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eligible for retail treatment regardless of exposure size, although supervisors may wish to establish exposure thresholds to distinguish between retail and corporate exposures.

**OSFI Notes**

No exposure thresholds will be established to distinguish between retail and corporate exposures.

- Residential mortgage loans (including first and subsequent liens, term loans and revolving home equity lines of credit) are eligible for retail treatment regardless of exposure size so long as the credit is extended to an individual that is an owner-occupier of the property (with the understanding that supervisors exercise reasonable flexibility regarding buildings containing only a few rental units – otherwise they are treated as corporate). Loans secured by a single or small number of condominium or co-operative residential housing units in a single building or complex also fall within the scope of the residential mortgage category. National supervisors may set limits on the maximum number of housing units per exposure.

**OSFI Notes**

Residential mortgage exposures are limited to one- to four-unit residences as set out in chapter 3, section 3.1.9.

- Loans extended to small businesses and managed as retail exposures are eligible for retail treatment provided the total exposure of the banking group to a small business borrower (on a consolidated basis where applicable) is less than CAD \$1.25 million. Small business loans extended through or guaranteed by an individual are subject to the same exposure threshold.
- It is expected that supervisors provide flexibility in the practical application of such thresholds such that banks are not forced to develop extensive new information systems simply for the purpose of ensuring perfect compliance. It is, however, important for supervisors to ensure that such flexibility (and the implied acceptance of exposure amounts in excess of the thresholds that are not treated as violations) is not being abused.

*Large number of exposures*

232. The exposure must be one of a large pool of exposures, which are managed by the bank on a pooled basis. Supervisors may choose to set a minimum number of exposures within a pool for exposures in that pool to be treated as retail.

- Small business exposures below CAD \$1.25 million may be treated as retail exposures if the bank treats such exposures in its internal risk management systems consistently over time and in the same manner as other retail exposures. This requires that such an exposure be originated in a similar manner to other retail exposures. Furthermore, it must not be managed individually in a way comparable to corporate exposures, but rather as part of a portfolio segment or pool of exposures with similar risk characteristics for purposes of risk assessment and quantification. However, this does not preclude retail exposures from being treated individually at some stages of the risk



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management process. The fact that an exposure is rated individually does not by itself deny the eligibility as a retail exposure.

#### **OSFI Notes**

The Basel II framework's approach provides banks and supervisors with sufficient flexibility to manage small business portfolios that may not fit easily with either retail or corporate exposures. Accordingly, OSFI relies on the existing wording in paragraphs 231 and 232 as they relate to the nature of the borrower, the size of the exposure and the number of exposures.

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

#### **(v) Definition of qualifying revolving retail exposures**

234. All of the following criteria must be satisfied for a sub-portfolio to be treated as a qualifying revolving retail exposure (QRRE). These criteria must be applied at a sub-portfolio level consistent with the bank's segmentation of its retail activities generally. Segmentation at the national or country level (or below) should be the general rule.

- (a) The exposures are revolving, unsecured, and uncommitted (both contractually and in practice). In this context, revolving exposures are defined as those where customers' outstanding balances are permitted to fluctuate based on their decisions to borrow and repay, up to a limit established by the bank.
- (b) The exposures are to individuals.
- (c) The maximum exposure to a single individual in the sub-portfolio is CAD \$125000 or less.

#### **OSFI Notes**

If credit cards are managed separately from lines of credit (LOC), then credit cards and LOCs may be considered as separate sub-portfolios.

- (d) Because the asset correlation assumptions for the QRRE risk-weight function are markedly below those for the other retail risk-weight function at low PD values, banks must demonstrate that the use of the QRRE risk-weight function is constrained to portfolios that have exhibited low volatility of loss rates, relative to their average level of loss rates, especially within the low PD bands. Supervisors will review the relative volatility of loss rates across the QRRE subportfolios, as well as the aggregate QRRE portfolio, and intend to share information on the typical characteristics of QRRE loss rates across jurisdictions.
- (e) Data on loss rates for the sub-portfolio must be retained in order to allow analysis of the volatility of loss rates.

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- (f) The supervisor must concur that treatment as a qualifying revolving retail exposure is consistent with the underlying risk characteristics of the sub-portfolio.

**(vi) Definition of equity exposures**

235. In general, equity exposures are defined on the basis of the economic substance of the instrument. They include both direct and indirect ownership interests,<sup>83</sup> whether voting or non-voting, in the assets and income of a commercial enterprise or of a financial institution that is not consolidated or deducted pursuant to section 1.1.<sup>84</sup> An instrument is considered to be an equity exposure if it meets all of the following requirements:

OSFI Notes
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Footnote 84 does not apply.
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- It is irredeemable in the sense that the return of invested funds can be achieved only by the sale of the investment or sale of the rights to the investment or by the liquidation of the issuer;
- It does not embody an obligation on the part of the issuer; and
- It conveys a residual claim on the assets or income of the issuer.

236. Additionally any of the following instruments must be categorised as an equity exposure:

- An instrument with the same structure as those permitted as Tier 1 capital for banking organisations.
- An instrument that embodies an obligation on the part of the issuer and meets any of the following conditions:
  - (1) The issuer may defer indefinitely the settlement of the obligation;
  - (2) The obligation requires (or permits at the issuer's discretion) settlement by issuance of a fixed number of the issuer's equity shares;
  - (3) The obligation requires (or permits at the issuer's discretion) settlement by issuance of a variable number of the issuer's equity shares and (ceteris paribus) any change in the value of the obligation is attributable to, comparable to, and in the same direction as, the change in the value of a fixed number of the issuer's equity shares;<sup>85</sup> or,

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<sup>83</sup> Indirect equity interests include holdings of derivative instruments tied to equity interests, and holdings in corporations, partnerships, limited liability companies or other types of enterprises that issue ownership interests and are engaged principally in the business of investing in equity instruments.

<sup>84</sup> Where some member countries retain their existing treatment as an exception to the deduction approach, such equity investments by IRB banks are to be considered eligible for inclusion in their IRB equity portfolios.

<sup>85</sup> For certain obligations that require or permit settlement by issuance of a variable number of the issuer's equity shares, the change in the monetary value of the obligation is equal to the change in the fair value of a fixed number of equity shares multiplied by a specified factor. Those obligations meet the conditions of item 3 if both the factor and the referenced number of shares are fixed. For example, an issuer may be required to settle an obligation by issuing shares with a value equal to three times the appreciation in the fair value of 1,000 equity shares. That obligation is considered to be the same as an obligation that requires settlement by issuance of shares equal to the appreciation in the fair value of 3,000 equity shares.

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- (4) The holder has the option to require that the obligation be settled in equity shares, unless either (i) in the case of a traded instrument, the supervisor is content that the bank has demonstrated that the instrument trades more like the debt of the issuer than like its equity, or (ii) in the case of non-traded instruments, the supervisor is content that the bank has demonstrated that the instrument should be treated as a debt position. In cases (i) and (ii), the bank may decompose the risks for regulatory purposes, with the consent of the supervisor.

237. Debt obligations and other securities, partnerships, derivatives or other vehicles structured with the intent of conveying the economic substance of equity ownership are considered an equity holding.<sup>86</sup> This includes liabilities from which the return is linked to that of equities.<sup>87</sup> Conversely, equity investments that are structured with the intent of conveying the economic substance of debt holdings or securitisation exposures would not be considered an equity holding.

## OSFI Notes

### Mezzanine issues

- without warrants to convert into common shares are treated as debt
- with warrants to convert into common shares – the warrant\* is treated as equity and the loan agreement is treated as debt

### Preferred shares\*\*

- convertible preferreds with or without a redeemable feature are treated as equity
- perpetual preferreds without a redeemable feature and perpetual preferreds with a redeemable feature at the issuer's option – the PD/LGD approach is used to calculate the equity charge
- perpetual preferreds with a redeemable feature at holder's option are treated as debt
- term preferreds are treated as debt

\* These should be detachable and separate from the loan agreement, and can be valued, i.e. there is a valuation mechanism.

\*\* As a result of the recent revisions to Section 3860 of the CICA Handbook, OSFI has determined that preferred shares accounted for as liabilities do not meet the conditions for non-innovative (or “core”) Tier 1 treatment. Any such preferred shares outstanding as of January 31, 2004 continue to be eligible for core Tier 1 treatment for as long as they remain outstanding.

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<sup>86</sup> Equities that are recorded as a loan but arise from a debt/equity swap made as part of the orderly realisation or restructuring of the debt are included in the definition of equity holdings. However, these instruments may not attract a lower capital charge than would apply if the holdings remained in the debt portfolio.

<sup>87</sup> Supervisors may decide not to require that such liabilities be included where they are directly hedged by an equity holding, such that the net position does not involve material risk.

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However, no such preferred shares issued after January 31, 2004, will be afforded core Tier 1 treatment.

**OSFI Notes**

Footnote 87: Where an IRB approach is required, equity-linked GIC business and related hedging should be scoped into an IRB capital charge.

238. The national supervisor has the discretion to re-characterise debt holdings as equities for regulatory purposes and to otherwise ensure the proper treatment of holdings under Pillar 2.

**OSFI Notes**

On a case-by-case basis, OSFI will use its discretion to re-characterize debt holdings as equity exposures or equity holdings as debt for regulatory capital purposes.

**(vii) Definition of eligible purchased receivables**

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

*Retail receivables*

240. Purchased retail receivables, provided the purchasing bank complies with the IRB rules for retail exposures, are eligible for the top-down approach as permitted within the existing standards for retail exposures. The bank must also apply the minimum operational requirements as set forth in sections 5.6 and 5.8.

*Corporate receivables*

241. In general, for purchased corporate receivables, banks are expected to assess the default risk of individual obligors as specified in section 5.3.1 (starting with paragraph 271) consistent with the treatment of other corporate exposures. However, the top-down approach may be used, provided that the purchasing bank's programme for corporate receivables complies with both the criteria for eligible receivables and the minimum operational requirements of this approach. The use of the top-down purchased receivables treatment is limited to situations where it would be an undue burden on a bank to be subjected to the minimum requirements for the IRB approach to corporate exposures that would otherwise apply. Primarily, it is intended for receivables that are purchased for inclusion in asset-backed securitisation structures, but banks may also use this approach, with the approval of national supervisors, for appropriate on-balance sheet exposures that share the same features.

242. Supervisors may deny the use of the top-down approach for purchased corporate receivables depending on the bank's compliance with minimum requirements. In particular, to

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be eligible for the proposed 'top-down' treatment, purchased corporate receivables must satisfy the following conditions:

- The receivables are purchased from unrelated, third party sellers, and as such the bank has not originated the receivables either directly or indirectly.
- The receivables must be generated on an arm's-length basis between the seller and the obligor. (As such, intercompany accounts receivable and receivables subject to contra-accounts between firms that buy and sell to each other are ineligible.<sup>88</sup>)
- The purchasing bank has a claim on all proceeds from the pool of receivables or a *pro-rata* interest in the proceeds.<sup>89</sup>
- National supervisors must also establish concentration limits above which capital charges must be calculated using the minimum requirements for the bottom-up approach for corporate exposures. Such concentration limits may refer to one or a combination of the following measures: the size of one individual exposure relative to the total pool, the size of the pool of receivables as a percentage of regulatory capital, or the maximum size of an individual exposure in the pool.

#### OSFI Notes

If any single receivable or group of receivables guaranteed by the same seller represents more than 3.5% of the pool of receivables, capital charges must be calculated using the minimum requirements for the bottom-up approach for corporate exposures.

243. The existence of full or partial recourse to the seller does not automatically disqualify a bank from adopting this top-down approach, as long as the cash flows from the purchased corporate receivables are the primary protection against default risk as determined by the rules in paragraphs 365 to 368 for purchased receivables and the bank meets the eligibility criteria and operational requirements.

#### 5.2.2. *Foundation and advanced approaches*

244. For each of the asset classes covered under the IRB framework, there are three key elements:

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

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<sup>88</sup> Contra-accounts involve a customer buying from and selling to the same firm. The risk is that debts may be settled through payments in kind rather than cash. Invoices between the companies may be offset against each other instead of being paid. This practice can defeat a security interest when challenged in court.

<sup>89</sup> Claims on tranches of the proceeds (first loss position, second loss position, etc.) would fall under the securitisation treatment.

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245. For many of the asset classes, the Committee has made available two broad approaches: a foundation and an advanced. Under the foundation approach, as a general rule, banks provide their own estimates of PD and rely on supervisory estimates for other risk components. Under the advanced approach, banks provide more of their own estimates of PD, LGD and EAD, and their own calculation of M, subject to meeting minimum standards. For both the foundation and advanced approaches, banks must always use the risk-weight functions provided in this Framework for the purpose of deriving capital requirements. The full suite of approaches is described below.

**(i) Corporate, sovereign, and bank exposures**

246. Under the foundation approach, banks must provide their own estimates of PD associated with each of their borrower grades, but must use supervisory estimates for the other relevant risk components. The other risk components are LGD, EAD and M.<sup>90</sup>

247. Under the advanced approach, banks must calculate the effective maturity (M)<sup>91</sup> and provide their own estimates of PD, LGD and EAD.

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

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

249. Banks that do not meet the requirements for the estimation of PD under the corporate foundation approach for their SL assets are required to map their internal risk grades to five supervisory categories, each of which is associated with a specific risk weight. This version is termed the ‘supervisory slotting criteria approach’.

250. Banks that meet the requirements for the estimation of PD are able to use the foundation approach to corporate exposures to derive risk weights for all classes of SL exposures except HVCRE. At national discretion, banks meeting the requirements for HVCRE exposure are able to use a foundation approach that is similar in all respects to the corporate approach, with the exception of a separate risk-weight function as described in paragraph 283.

251. Banks that meet the requirements for the estimation of PD, LGD and EAD are able to use the advanced approach to corporate exposures to derive risk weights for all classes of SL exposures except HVCRE. At national discretion, banks meeting these requirements for HVCRE exposure are able to use an advanced approach that is similar in all respects to the corporate approach, with the exception of a separate risk-weight function as described in paragraph 283.

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<sup>90</sup> As noted in paragraph 318, some supervisors may require banks using the foundation approach to calculate M using the definition provided in paragraphs 320 to 324.

<sup>91</sup> At the discretion of the national supervisor, certain domestic exposures may be exempt from the calculation of M (see paragraph 319).

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**(ii) Retail exposures**

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

**(iii) Equity exposures**

253. There are two broad approaches to calculate risk-weighted assets for equity exposures not held in the trading book: a market-based approach and a PD/LGD approach. These are set out in full in paragraphs 340 to 361.

254. The PD/LGD approach to equity exposures remains available for banks that adopt the advanced approach for other exposure types.

**(iv) Eligible purchased receivables**

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

*5.2.3. Adoption of the IRB approach across asset classes*

256. Once a bank adopts an IRB approach for part of its holdings, it is expected to extend it across the entire banking group. The Committee recognises however, that, for many banks, it may not be practicable for various reasons to implement the IRB approach across all material asset classes and business units at the same time. Furthermore, once on IRB, data limitations may mean that banks can meet the standards for the use of own estimates of LGD and EAD for some but not all of their asset classes/business units at the same time.

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

258. A bank must produce an implementation plan, specifying to what extent and when it intends to roll out IRB approaches across significant asset classes (or sub-classes in the case of retail) and business units over time. The plan should be exacting, yet realistic, and must be agreed with the supervisor. It should be driven by the practicality and feasibility of moving to the more advanced approaches, and not motivated by a desire to adopt a Pillar 1 approach that minimises its capital charge. During the roll-out period, supervisors will ensure that no capital relief is granted for intra-group transactions which are designed to reduce a banking group's aggregate capital charge by transferring credit risk among entities on the standardised approach, foundation and advanced IRB approaches. This includes, but is not limited to, asset sales or cross guarantees.



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259. Some exposures in non-significant business units as well as asset classes (or sub-classes in the case of retail) that are immaterial in terms of size and perceived risk profile may be exempt from the requirements in the previous two paragraphs, subject to supervisory approval. Capital requirements for such operations will be determined according to the standardised approach, with the national supervisor determining whether a bank should hold more capital under Pillar 2 for such positions.

260. Notwithstanding the above, once a bank has adopted the IRB approach for all or part of any of the corporate, bank, sovereign, or retail asset classes, it will be required to adopt the IRB approach for its equity exposures at the same time, subject to materiality. Supervisors may require a bank to employ one of the IRB equity approaches if its equity exposures are a significant part of the bank's business, even though the bank may not employ an IRB approach in other business lines. Further, once a bank has adopted the general IRB approach for corporate exposures, it will be required to adopt the IRB approach for the SL sub-classes within the corporate exposure class.

261. Banks adopting an IRB approach are expected to continue to employ an IRB approach. A voluntary return to the standardised or foundation approach is permitted only in extraordinary circumstances, such as divestiture of a large fraction of the bank's credit-related business, and must be approved by the supervisor.

262. Given the data limitations associated with SL exposures, a bank may remain on the supervisory slotting criteria approach for one or more of the PF, OF, CF, IPRE or HVCRE sub-classes, and move to the foundation or advanced approach for other sub-classes within the corporate asset class. However, a bank should not move to the advanced approach for the HVCRE sub-class without also doing so for material IPRE exposures at the same time.

#### 5.2.4. *Transition arrangements*

##### (i) **Parallel calculation**

263. Banks adopting the foundation or advanced approaches are required to calculate their capital requirement using these approaches, as well as the 1988 Accord for the time period specified in section 1.7. Parallel calculation for banks adopting the foundation IRB approach to credit risk will start in the year beginning year-end 2005. Banks moving directly from the 1988 Accord to the advanced approaches to credit and/or operational risk will be subject to parallel calculations or impact studies for the year beginning year-end 2005 and to parallel calculations for the year beginning year-end 2006.

##### (ii) **Corporate, sovereign, bank, and retail exposures**

264. The transition period starts on the date of implementation of this Framework and will last for 3 years from that date. During the transition period, the following minimum requirements can be relaxed, subject to discretion of the national supervisor:

- For corporate, sovereign, and bank exposures under the foundation approach, paragraph 463, the requirement that, regardless of the data source, banks must use at least five years of data to estimate the PD; and



- For retail exposures, paragraph 466, the requirement that regardless of the data source banks must use at least five years of data to estimate loss characteristics (EAD, and either expected loss (EL) or PD and LGD).
- For corporate, sovereign, bank, and retail exposures, paragraph 445, the requirement that a bank must demonstrate it has been using a rating system that was broadly in line with the minimum requirements articulated in this document for at least three years prior to qualification.
- The applicable aforementioned transitional arrangements also apply to the PD/LGD approach to equity. There are no transitional arrangements for the market-based approach to equity.

265. Under these transitional arrangements banks are required to have a minimum of two years of data at the implementation of this Framework. This requirement will increase by one year for each of three years of transition.

266. Owing to the potential for very long-run cycles in house prices which short-term data may not adequately capture, during this transition period, LGDs for retail exposures secured by residential properties cannot be set below 10% for any sub-segment of exposures to which the formula in paragraph 328 is applied.<sup>92</sup> During the transition period the Committee will review the potential need for continuation of this floor.

#### OSFI Notes

Footnote 92: The 10% floor on LGD for residential mortgages applies to any portion of a residential mortgage that is not guaranteed or otherwise insured by the Government of Canada. Residential mortgage exposures that are insured by a private mortgage insurer having a Government of Canada backstop guarantee may be separated into a sovereign-guaranteed mortgage exposure and a corporate-guaranteed mortgage exposure, as described in section 3.1.9.

#### (iii) Equity exposures

267. For a maximum of ten years, supervisors may exempt from the IRB treatment particular equity investments held at the time of the publication of this Framework.<sup>93</sup> The exempted position is measured as the number of shares as of that date and any additional arising directly as a result of owning those holdings, as long as they do not increase the proportional share of ownership in a portfolio company.

<sup>92</sup> The 10% LGD floor shall not apply, however, to sub-segments that are subject to/benefit from sovereign guarantees. Further, the existence of the floor does not imply any waiver of the requirements of LGD estimation as laid out in the minimum requirements starting with paragraph 468.

<sup>93</sup> This exemption does not apply to investments in entities where some countries will retain the existing risk weighting treatment.

## OSFI Notes

Equity investments held as of July 1, 2004, are exempt from the AIRB equity capital charge for a period of ten years commencing Q4 2007 and ending in Q4 2017. During this time, these holdings are risk weighted at 100%. This exemption also applies to commitments to invest in private equity funds that were entered into before July 1, 2004 and that remain undrawn.

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

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

### 5.3. Rules for corporate, sovereign, and bank exposures

270. Section 5.3. presents the method of calculating the unexpected loss (UL) capital requirements for corporate, sovereign and bank exposures. As discussed in section 5.3.1., one risk-weight function is provided for determining the capital requirement for all three asset classes with one exception. Supervisory risk weights are provided for each of the specialised lending sub-classes of corporates, and a separate risk-weight function is also provided for HVCRE. Section 5.3.2 discusses the risk components. The method of calculating expected losses, and for determining the difference between that measure and provisions is described in section 5.7.

#### 5.3.1. *Risk-weighted assets for corporate, sovereign, and bank exposures*

##### (i) **Formula for derivation of risk-weighted assets**

271. The derivation of risk-weighted assets is dependent on estimates of the PD, LGD, EAD and, in some cases, effective maturity (M), for a given exposure. Paragraphs 318 to 324 discuss the circumstances in which the maturity adjustment applies.

272. Throughout this section, PD and LGD are measured as decimals, and EAD is measured as currency (e.g. euros), except where explicitly noted otherwise. For exposures not in default, the formula for calculating risk-weighted assets is:<sup>94, 95</sup>

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

<sup>94</sup> Ln denotes the natural logarithm.

<sup>95</sup> N(x) denotes the cumulative distribution function for a standard normal random variable (i.e. the probability that a normal random variable with mean zero and variance of one is less than or equal to x). G(z) denotes the inverse cumulative distribution function for a standard normal random variable (i.e. the value of x such that N(x) = z). The normal cumulative distribution function and the inverse of the normal cumulative distribution function are, for example, available in Excel as the functions NORMSDIST and NORMSINV.

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

$$\text{Capital requirement}^{96} \text{ (K)} = [\text{LGD} \times \text{N} [(1 - \text{R})^{-0.5} \times \text{G}(\text{PD}) + (\text{R} / (1 - \text{R}))^{0.5} \times \text{G} (0.999)] - \text{PD} \times \text{LGD}] \times (1 - 1.5 \times \text{b})^{-1} \times (1 + (\text{M} - 2.5) \times \text{b})$$

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

The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in paragraph 468) and the bank's best estimate of expected loss (described in paragraph 471). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

Illustrative risk weights are shown in Annex 5.

## (ii) Firm-size adjustment for small- and medium-sized entities (SME)

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

$$\text{Correlation (R)} = 0.12 \times (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50)) + 0.24 \times [1 - (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50))] - 0.04 \times (1 - (S-5)/45)$$

### OSFI Notes

Thresholds in the Basel II framework have been converted into Canadian dollar amounts at an exchange rate of 1.25. The rate for this one-time conversion was chosen to ensure competitive equity with US banks.

The firm-size adjustment may not be used under the PD/LGD approach for equities.

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

### OSFI Notes

<sup>96</sup> If this calculation results in a negative capital charge for any individual sovereign exposure, banks should apply a zero capital charge for that exposure.

Annual sales, rather than total assets, are to be used to measure borrower size, unless in limited circumstances an institution can demonstrate that it would be more appropriate to use the total assets of the borrower. OSFI is willing to consider limited recognition for classes of entities that always have much smaller sales than total assets, because assets are a more appropriate indicator in this case. The use of total assets should be a limited exception. The maximum reduction in the risk weight for SMEs is achieved when borrower size is CAD \$6.25 million. For borrower sizes below CAD \$6.25 million, borrower size is set equal to CAD \$6.25 million. The adjustment shrinks to zero as borrower size approaches CAD \$62.5 million. The term “Consolidated Group” is understood to mean all firms that are consolidated for the purposes of OSFI’s Large Exposures Guideline B-2.

**(iii) Risk weights for specialised lending**

*Risk weights for PF, OF, CF, and IPRE*

275. Banks that do not meet the requirements for the estimation of PD under the corporate IRB approach will be required to map their internal grades to five supervisory categories, each of which is associated with a specific risk weight. The slotting criteria on which this mapping must be based are provided in Annex 6. The risk weights for unexpected losses associated with each supervisory category are:

**Supervisory categories and UL risk weights for other SL exposures**

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

276. Although banks are expected to map their internal ratings to the supervisory categories for specialised lending using the slotting criteria provided in Annex 6, each supervisory category broadly corresponds to a range of external credit assessments as outlined below.

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

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

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

279. Banks that meet the requirements for the estimation of PD and LGD and/or EAD will be able to use the general advanced approach for the corporate asset class to derive risk weights for SL sub-classes.

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*Risk weights for HVCRE*

**OSFI Notes**

No specific Canadian property types fall into the HVCRE category. Thus, the optional risk weight choices in paragraphs 280, 282 and 283 do not apply in Canada.

The HVCRE risk weights apply to Canadian institution foreign operations' loans on properties in jurisdictions where the national supervisor has designated specific property types as HVCRE.

280. Banks that do not meet the requirements for estimation of PD, or whose supervisor has chosen not to implement the foundation or advanced approaches to HVCRE, must map their internal grades to five supervisory categories, each of which is associated with a specific risk weight. The slotting criteria on which this mapping must be based are the same as those for IPRE, as provided in Annex 6. The risk weights associated with each category are:

**Supervisory categories and UL risk weights for high-volatility commercial real estate**

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

281. As indicated in paragraph 276, each supervisory category broadly corresponds to a range of external credit assessments.

282. At national discretion, supervisors may allow banks to assign preferential risk weights of 70% to "strong" exposures, and 95% to "good" exposures, provided they have a remaining maturity of less than 2.5 years or the supervisor determines that banks' underwriting and other risk characteristics are substantially stronger than specified in the slotting criteria for the relevant supervisory risk category.

**OSFI Notes**

The HVCRE category does not apply to commercial real estate in Canada. Thus the preferential risk weights set out in this paragraph may not be applied to loans secured by Canadian properties.

However, the HVCRE risk weights do apply to loans made by Canadian institutions' foreign operations that are secured by property types designated by the host supervisor as HVCRE, where the host supervisor has given the foreign operation approval to use the IRB approach. In this instance, a Canadian institution shall use the HVCE risk weights required by the foreign supervisor in calculating its consolidated capital requirements for loans secured by these properties.

283. Banks that meet the requirements for the estimation of PD and whose supervisor has chosen to implement a foundation or advanced approach to HVCRE exposures will use the same formula for the derivation of risk weights that is used for other SL exposures, except that they will apply the following asset correlation formula:

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

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

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

284 (i) For hedged exposures to be treated within the scope of the double default framework, capital requirements may be calculated according to paragraphs 284 (ii) and 284 (iii).

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

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

$K_0$  is calculated in the same way as a capital requirement for an unhedged corporate exposure (as defined in paragraphs 272 and 273), but using different parameters for LGD and the maturity adjustment.

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

$PD_o$  and  $PD_g$  are the probabilities of default of the obligor and guarantor, respectively, both subject to the PD floor set out in paragraph 285. The correlation  $\rho_{os}$  is calculated according to the formula for correlation (R) in paragraph 272 (or, if applicable, paragraph 273), with PD being equal to  $PD_o$ , and  $LGD_g$  is the LGD of a comparable direct exposure to the guarantor (i.e., consistent with paragraph 301, the LGD associated with an unhedged facility to the guarantor or the unhedged facility to the obligor, depending upon whether in the event both the guarantor and the obligor default during the life of the hedged transaction available evidence and the structure of the guarantee indicate that the amount recovered would depend on the financial condition of the guarantor or obligor, respectively; in estimating either of these LGDs, a bank may recognise collateral posted exclusively against the exposure or credit protection, respectively, in a manner consistent with paragraphs 303 or 279 and 468 to 473, as applicable). There may be no consideration of double recovery in the LGD estimate. The maturity adjustment coefficient  $b$  is calculated according to the formula for maturity adjustment (b) in paragraph 272, with PD being the minimum of  $PD_o$  and  $PD_g$ .  $M$  is the effective maturity of the credit protection, which may under no circumstances be below the one-year floor if the double default framework is to be applied.

284 (iii) The risk-weighted asset amount is calculated in the same way as for unhedged exposures, i.e.

$$RWA_{DD} = K_{DD} \cdot 12.5 \cdot EAD_g.$$

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### 5.3.2. *Risk components*

#### (i) **Probability of default (PD)**

285. For corporate and bank exposures, the PD is the greater of the one-year PD associated with the internal borrower grade to which that exposure is assigned, or 0.03%. For sovereign exposures, the PD is the one-year PD associated with the internal borrower grade to which that exposure is assigned. The PD of borrowers assigned to a default grade(s), consistent with the reference definition of default, is 100%. The minimum requirements for the derivation of the PD estimates associated with each internal borrower grade are outlined in paragraphs 461 to 463.

#### (ii) **Loss given default (LGD)**

286. A bank must provide an estimate of the LGD for each corporate, sovereign and bank exposure. There are two approaches for deriving this estimate: a foundation approach and an advanced approach.

##### *LGD under the foundation approach*

##### *Treatment of unsecured claims and non-recognised collateral*

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

288. All subordinated claims on corporates, sovereigns and banks will be assigned a 75% LGD. A subordinated loan is a facility that is expressly subordinated to another facility. At national discretion, supervisors may choose to employ a wider definition of subordination. This might include economic subordination, such as cases where the facility is unsecured and the bulk of the borrower's assets are used to secure other exposures.

#### **OSFI Notes**

The legal definition of subordination applies for the purpose of applying the 75% supervisory LGD.

##### *Collateral under the foundation approach*

289. In addition to the eligible financial collateral recognised in the standardised approach, under the foundation IRB approach some other forms of collateral, known as eligible IRB collateral, are also recognised. These include receivables, specified commercial and residential real estate (CRE/RRE), and other collateral, where they meet the minimum requirements set out in paragraphs 509 to 524.<sup>97</sup> For eligible financial collateral, the requirements are identical to the operational standards as set out in section 4.1 beginning with paragraph 111.

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<sup>97</sup> The Committee, however, recognises that, in exceptional circumstances for well-developed and long-established markets, mortgages on office and/or multi-purpose commercial premises and/or multi-tenanted commercial premises may have the potential to receive alternative recognition as collateral in the corporate



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*Methodology for recognition of eligible financial collateral under the foundation approach*

290. The methodology for the recognition of eligible financial collateral closely follows that outlined in the comprehensive approach to collateral in the standardised approach in paragraphs 147 to 181 (i). The simple approach to collateral presented in the standardised approach will not be available to banks applying the IRB approach.

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

- LGD is that of the senior unsecured exposure before recognition of collateral (45%);
- E is the current value of the exposure (i.e. cash lent or securities lent or posted);
- E\* is the exposure value after risk mitigation as determined in paragraphs 147 to 150 of the standardised approach. This concept is only used to calculate LGD\*. Banks must continue to calculate EAD without taking into account the presence of any collateral, unless otherwise specified.

$$\text{LGD}^* = \text{LGD} \times (\text{E}^* / \text{E})$$

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

293. Where repo-style transactions are subject to a master netting agreement, a bank may choose not to recognise the netting effects in calculating capital. Banks that want to recognise the effect of master netting agreements on such transactions for capital purposes must satisfy the criteria provided in paragraph 173 and 174 of the standardised approach. The bank must calculate E\* in accordance with paragraphs 176 and 177 or 178 to 181 (i) and equate this to EAD. The impact of collateral on these transactions may not be reflected through an adjustment to LGD.

*Carve out from the comprehensive approach*

294. As in the standardised approach, for transactions where the conditions in paragraph 170 are met, and in addition, the counterparty is a core market participant as specified in paragraph 171, supervisors may choose not to apply the haircuts specified under the comprehensive approach, but instead to apply a zero H.

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portfolio. The LGD applied to the collateralised portion of such exposures, subject to the limitations set out in paragraphs 119 to 181 (i) of the standardised approach, will be set at 35%. The LGD applied to the remaining portion of this exposure will be set at 45%. In order to ensure consistency with the capital charges in the standardised approach (while providing a small capital incentive in the IRB approach relative to the standardised approach), supervisors may apply a cap on the capital charge associated with such exposures so as to achieve comparable treatment in both approaches.



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### *Methodology for recognition of eligible IRB collateral*

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

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

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

#### **Minimum LGD for secured portion of senior exposures**

	<b>Minimum LGD</b>	<b>Required minimum collateralisation level of the exposure (C*)</b>	<b>Required level of over-collateralisation for full LGD recognition (C**)</b>
Eligible Financial collateral	0%	0%	n.a.
Receivables	35%	0%	125%
CRE/RRE	35%	30%	140%
Other collateral <sup>98</sup>	40%	30%	140%

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

### *Methodology for the treatment of pools of collateral*

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

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<sup>98</sup> Other collateral excludes physical assets acquired by the bank as a result of a loan default.

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- In the case where a bank has obtained multiple forms of CRM, it will be required to subdivide the adjusted value of the exposure (after the haircut for eligible financial collateral) into portions each covered by only one CRM type. That is, the bank must divide the exposure into the portion covered by eligible financial collateral, the portion covered by receivables, the portion covered by CRE/RRE collateral, a portion covered by other collateral, and an unsecured portion, where relevant.
  - Where the ratio of the sum of the value of CRE/RRE and other collateral to the reduced exposure (after recognising the effect of eligible financial collateral and receivables collateral) is below the associated threshold level (i.e. the minimum degree of collateralisation of the exposure), the exposure would receive the appropriate unsecured LGD value of 45%.
  - The risk-weighted assets for each fully secured portion of exposure must be calculated separately.

#### *LGD under the advanced approach*

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

298. The minimum requirements for the derivation of LGD estimates are outlined in paragraphs 468 to 473.

#### *Treatment of certain repo-style transactions*

299. Banks that want to recognise the effects of master netting agreements on repo-style transactions for capital purposes must apply the methodology outlined in paragraph 293 for determining E\* for use as the EAD. For banks using the advanced approach, own LGD estimates would be permitted for the unsecured equivalent amount (E\*).

#### *Treatment of guarantees and credit derivatives*

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

301. Under either approach, CRM in the form of guarantees and credit derivatives must not reflect the effect of double default (see paragraph 482). As such, to the extent that the CRM is recognised by the bank, the adjusted risk weight will not be less than that of a comparable direct exposure to the protection provider. Consistent with the standardised approach, banks may choose not to recognise credit protection if doing so would result in a higher capital requirement.

#### *Recognition under the foundation approach*

302. For banks using the foundation approach for LGD, the approach to guarantees and credit derivatives closely follows the treatment under the standardised approach as specified in

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paragraphs 189 to 201. The range of eligible guarantors is the same as under the standardised approach except that companies that are internally rated and associated with a PD equivalent to A- or better may also be recognised under the foundation approach. To receive recognition, the requirements outlined in paragraphs 189 to 194 must be met.

303. Eligible guarantees from eligible guarantors will be recognised as follows:

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

#### **OSFI Notes**

Although the PD component may be adjusted to lie somewhere between those of the guarantor and the obligor if the guarantor's PD is not appropriate, note that LGD may only be substituted and may not be adjusted.

Paragraph 301 establishes a floor on the recognition of a guarantee. Therefore, the PD and LGD used for the covered portion of an exposure under the foundation approach must not result in a risk weight that is lower than that of a comparable direct exposure to the guarantor. While substituting both the PD and LGD of the guarantor for those of the borrower will result in a risk weight equal to that of a direct exposure to the guarantor, replacing or adjusting only one of these components could result in a risk weight that is lower. Paragraph 303 notwithstanding, institutions are not permitted to combine a risk component of the guarantor with a component of the underlying obligation in the risk weight formula if doing so results in a risk weight lower than that of a comparable direct exposure to the guarantor.

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

305. Where partial coverage exists, or where there is a currency mismatch between the underlying obligation and the credit protection, it is necessary to split the exposure into a covered and an uncovered amount. The treatment in the foundation approach follows that outlined in the standardised approach in paragraphs 198 to 200, and depends upon whether the cover is proportional or tranching.

#### *Recognition under the advanced approach*

306. Banks using the advanced approach for estimating LGDs may reflect the risk-mitigating effect of guarantees and credit derivatives through either adjusting PD or LGD estimates. Whether adjustments are done through PD or LGD, they must be done in a consistent manner

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for a given guarantee or credit derivative type. In doing so, banks must not include the effect of double default in such adjustments. Thus, the adjusted risk weight must not be less than that of a comparable direct exposure to the protection provider.

### OSFI Notes

Under all circumstances, with the exception of transactions qualifying for double default treatment, the risk weight of a guaranteed exposure cannot be lower than that of a comparable direct claim on the guarantor. This assumes that any claim on the guarantor will be net of any recovery from the collateral pledged by the borrower, and reflects the Basel Committee's explanation of why it prohibits the recognition of double recovery in the double default framework.

In determining the risk weight for a comparable direct exposure, banks should take into account both the seniority and the exposure at default of the direct exposure.

When an adjustment is made to PD, the risk weight function used for the guaranteed exposure should be that of the protection provider. However, when an adjustment is made to LGD the risk weight function used must be the one applicable to the original exposure.

307. A bank relying on own-estimates of LGD has the option to adopt the treatment outlined above for banks under the foundation IRB approach (paragraphs 302 to 305), or to make an adjustment to its LGD estimate of the exposure to reflect the presence of the guarantee or credit derivative. Under this option, there are no limits to the range of eligible guarantors although the set of minimum requirements provided in paragraphs 483 and 484 concerning the type of guarantee must be satisfied. For credit derivatives, the requirements of paragraphs 488 and 489 must be satisfied.<sup>99</sup>

#### *Operational requirements for recognition of double default*

307 (i) A bank using an IRB approach has the option of using the substitution approach in determining the appropriate capital requirement for an exposure. However, for exposures hedged by one of the following instruments the double default framework according to paragraphs 284 (i) to 284 (iii) may be applied subject to the additional operational requirements set out in paragraph 307 (ii). A bank may decide separately for each eligible exposure to apply either the double default framework or the substitution approach.

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- (a) Single-name, unfunded credit derivatives (e.g. credit default swaps) or single-name guarantees.

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  - (b) First-to-default basket products — the double default treatment will be applied to the asset within the basket with the lowest risk-weighted amount.

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  - (c)  $n^{\text{th}}$ -to-default basket products — the protection obtained is only eligible for consideration under the double default framework if eligible  $(n-1)^{\text{th}}$  default protection
- 

<sup>99</sup> When credit derivatives do not cover the restructuring of the underlying obligation, the partial recognition set out in paragraph 192 applies.

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has also been obtained or where  $(n-1)$  of the assets within the basket have already defaulted.

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307 (ii) The double default framework is only applicable where the following conditions are met.

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(a) The risk weight that is associated with the exposure prior to the application of the framework does not already factor in any aspect of the credit protection.

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(b) The entity selling credit protection is a bank<sup>100</sup>, investment firm or insurance company (but only those that are in the business of providing credit protection, including mono-lines, re-insurers, and non-sovereign credit export agencies<sup>101</sup>), referred to as a financial firm, that:

- is regulated in a manner broadly equivalent to that in this Framework (where there is appropriate supervisory oversight and transparency/market discipline), or externally rated as at least investment grade by a credit rating agency deemed suitable for this purpose by supervisors;
  - had an internal rating with a PD equivalent to or lower than that associated with an external A– rating at the time the credit protection for an exposure was first provided or for any period of time thereafter; and
  - has an internal rating with a PD equivalent to or lower than that associated with an external investment-grade rating.
- 

(c) The underlying obligation is:

- a corporate exposure as defined in paragraphs 218 to 228 (excluding specialised lending exposures for which the supervisory slotting criteria approach described in paragraphs 275 to 282 is being used); or
  - a claim on a PSE that is not a sovereign exposure as defined in paragraph 229; or
  - a loan extended to a small business and classified as a retail exposure as defined in paragraph 231.
- 

(d) The underlying obligor is **not**:

- a financial firm as defined in (b); or
  - a member of the same group as the protection provider.
- 

(e) The credit protection meets the minimum operational requirements for such instruments as outlined in paragraphs 189 to 193.

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<sup>100</sup> This does not include PSEs and MDBs, even though claims on these may be treated as claims on banks according to paragraph 230.

<sup>101</sup> By non-sovereign it is meant that credit protection in question does not benefit from any explicit sovereign counter-guarantee.

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- (f) In keeping with paragraph 190 for guarantees, for any recognition of double default effects for both guarantees and credit derivatives a bank must have the right and expectation to receive payment from the credit protection provider without having to take legal action in order to pursue the counterparty for payment. To the extent possible, a bank should take steps to satisfy itself that the protection provider is willing to pay promptly if a credit event should occur.
- 
- (g) The purchased credit protection absorbs all credit losses incurred on the hedged portion of an exposure that arise due to the credit events outlined in the contract.
- 
- (h) If the payout structure provides for physical settlement, then there must be legal certainty with respect to the deliverability of a loan, bond, or contingent liability. If a bank intends to deliver an obligation other than the underlying exposure, it must ensure that the deliverable obligation is sufficiently liquid so that the bank would have the ability to purchase it for delivery in accordance with the contract.
- 
- (i) The terms and conditions of credit protection arrangements must be legally confirmed in writing by both the credit protection provider and the bank.
- 
- (j) In the case of protection against dilution risk, the seller of purchased receivables must not be a member of the same group as the protection provider.
- 
- (k) There is no excessive correlation between the creditworthiness of a protection provider and the obligor of the underlying exposure due to their performance being dependent on common factors beyond the systematic risk factor. The bank has a process to detect such excessive correlation. An example of a situation in which such excessive correlation would arise is when a protection provider guarantees the debt of a supplier of goods or services and the supplier derives a high proportion of its income or revenue from the protection provider.
- 

**(iii) Exposure at default (EAD)**

308. The following sections apply to both on and off-balance sheet positions. All exposures are measured gross of specific provisions or partial write-offs. The EAD on drawn amounts should not be less than the sum of (i) the amount by which a bank's regulatory capital would be reduced if the exposure were written-off fully, and (ii) any specific provisions and partial write-offs. When the difference between the instrument's EAD and the sum of (i) and (ii) is positive, this amount is termed a discount. The calculation of risk-weighted assets is independent of any discounts. Under the limited circumstances described in paragraph 380, discounts may be included in the measurement of total eligible provisions for purposes of the EL-provision calculation set out in section 5.7.

*Exposure measurement for on-balance sheet items*

309. On-balance sheet netting of loans and deposits will be recognised subject to the same conditions as under the standardised approach (see paragraph 188). Where currency or maturity mismatched on-balance sheet netting exists, the treatment follows the standardised approach, as set out in paragraphs 200 and 202 to 205.

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

310. For off-balance sheet items, exposure is calculated as the committed but undrawn amount multiplied by a CCF. There are two approaches for the estimation of CCFs: a foundation approach and an advanced approach.

*EAD under the foundation approach*

311. The types of instruments and the CCFs applied to them are the same as those in the standardised approach, as outlined in chapter 3 with the exception of commitments, Note Issuance Facilities (NIFs) and Revolving Underwriting Facilities (RUFs).

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

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

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

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

*EAD under the advanced approach*

316. Banks which meet the minimum requirements for use of their own estimates of EAD (see paragraphs 474 to 478) will be allowed to use their own internal estimates of CCFs across different product types provided the exposure is not subject to a CCF of 100% in the foundation approach (see paragraph 311).

*Exposure measurement for transactions that expose banks to counterparty credit risk*

317. Measures of exposure for SFTs and OTC derivatives that expose banks to counterparty credit risk under the IRB approach will be calculated as per the rules set forth in Annex 4 of this guideline.



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**(iv) Effective maturity (M)**

318. For banks using the foundation approach for corporate exposures, effective maturity (M) will be 2.5 years except for repo-style transactions where the effective maturity will be 6 months. National supervisors may choose to require all banks in their jurisdiction (those using the foundation and advanced approaches) to measure M for each facility using the definition provided below.

**OSFI Notes**

Institutions using the FIRB approach are required to calculate an explicit M adjustment.

319. Banks using any element of the advanced IRB approach are required to measure effective maturity for each facility as defined below. However, national supervisors may exempt facilities to certain smaller domestic corporate borrowers from the explicit maturity adjustment if the reported sales (i.e. turnover) as well as total assets for the consolidated group of which the firm is a part of are less than CAD \$625 million. The consolidated group has to be a domestic company based in the country where the exemption is applied. If adopted, national supervisors must apply such an exemption to all IRB banks using the advanced approach in that country, rather than on a bank-by-bank basis. If the exemption is applied, all exposures to qualifying smaller domestic firms will be assumed to have an average maturity of 2.5 years, as under the foundation IRB approach.

**OSFI Notes**

The exemption does not apply when lending to borrowers in Canada.

320. Except as noted in paragraph 321, M is defined as the greater of one year and the remaining effective maturity in years as defined below. In all cases, M will be no greater than 5 years.

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

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

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

- If a bank is not in a position to calculate the effective maturity of the contracted payments as noted above, it is allowed to use a more conservative measure of M such as that it equals the maximum remaining time (in years) that the borrower is permitted to take to fully discharge its contractual obligation (principal, interest, and fees) under the terms of loan agreement. Normally, this will correspond to the nominal maturity of the instrument.
- For derivatives subject to a master netting agreement, the weighted average maturity of the transactions should be used when applying the explicit maturity



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adjustment. Further, the notional amount of each transaction should be used for weighting the maturity.

321. The one-year floor does not apply to certain short-term exposures, comprising fully or nearly-fully collateralised<sup>102</sup> capital market-driven transactions (i.e., OTC derivatives transactions and margin lending) and repo-style transactions (i.e., repos/reverse repos and securities lending/borrowing) with an original maturity of less than one year, where the documentation contains daily remargining clauses. For all eligible transactions the documentation must require daily revaluation, and must include provisions that must allow for the prompt liquidation or setoff of the collateral in the event of default or failure to re-margin. The maturity of such transactions must be calculated as the greater of one-day, and the effective maturity (M, consistent with the definition above).

322. In addition to the transactions considered in paragraph 321 above, other short-term exposures with an original maturity of less than one year that are not part of a bank's ongoing financing of an obligor may be eligible for exemption from the one-year floor. After a careful review of the particular circumstances in their jurisdictions, national supervisors should define the types of short-term exposures that might be considered eligible for this treatment. The results of these reviews might, for example, include transactions such as:

- Some capital market-driven transactions and repo-style transactions that might not fall within the scope of paragraph 321;

#### **OSFI Notes**

These are repo-style transactions, interbank loans and deposits with a maturity of under one-year.

- Some short-term self-liquidating trade transactions. Import and export letters of credit and similar transactions could be accounted for at their actual remaining maturity;
- Some exposures arising from settling securities purchases and sales. This could also include overdrafts arising from failed securities settlements provided that such overdrafts do not continue more than a short, fixed number of business days;
- Some exposures arising from cash settlements by wire transfer, including overdrafts arising from failed transfers provided that such overdrafts do not continue more than a short, fixed number of business days; and
- Some exposures to banks arising from foreign exchange settlements; and
- Some short-term loans and deposits.

#### **OSFI Notes**

The exposures listed in Paragraph 322 are exempted from the one-year floor on maturity adjustments.

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<sup>102</sup> The intention is to include both parties of a transaction meeting these conditions where neither of the parties is systematically under-collateralised.

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323. For transactions falling within the scope of paragraph 321 subject to a master netting agreement, the weighted average maturity of the transactions should be used when applying the explicit maturity adjustment. A floor equal to the minimum holding period for the transaction type set out in paragraph 167 will apply to the average. Where more than one transaction type is contained in the master netting agreement a floor equal to the highest holding period will apply to the average. Further, the notional amount of each transaction should be used for weighting maturity.

324. Where there is no explicit adjustment, the effective maturity (M) assigned to all exposures is set at 2.5 years unless otherwise specified in paragraph 318.

#### *Treatment of maturity mismatches*

325. The treatment of maturity mismatches under IRB is identical to that in the standardised approach – see paragraphs 202 to 205.

### **5.4. Rules for Retail Exposures**

326. This section presents in detail the method of calculating the UL capital requirements for retail exposures. Section 5.4.1. provides three risk-weight functions, one for residential mortgage exposures, a second for qualifying revolving retail exposures, and a third for other retail exposures. Section 5.4.2. presents the risk components to serve as inputs to the risk-weight functions. The method of calculating expected losses, and for determining the difference between that measure and provisions is described in Section 5.7.

#### *5.4.1. Risk-weighted assets for retail exposures*

327. There are three separate risk-weight functions for retail exposures, as defined in paragraphs 328 to 330. Risk weights for retail exposures are based on separate assessments of PD and LGD as inputs to the risk-weight functions. None of the three retail risk-weight functions contains an explicit maturity adjustment. Throughout this section, PD and LGD are measured as decimals, and EAD is measured as currency (e.g. euros).

#### **(i) Residential mortgage exposures**

328. For exposures defined in paragraph 231 that are not in default and are secured or partly secured<sup>103</sup> by residential mortgages, risk weights will be assigned based on the following formula:

Correlation (R) = 0.15

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

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<sup>103</sup> This means that risk weights for residential mortgages also apply to the unsecured portion of such residential mortgages.

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

The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in paragraph 468) and the bank's best estimate of expected loss (described in paragraph 471). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

**(ii) Qualifying revolving retail exposures**

329. For qualifying revolving retail exposures as defined in paragraph 234 that are not in default, risk weights are defined based on the following formula:

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

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

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

The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in paragraph 468) and the bank's best estimate of expected loss (described in paragraph 471). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

**(iii) Other retail exposures**

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

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

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

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

The capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD (described in paragraph 468) and the bank's best estimate of expected loss (described in paragraph 471). The risk-weighted asset amount for the defaulted exposure is the product of K, 12.5, and the EAD.

Illustrative risk weights are shown in Annex 5.

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#### 5.4.2. *Risk components*

##### (i) **Probability of default (PD) and loss given default (LGD)**

331. For each identified pool of retail exposures, banks are expected to provide an estimate of the PD and LGD associated with the pool, subject to the minimum requirements as set out in section 5.8. Additionally, the PD for retail exposures is the greater of the one-year PD associated with the internal borrower grade to which the pool of retail exposures is assigned or 0.03%.

##### (ii) **Recognition of guarantees and credit derivatives**

332. Banks may reflect the risk-reducing effects of guarantees and credit derivatives, either in support of an individual obligation or a pool of exposures, through an adjustment of either the PD or LGD estimate, subject to the minimum requirements in paragraphs 480 to 489. Whether adjustments are done through PD or LGD, they must be done in a consistent manner for a given guarantee or credit derivative type.

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

##### (iii) **Exposure at default (EAD)**

334. Both on and off-balance sheet retail exposures are measured gross of specific provisions or partial write-offs. The EAD on drawn amounts should not be less than the sum of (i) the amount by which a bank's regulatory capital would be reduced if the exposure were written-off fully, and (ii) any specific provisions and partial write-offs. When the difference between the instrument's EAD and the sum of (i) and (ii) is positive, this amount is termed a discount. The calculation of risk-weighted assets is independent of any discounts. Under the limited circumstances described in paragraph 380, discounts may be included in the measurement of total eligible provisions for purposes of the EL-provision calculation set out in section 5.7.

335. On-balance sheet netting of loans and deposits of a bank to or from a retail customer will be permitted subject to the same conditions outlined in paragraph 188 of the standardised approach. For retail off-balance sheet items, banks must use their own estimates of CCFs provided the minimum requirements in paragraphs 474 to 477 and 479 are satisfied.

336. For retail exposures with uncertain future drawdown such as credit cards, banks must take into account their history and/or expectation of additional drawings prior to default in their overall calibration of loss estimates. In particular, where a bank does not reflect conversion factors for undrawn lines in its EAD estimates, it must reflect in its LGD estimates the likelihood of additional drawings prior to default. Conversely, if the bank does not incorporate the possibility of additional drawings in its LGD estimates, it must do so in its EAD estimates.

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337. When only the drawn balances of retail facilities have been securitised, banks must ensure that they continue to hold required capital against their share (i.e. seller's interest) of undrawn balances related to the securitised exposures using the IRB approach to credit risk. This means that for such facilities, banks must reflect the impact of CCFs in their EAD estimates rather than in the LGD estimates. For determining the EAD associated with the seller's interest in the undrawn lines, the undrawn balances of securitised exposures would be allocated between the seller's and investors' interests on a pro rata basis, based on the proportions of the seller's and investors' shares of the securitised drawn balances. The investors' share of undrawn balances related to the securitised exposures is subject to the treatment in paragraph 643.

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

## 5.5. Rules for Equity Exposures

339. This section presents the method of calculating the UL capital requirements for equity exposures. Section 5.5.1. discusses (a) the market-based approach (which is further subdivided into a simple risk weight method and an internal models method), and (b) the PD/LGD approach. The risk components are provided in section 5.5.2. The method of calculating expected losses, and for determining the difference between that measure and provisions is described in section 5.7.

### 5.5.1. *Risk-weighted assets for equity exposures*

340. Risk-weighted assets for equity exposures in the trading book are subject to the market risk capital rules.

341. There are two approaches to calculate risk-weighted assets for equity exposures not held in the trading book: a market-based approach and a PD/LGD approach. Supervisors will decide which approach or approaches will be used by banks, and in what circumstances. Certain equity holdings are excluded as defined in paragraphs 356 to 358 and are subject to the capital charges required under the standardised approach.

### **OSFI Notes**

Institutions may use the equity PD/LGD approach for non-tier 1 perpetual preferred shares without a redeemable feature and for perpetual preferred shares that are redeemable at the issuer's option. Institutions must use the market-based approach (MBA) to determine capital requirements for all other equity exposures in the banking book. Under the MBA, an institution calculates the minimum capital requirements for its banking book equity holdings using one or both of two separate methods: the simple risk weight method or the internal models method. Where an internal model is used, minimum quantitative and qualitative requirements have to be met on an ongoing basis. Certain equity holdings are excluded as defined in paragraphs 357 and 358 (see Exclusions to the MBA).

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OSFI expects institutions to be able to calculate their own estimates of LGD for those credit businesses to which an AIRB approach applies from year-end 2007. Where mezzanine debt falls into this category, failure to produce own estimates of LGD will be addressed on a case-by-case basis. Where mezzanine debt is not a material credit business in Canada or the US, then a fall back approach to AIRB could be used as part of a transitional arrangement, provided there is a suitable plan to move to the AIRB approach.

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

**(i) Market-based approach**

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

*Simple risk weight method*

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

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

**OSFI Notes**

The offset rule in the above paragraph may be used only for equities under the AIRB simple risk weight approach. It may not be used for equities under the standardized approach nor for equities that are exempt from the AIRB capital charge.

Where such business involves actively managed options trades, an internal market risk model would be more appropriate to the complexity of the risk profile than the IRB simple risk weight method.

When a maturity mismatch occurs for institutions using the simple risk weight method, OSFI will recognize a hedge maturity that is greater than or equal to one year.

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Since the time horizon for the internal models approach to equity is three months, OSFI will recognize a hedge maturity of three months or more for institutions using the internal models approach.

*Internal models method*

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

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

**OSFI Notes**

The minimum risk-weighted equivalent assets calculated for a portfolio of equity positions using an approved internal model is the greater of:

- 12.5 times the capital charge for the portfolio derived from the institution's approved equity model, or
- 200% of the total of the portfolio's absolute net positions in publicly traded equities, plus 300% of the total of the portfolio's absolute net positions in all other equities, where short positions and recognition of netting are subject to the same conditions as in paragraph 345.

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

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



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**(ii) PD/LGD approach**

**OSFI Notes**

The PD/LGD approach may be used only for non-tier 1 perpetual preferred shares without a redeemable feature and for perpetual preferred shares with a redeemable feature at the issuer's option.

350. The minimum requirements and methodology for the PD/LGD approach for equity exposures (including equity of companies that are included in the retail asset class) are the same as those for the IRB foundation approach for corporate exposures subject to the following specifications:<sup>104</sup>

- The bank's estimate of the PD of a corporate entity in which it holds an equity position must satisfy the same requirements as the bank's estimate of the PD of a corporate entity where the bank holds debt.<sup>105</sup> If a bank does not hold debt of the company in whose equity it has invested, and does not have sufficient information on the position of that company to be able to use the applicable definition of default in practice but meets the other standards, a 1.5 scaling factor will be applied to the risk weights derived from the corporate risk-weight function, given the PD set by the bank. If, however, the bank's equity holdings are material and it is permitted to use a PD/LGD approach for regulatory purposes but the bank has not yet met the relevant standards, the simple risk-weight method under the market-based approach will apply.
- An LGD of 90% would be assumed in deriving the risk weight for equity exposures.
- For these purposes, the risk weight is subject to a five-year maturity adjustment whether or not the bank is using the explicit approach to maturity elsewhere in its IRB portfolio.

351. Under the PD/LGD approach, minimum risk weights as set out in paragraphs 352 and 353 apply. When the sum of UL and EL associated with the equity exposure results in less capital than would be required from application of one of the minimum risk weights, the minimum risk weights must be used. In other words, the minimum risk weights must be applied, if the risk weights calculated according to paragraph 350 plus the EL associated with the equity exposure multiplied by 12.5 are smaller than the applicable minimum risk weights.

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

- Public equities where the investment is part of a long-term customer relationship, any capital gains are not expected to be realised in the short term and there is no anticipation of (above trend) capital gains in the long term. It is expected that in almost all cases, the institution will have lending and/or general banking

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<sup>104</sup> There is no advanced approach for equity exposures, given the 90% LGD assumption.

<sup>105</sup> In practice, if there is both an equity exposure and an IRB credit exposure to the same counterparty, a default on the credit exposure would thus trigger a simultaneous default for regulatory purposes on the equity exposure.

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relationships with the portfolio company so that the estimated probability of default is readily available. Given their long-term nature, specification of an appropriate holding period for such investments merits careful consideration. In general, it is expected that the bank will hold the equity over the long term (at least five years).

- Private equities where the returns on the investment are based on regular and periodic cash flows not derived from capital gains and there is no expectation of future (above trend) capital gain or of realising any existing gain.

353. For all other equity positions, including net short positions (as defined in paragraph 345), capital charges calculated under the PD/LGD approach may be no less than the capital charges that would be calculated under a simple risk weight method using a 200% risk weight for publicly traded equity holdings and a 300% risk weight for all other equity holdings.

354. The maximum risk weight for the PD/LGD approach for equity exposures is 1250%. This maximum risk weight can be applied, if risk weights calculated according to paragraph 350 plus the EL associated with the equity exposure multiplied by 12.5 exceed the 1250% risk weight. Alternatively, banks may deduct the entire equity exposure amount, assuming it represents the EL amount, 50% from Tier 1 capital and 50% from Tier 2 capital.

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

### **(iii) Exclusions to the market-based and PD/LGD approaches**

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

#### **OSFI Notes**

Only exposures to corporations that are wholly owned by sovereigns may be treated as exposures to sovereigns. This would preclude institutions' ownership interests in these corporations from receiving sovereign treatment. Exceptions, if any, will be treated on a case-by-case basis, and where the exceptions are significant, they will be identified in the instructions to the reporting forms.

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

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## OSFI Notes

Equity investments made pursuant to the *Specialized Financing (Banks) Regulations* of the *Bank Act* qualify for this exclusion and are risk weighted at 100%. This treatment is extended to Canadian institution foreign operations' holdings of equities made under nationally legislated programs of the countries in which they operate.

358. Supervisors may also exclude the equity exposures of a bank from the IRB treatment based on materiality. The equity exposures of a bank are considered material if their aggregate value, excluding all legislative programmes discussed in paragraph 357, exceeds, on average over the prior year, 10% of bank's Tier 1 plus Tier 2 capital. This materiality threshold is lowered to 5% of a bank's Tier 1 plus Tier 2 capital if the equity portfolio consists of less than 10 individual holdings. National supervisors may use lower materiality thresholds.

## OSFI Notes

An institution is not required to use the AIRB approach if the aggregate carrying value of its equities, including holdings subject to transitional provisions (see Transitional Arrangements paragraph 267), but excluding holdings subject to exemptions (see paragraph 357), is less than or equal to 10% of tier 1 and tier 2 capital. Equity investments that qualify for this materiality exemption are risk weighted at 100%. If this exposure, averaged over the prior year, exceeds 10% of the institution's tier 1 and tier 2 capital, the AIRB approach will apply. For the purpose of calculating the materiality threshold, institutions should only include equity positions that are recorded as assets on the balance sheet.

Grandfathering is a one-time exemption commencing from the implementation date and limited to the total amount of equity investments and commitments held as of July 1, 2004. Switching from materiality to grandfathering after implementation would be inconsistent with the intent of accommodating only those investments made prior to the publication of the new rules.

An institution qualifying for the materiality exemption will also be eligible for the nationally legislated programs exemption for investments made pursuant to the *Bank Act*, *Specialized Financing (Banks) Regulations*. Holdings that are eligible for the legislated programs exemption but exceed the exemption limit must be included in the calculation of the materiality threshold.

### 5.5.2. *Risk components*

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

- For investments held at fair value with changes in value flowing directly through income and into regulatory capital, exposure is equal to the fair value presented in the balance sheet.

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- For investments held at fair value with changes in value not flowing through income but into a tax-adjusted separate component of equity, exposure is equal to the fair value presented in the balance sheet.
  - For investments held at cost or at the lower of cost or market, exposure is equal to the cost or market value presented in the balance sheet.<sup>106</sup>

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

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

#### **OSFI Notes**

See paragraphs 525 to 537 for the calculation of capital charges for equity exposures.

### **5.6. Rules for Purchased Receivables**

362. Section 5.6 presents the method of calculating the UL capital requirements for purchased receivables. For such assets, there are IRB capital charges for both default risk and dilution risk. Section 5.6.1. discusses the calculation of risk-weighted assets for default risk. The calculation of risk-weighted assets for dilution risk is provided in section 5.6.2. The method of calculating expected losses, and for determining the difference between that measure and provisions, is described in section 5.7.

#### **5.6.1. Risk-weighted assets for default risk**

363. For receivables belonging unambiguously to one asset class, the IRB risk weight for default risk is based on the risk-weight function applicable to that particular exposure type, as long as the bank can meet the qualification standards for this particular risk-weight function. For example, if banks cannot comply with the standards for qualifying revolving retail exposures (defined in paragraph 234), they should use the risk-weight function for other retail exposures. For hybrid pools containing mixtures of exposure types, if the purchasing bank cannot separate the exposures by type, the risk-weight function producing the highest capital requirements for the exposure types in the receivable pool applies.

#### **(i) Purchased retail receivables**

364. For purchased retail receivables, a bank must meet the risk quantification standards for retail exposures but can utilise external and internal reference data to estimate the PDs and

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<sup>106</sup> This does not affect the existing allowance of 45% of unrealised gains to Tier 2 capital in the 1988 Accord.

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LGDs. The estimates for PD and LGD (or EL) must be calculated for the receivables on a stand-alone basis; that is, without regard to any assumption of recourse or guarantees from the seller or other parties.

**(ii) Purchased corporate receivables**

365. For purchased corporate receivables the purchasing bank is expected to apply the existing IRB risk quantification standards for the bottom-up approach. However, for eligible purchased corporate receivables, and subject to supervisory permission, a bank may employ the following top-down procedure for calculating IRB risk weights for default risk:

- The purchasing bank will estimate the pool's one-year EL for default risk, expressed in percentage of the exposure amount (i.e. the total EAD amount to the bank by all obligors in the receivables pool). The estimated EL must be calculated for the receivables on a stand-alone basis; that is, without regard to any assumption of recourse or guarantees from the seller or other parties. The treatment of recourse or guarantees covering default risk (and/or dilution risk) is discussed separately below.
- Given the EL estimate for the pool's default losses, the risk weight for default risk is determined by the risk-weight function for corporate exposures.<sup>107</sup> As described below, the precise calculation of risk weights for default risk depends on the bank's ability to decompose EL into its PD and LGD components in a reliable manner. Banks can utilise external and internal data to estimate PDs and LGDs. However, the advanced approach will not be available for banks that use the foundation approach for corporate exposures.

*Foundation IRB treatment*

366. If the purchasing bank is unable to decompose EL into its PD and LGD components in a reliable manner, the risk weight is determined from the corporate risk-weight function using the following specifications: if the bank can demonstrate that the exposures are exclusively senior claims to corporate borrowers, an LGD of 45% can be used. PD will be calculated by dividing the EL using this LGD. EAD will be calculated as the outstanding amount minus the capital charge for dilution prior to credit risk mitigation ( $K_{\text{Dilution}}$ ). Otherwise, PD is the bank's estimate of EL; LGD will be 100%; and EAD is the amount outstanding minus  $K_{\text{Dilution}}$ . EAD for a revolving purchase facility is the sum of the current amount of receivables purchased plus 75% of any undrawn purchase commitments minus  $K_{\text{Dilution}}$ . If the purchasing bank is able to estimate PD in a reliable manner, the risk weight is determined from the corporate risk-weight functions according to the specifications for LGD, M and the treatment of guarantees under the foundation approach as given in paragraphs 287 to 296, 299, 300 to 305, and 318.

*Advanced IRB treatment*

367. If the purchasing bank can estimate either the pool's default-weighted average loss rates given default (as defined in paragraph 468) or average PD in a reliable manner, the bank may

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<sup>107</sup> The firm-size adjustment for SME, as defined in paragraph 273, will be the weighted average by individual exposure of the pool of purchased corporate receivables. If the bank does not have the information to calculate the average size of the pool, the firm-size adjustment will not apply.

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estimate the other parameter based on an estimate of the expected long-run loss rate. The bank may (i) use an appropriate PD estimate to infer the long-run default-weighted average loss rate given default, or (ii) use a long-run default-weighted average loss rate given default to infer the appropriate PD. In either case, it is important to recognise that the LGD used for the IRB capital calculation for purchased receivables cannot be less than the long-run default-weighted average loss rate given default and must be consistent with the concepts defined in paragraph 468. The risk weight for the purchased receivables will be determined using the bank's estimated PD and LGD as inputs to the corporate risk-weight function. Similar to the foundation IRB treatment, EAD will be the amount outstanding minus  $K_{\text{Dilution}}$ . EAD for a revolving purchase facility will be the sum of the current amount of receivables purchased plus 75% of any undrawn purchase commitments minus  $K_{\text{Dilution}}$  (thus, banks using the advanced IRB approach will not be permitted to use their internal EAD estimates for undrawn purchase commitments).

368. For drawn amounts, M will equal the pool's exposure-weighted average effective maturity (as defined in paragraphs 320 to 324). This same value of M will also be used for undrawn amounts under a committed purchase facility provided the facility contains effective covenants, early amortisation triggers, or other features that protect the purchasing bank against a significant deterioration in the quality of the future receivables it is required to purchase over the facility's term. Absent such effective protections, the M for undrawn amounts will be calculated as the sum of (a) the longest-dated potential receivable under the purchase agreement and (b) the remaining maturity of the purchase facility.

#### 5.6.2. *Risk-weighted assets for dilution risk*

369. Dilution refers to the possibility that the receivable amount is reduced through cash or non-cash credits to the receivable's obligor.<sup>108</sup> For both corporate and retail receivables, unless the bank can demonstrate to its supervisor that the dilution risk for the purchasing bank is immaterial, the treatment of dilution risk must be the following: at the level of either the pool as a whole (top-down approach) or the individual receivables making up the pool (bottom-up approach), the purchasing bank will estimate the one-year EL for dilution risk, also expressed in percentage of the receivables amount. Banks can utilise external and internal data to estimate EL. As with the treatments of default risk, this estimate must be computed on a stand-alone basis; that is, under the assumption of no recourse or other support from the seller or third-party guarantors. For the purpose of calculating risk weights for dilution risk, the corporate risk-weight function must be used with the following settings: the PD must be set equal to the estimated EL, and the LGD must be set at 100%. An appropriate maturity treatment applies when determining the capital requirement for dilution risk. If a bank can demonstrate that the dilution risk is appropriately monitored and managed to be resolved within one year, the supervisor may allow the bank to apply a one-year maturity.

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

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<sup>108</sup> Examples include offsets or allowances arising from returns of goods sold, disputes regarding product quality, possible debts of the borrower to a receivables obligor, and any payment or promotional discounts offered by the borrower (e.g. a credit for cash payments within 30 days).



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### 5.6.3. *Treatment of purchase price discounts for receivables*

371. In many cases, the purchase price of receivables will reflect a discount (not to be confused with the discount concept defined in paragraphs 308 and 334) that provides first loss protection for default losses, dilution losses or both (see paragraph 629). To the extent a portion of such a purchase price discount will be refunded to the seller, this refundable amount may be treated as first loss protection under the IRB securitisation framework. Non-refundable purchase price discounts for receivables do not affect either the EL-provision calculation in section 5.7. or the calculation of risk-weighted assets.

372. When collateral or partial guarantees obtained on receivables provide first loss protection (collectively referred to as mitigants in this paragraph), and these mitigants cover default losses, dilution losses, or both, they may also be treated as first loss protection under the IRB securitisation framework (see paragraph 629). When the same mitigant covers both default and dilution risk, banks using the Supervisory Formula that are able to calculate an exposure-weighted LGD must do so as defined in paragraph 634.

### 5.6.4. *Recognition of credit risk mitigants*

373. Credit risk mitigants will be recognised generally using the same type of framework as set forth in paragraphs 300 to 307.<sup>109</sup> In particular, a guarantee provided by the seller or a third party will be treated using the existing IRB rules for guarantees, regardless of whether the guarantee covers default risk, dilution risk, or both.

- If the guarantee covers both the pool's default risk *and* dilution risk, the bank will substitute the risk weight for an exposure to the guarantor in place of the pool's total risk weight for default and dilution risk.
- If the guarantee covers only default risk or dilution risk, but not both, the bank will substitute the risk weight for an exposure to the guarantor in place of the pool's risk weight for the corresponding risk component (default or dilution). The capital requirement for the other component will then be added.
- If a guarantee covers only a portion of the default and/or dilution risk, the uncovered portion of the default and/or dilution risk will be treated as per the existing CRM rules for proportional or tranching coverage (i.e. the risk weights of the uncovered risk components will be added to the risk weights of the covered risk components).

373 (i). If protection against dilution risk has been purchased, and the conditions of paragraphs 307 (i) and 307 (ii) are met, the double default framework may be used for the calculation of the risk-weighted asset amount for dilution risk. In this case, paragraphs 284 (i) to 284 (iii) apply with  $PD_o$  being equal to the estimated EL,  $LGD_g$  being equal to 100 percent, and effective maturity being set according to paragraph 369.

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<sup>109</sup> At national supervisory discretion, banks may recognise guarantors that are internally rated and associated with a PD equivalent to less than A- under the foundation IRB approach for purposes of determining capital requirements for dilution risk.



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## 5.7. Treatment of expected losses and recognition of provisions

374. Section 5.7. discusses the method by which the difference between provisions (e.g. specific provisions, portfolio-specific general provisions such as country risk provisions or general provisions) and expected losses may be included in or must be deducted from regulatory capital, as outlined in section 2.2.2.2.

### 5.7.1. Calculation of expected losses

375. A bank must sum the EL amount (defined as EL multiplied by EAD) associated with its exposures (excluding the EL amount associated with equity exposures under the PD/LGD approach and securitisation exposures) to obtain a total EL amount. While the EL amount associated with equity exposures subject to the PD/LGD approach is excluded from the total EL amount, paragraphs 376 and 386 apply to such exposures. The treatment of EL for securitisation exposures is described in paragraph 563.

#### (i) Expected loss for exposures other than SL subject to the supervisory slotting criteria

376. Banks must calculate an EL as  $PD \times LGD$  for corporate, sovereign, bank, and retail exposures both not in default and not treated as hedged exposures under the double default treatment. For corporate, sovereign, bank, and retail exposures that are in default, banks must use their best estimate of expected loss as defined in paragraph 471 and banks on the foundation approach must use the supervisory LGD. For SL exposures subject to the supervisory slotting criteria EL is calculated as described in paragraphs 377 and 378. For equity exposures subject to the PD/LGD approach, the EL is calculated as  $PD \times LGD$  unless paragraphs 351 to 354 apply. Securitisation exposures do not contribute to the EL amount, as set out in paragraph 563. For all other exposures, including hedged exposures under the double default treatment, the EL is 0.

#### (ii) Expected loss for SL exposures subject to the supervisory slotting criteria

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

#### *Supervisory categories and EL risk weights for other SL exposures*

378. The risk weights for SL, other than HVCRE, are as follows:

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

Where, at national discretion, supervisors allow banks to assign preferential risk weights to other SL exposures falling into the “strong” and “good” supervisory categories as outlined in paragraph 277, the corresponding EL risk weight is 0% for “strong” exposures, and 5% for “good” exposures.

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*Supervisory categories and EL risk weights for HVCRE*

379. The risk weights for HVCRE are as follows:

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

Even where, at national discretion, supervisors allow banks to assign preferential risk weights to HVCRE exposures falling into the “strong” and “good” supervisory categories as outlined in paragraph 282, the corresponding EL risk weight will remain at 5% for both “strong” and “good” exposures.

*5.7.2. Calculation of provisions*

**(i) Exposures subject to IRB approach**

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

**(ii) Portion of exposures subject to the standardised approach to credit risk**

381. Banks using the standardised approach for a portion of their credit risk exposures, either on a transitional basis (as defined in paragraphs 257 and 258), or on a permanent basis if the exposures subject to the standardised approach are immaterial (paragraph 259), must determine the portion of general provisions attributed to the standardised or IRB treatment of provisions (see section 2.2.2.1) according to the methods outlined in paragraphs 382 and 383.

382. Banks should generally attribute total general provisions on a pro rata basis according to the proportion of credit risk-weighted assets subject to the standardised and IRB approaches. However, when one approach to determining credit risk-weighted assets (i.e. standardised or IRB approach) is used exclusively within an entity, general provisions booked within the entity using the standardised approach may be attributed to the standardised treatment. Similarly, general provisions booked within entities using the IRB approach may be attributed to the total eligible provisions as defined in paragraph 380.

383. At national supervisory discretion, banks using both the standardised and IRB approaches may rely on their internal methods for allocating general provisions for recognition in capital under either the standardised or IRB approach, subject to the following conditions. Where the internal allocation method is made available, the national supervisor will establish the standards surrounding their use. Banks will need to obtain prior approval from their supervisors to use an internal allocation method for this purpose.

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## OSFI Notes

As a temporary measure, banks using IRB approaches may use the proportional split method to allocate general allowances between portfolios carried on the Standardized Approach and portfolios carried on an IRB approach. This is seen as a temporary measure, as OSFI fully expects institutions to adopt the IRB approach for material portfolios. Refer to General Allowances in section 2.2.2.

### 5.7.3. *Treatment of EL and provisions*

384. As specified in section 2.2.2.2, banks using the IRB approach must compare the total amount of total eligible provisions (as defined in paragraph 380) with the total EL amount as calculated within the IRB approach (as defined in paragraph 375). In addition, section 2.2.2.3 outlines the treatment for that portion of a bank that is subject to the standardised approach to credit risk when the bank uses both the standardised and IRB approaches.

385. Where the calculated EL amount is lower than the provisions of the bank, its supervisors must consider whether the EL fully reflects the conditions in the market in which it operates before allowing the difference to be included in Tier 2 capital. If specific provisions exceed the EL amount on defaulted assets this assessment also needs to be made before using the difference to offset the EL amount on non-defaulted assets.

## OSFI Notes

If EL on defaulted assets is less than the specific allowances, the excess cannot be recognized in capital. OSFI will not require any additional processes to operationalize paragraph 385 over and above what is already being done for the assessment of specific and general allowances, credit reviews, and the self-assessment process.

386. The EL amount for equity exposures under the PD/LGD approach is deducted 50% from Tier 1 and 50% from Tier 2. Provisions or write-offs for equity exposures under the PD/LGD approach will not be used in the EL-provision calculation. The treatment of EL and provisions related to securitisation exposures is outlined in paragraph 563.

## 5.8. Minimum requirements for IRB approach

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

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### 5.8.1. *Composition of minimum requirements*

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

389. The overarching principle behind these requirements is that rating and risk estimation systems and processes provide for a meaningful assessment of borrower and transaction characteristics; a meaningful differentiation of risk; and reasonably accurate and consistent quantitative estimates of risk. Furthermore, the systems and processes must be consistent with internal use of these estimates. The Committee recognises that differences in markets, rating methodologies, banking products, and practices require banks and supervisors to customise their operational procedures. It is not the Committee's intention to dictate the form or operational detail of banks' risk management policies and practices. Each supervisor will develop detailed review procedures to ensure that banks' systems and controls are adequate to serve as the basis for the IRB approach.

390. The minimum requirements set out in this document apply to all asset classes unless noted otherwise. The standards related to the process of assigning exposures to borrower or facility *grades* (and the related oversight, validation, etc.) apply equally to the process of assigning retail exposures to pools of homogenous exposures, unless noted otherwise.

391. The minimum requirements set out in this document apply to both foundation and advanced approaches unless noted otherwise. Generally, all IRB banks must produce their own estimates of PD<sup>110</sup> and must adhere to the overall requirements for rating system design, operations, controls, and corporate governance, as well as the requisite requirements for estimation and validation of PD measures. Banks wishing to use their own estimates of LGD and EAD must also meet the incremental minimum requirements for these risk factors included in paragraphs 468 to 489.

### 5.8.2. *Compliance with minimum requirements*

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

393. There may be circumstances when a bank is not in complete compliance with all the minimum requirements. Where this is the case, the bank must produce a plan for a timely return to compliance, and seek approval from its supervisor, or the bank must demonstrate that the effect of such non-compliance is immaterial in terms of the risk posed to the institution. Failure to produce an acceptable plan or satisfactorily implement the plan or to demonstrate immateriality will lead supervisors to reconsider the bank's eligibility for the IRB approach.

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<sup>110</sup> Banks are not required to produce their own estimates of PD for certain equity exposures and certain exposures that fall within the SL sub-class.

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Furthermore, for the duration of any non-compliance, supervisors will consider the need for the bank to hold additional capital under Pillar 2 or take other appropriate supervisory action.

### 5.8.3. *Rating system design*

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

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

#### (i) **Rating dimensions**

##### *Standards for corporate, sovereign, and bank exposures*

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

397. The first dimension must be oriented to the risk of borrower default. Separate exposures to the same borrower must be assigned to the same borrower grade, irrespective of any differences in the nature of each specific transaction. There are two exceptions to this. Firstly, in the case of country transfer risk, where a bank may assign different borrower grades depending on whether the facility is denominated in local or foreign currency. Secondly, when the treatment of associated guarantees to a facility may be reflected in an adjusted borrower grade. In either case, separate exposures may result in multiple grades for the same borrower. A bank must articulate in its credit policy the relationship between borrower grades in terms of the level of risk each grade implies. Perceived and measured risk must increase as credit quality declines from one grade to the next. The policy must articulate the risk of each grade in terms of both a description of the probability of default risk typical for borrowers assigned the grade and the criteria used to distinguish that level of credit risk.

398. The second dimension must reflect transaction-specific factors, such as collateral, seniority, product type, etc. For foundation IRB banks, this requirement can be fulfilled by the existence of a facility dimension, which reflects both borrower and transaction-specific factors. For example, a rating dimension that reflects EL by incorporating both borrower strength (PD) and loss severity (LGD) considerations would qualify. Likewise a rating system that exclusively reflects LGD would qualify. Where a rating dimension reflects EL and does not separately quantify LGD, the supervisory estimates of LGD must be used.

399. For banks using the advanced approach, facility ratings must reflect exclusively LGD. These ratings can reflect any and all factors that can influence LGD including, but not limited to, the type of collateral, product, industry, and purpose. Borrower characteristics may be included

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as LGD rating criteria only to the extent they are predictive of LGD. Banks may alter the factors that influence facility grades across segments of the portfolio as long as they can satisfy their supervisor that it improves the relevance and precision of their estimates.

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

#### *Standards for retail exposures*

401. Rating systems for retail exposures must be oriented to both borrower and transaction risk, and must capture all relevant borrower and transaction characteristics. Banks must assign each exposure that falls within the definition of retail for IRB purposes into a particular pool. Banks must demonstrate that this process provides for a meaningful differentiation of risk, provides for a grouping of sufficiently homogenous exposures, and allows for accurate and consistent estimation of loss characteristics at pool level.

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

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

#### **(ii) Rating structure**

##### *Standards for corporate, sovereign, and bank exposures*

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

404. To meet this objective, a bank must have a minimum of seven borrower grades for non-defaulted borrowers and one for those that have defaulted. Banks with lending activities focused on a particular market segment may satisfy this requirement with the minimum number of grades; supervisors may require banks, which lend to borrowers of diverse credit quality, to have a greater number of borrower grades.

405. A borrower grade is defined as an assessment of borrower risk on the basis of a specified and distinct set of rating criteria, from which estimates of PD are derived. The grade definition must include both a description of the degree of default risk typical for borrowers assigned the grade and the criteria used to distinguish that level of credit risk. Furthermore, “+”



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or “-” modifiers to alpha or numeric grades will only qualify as distinct grades if the bank has developed complete rating descriptions and criteria for their assignment, and separately quantifies PDs for these modified grades.

406. Banks with loan portfolios concentrated in a particular market segment and range of default risk must have enough grades within that range to avoid undue concentrations of borrowers in particular grades. Significant concentrations within a single grade or grades must be supported by convincing empirical evidence that the grade or grades cover reasonably narrow PD bands and that the default risk posed by all borrowers in a grade fall within that band.

407. There is no specific minimum number of facility grades for banks using the advanced approach for estimating LGD. A bank must have a sufficient number of facility grades to avoid grouping facilities with widely varying LGDs into a single grade. The criteria used to define facility grades must be grounded in empirical evidence.

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

#### *Standards for retail exposures*

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

#### **(iii) Rating criteria**

410. A bank must have specific rating definitions, processes and criteria for assigning exposures to grades within a rating system. The rating definitions and criteria must be both plausible and intuitive and must result in a meaningful differentiation of risk.

- The grade descriptions and criteria must be sufficiently detailed to allow those charged with assigning ratings to consistently assign the same grade to borrowers or facilities posing similar risk. This consistency should exist across lines of business, departments and geographic locations. If rating criteria and procedures differ for different types of borrowers or facilities, the bank must monitor for possible inconsistency, and must alter rating criteria to improve consistency when appropriate.
- Written rating definitions must be clear and detailed enough to allow third parties to understand the assignment of ratings, such as internal audit or an equally independent function and supervisors, to replicate rating assignments and evaluate the appropriateness of the grade/pool assignments.
- The criteria must also be consistent with the bank’s internal lending standards and its policies for handling troubled borrowers and facilities.



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

*SL product lines within the corporate asset class*

412. Banks using the supervisory slotting criteria for SL exposures must assign exposures to their internal rating grades based on their own criteria, systems and processes, subject to compliance with the requisite minimum requirements. Banks must then map these internal rating grades into the five supervisory rating categories. Tables 1 to 4 in Annex 6 provide, for each sub-class of SL exposures, the general assessment factors and characteristics exhibited by the exposures that fall under each of the supervisory categories. Each lending activity has a unique table describing the assessment factors and characteristics.

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

**(iv) Rating assignment horizon**

414. Although the time horizon used in PD estimation is one year (as described in paragraph 447), banks are expected to use a longer time horizon in assigning ratings.

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

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

**(v) Use of models**

417. The requirements in this section apply to statistical models and other mechanical methods used to assign borrower or facility ratings or in estimation of PDs, LGDs, or EADs. Credit scoring models and other mechanical rating procedures generally use only a subset of available information. Although mechanical rating procedures may sometimes avoid some of the idiosyncratic errors made by rating systems in which human judgement plays a large role,

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mechanical use of limited information also is a source of rating errors. Credit scoring models and other mechanical procedures are permissible as the primary or partial basis of rating assignments, and may play a role in the estimation of loss characteristics. Sufficient human judgement and human oversight is necessary to ensure that all relevant and material information, including that which is outside the scope of the model, is also taken into consideration, and that the model is used appropriately.

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

**(vi) Documentation of rating system design**

418. Banks must document in writing their rating systems' design and operational details. The documentation must evidence banks' compliance with the minimum standards, and must address topics such as portfolio differentiation, rating criteria, responsibilities of parties that rate borrowers and facilities, definition of what constitutes a rating exception, parties that have authority to approve exceptions, frequency of rating reviews, and management oversight of the rating process. A bank must document the rationale for its choice of internal rating criteria and must be able to provide analyses demonstrating that rating criteria and procedures are likely to result in ratings that meaningfully differentiate risk. Rating criteria and procedures must be periodically reviewed to determine whether they remain fully applicable to the current portfolio and to external conditions. In addition, a bank must document a history of major changes in the risk rating process, and such documentation must support identification of changes made to the risk rating process subsequent to the last supervisory review. The organisation of rating assignment, including the internal control structure, must also be documented.

419. Banks must document the specific definitions of default and loss used internally and demonstrate consistency with the reference definitions set out in paragraphs 452 to 460.

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

- Provide a detailed outline of the theory, assumptions and/or mathematical and empirical basis of the assignment of estimates to grades, individual obligors, exposures, or pools, and the data source(s) used to estimate the model;
- Establish a rigorous statistical process (including out-of-time and out-of-sample performance tests) for validating the model; and
- Indicate any circumstances under which the model does not work effectively.

421. Use of a model obtained from a third-party vendor that claims proprietary technology is not a justification for exemption from documentation or any other of the requirements for internal rating systems. The burden is on the model's vendor and the bank to satisfy supervisors.

#### *5.8.4. Risk rating system operations*

##### **(i) Coverage of ratings**

422. For corporate, sovereign, and bank exposures, each borrower and all recognised guarantors must be assigned a rating and each exposure must be associated with a facility rating as part of the loan approval process. Similarly, for retail, each exposure must be assigned to a pool as part of the loan approval process.

423. Each separate legal entity to which the bank is exposed must be separately rated. A bank must have policies acceptable to its supervisor regarding the treatment of individual entities in a connected group including circumstances under which the same rating may or may not be assigned to some or all related entities.

##### **(ii) Integrity of rating process**

###### *Standards for corporate, sovereign, and bank exposures*

424. Rating assignments and periodic rating reviews must be completed or approved by a party that does not directly stand to benefit from the extension of credit. Independence of the rating assignment process can be achieved through a range of practices that will be carefully reviewed by supervisors. These operational processes must be documented in the bank's procedures and incorporated into bank policies. Credit policies and underwriting procedures must reinforce and foster the independence of the rating process.

425. Borrowers and facilities must have their ratings refreshed at least on an annual basis. Certain credits, especially higher risk borrowers or problem exposures, must be subject to more frequent review. In addition, banks must initiate a new rating if material information on the borrower or facility comes to light.

426. The bank must have an effective process to obtain and update relevant and material information on the borrower's financial condition, and on facility characteristics that affect LGDs and EADs (such as the condition of collateral). Upon receipt, the bank needs to have a procedure to update the borrower's rating in a timely fashion.

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### *Standards for retail exposures*

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

#### **(iii) Overrides**

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

#### **(iv) Data maintenance**

429. A bank must collect and store data on key borrower and facility characteristics to provide effective support to its internal credit risk measurement and management process, to enable the bank to meet the other requirements in this document, and to serve as a basis for supervisory reporting. These data should be sufficiently detailed to allow retrospective re-allocation of obligors and facilities to grades, for example if increasing sophistication of the internal rating system suggests that finer segregation of portfolios can be achieved. Furthermore, banks must collect and retain data on aspects of their internal ratings as required under Pillar 3 of this Framework.

### *For corporate, sovereign, and bank exposures*

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

431. Banks using the advanced IRB approach must also collect and store a complete history of data on the LGD and EAD estimates associated with each facility and the key data used to derive the estimate and the person/model responsible. Banks must also collect data on the estimated and realised LGDs and EADs associated with each defaulted facility. Banks that reflect the credit risk mitigating effects of guarantees/credit derivatives through LGD must retain data on the LGD of the facility before and after evaluation of the effects of the guarantee/credit derivative. Information about the components of loss or recovery for each defaulted exposure must be retained, such as amounts recovered, source of recovery (e.g. collateral, liquidation proceeds and guarantees), time period required for recovery, and administrative costs.

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

*For retail exposures*

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

**(v) Stress tests used in assessment of capital adequacy**

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

435. In addition to the more general tests described above, the bank must perform a credit risk stress test to assess the effect of certain specific conditions on its IRB regulatory capital requirements. The test to be employed would be one chosen by the bank, subject to supervisory review. The test to be employed must be meaningful and reasonably conservative. Individual banks may develop different approaches to undertaking this stress test requirement, depending on their circumstances. For this purpose, the objective is not to require banks to consider worst-case scenarios. The bank's stress test in this context should, however, consider at least the effect of mild recession scenarios. In this case, one example might be to use two consecutive quarters of zero growth to assess the effect on the bank's PDs, LGDs and EADs, taking account – on a conservative basis – of the bank's international diversification.

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

436. Whatever method is used, the bank must include a consideration of the following sources of information. First, a bank's own data should allow estimation of the ratings migration of at least some of its exposures. Second, banks should consider information about the impact of smaller deterioration in the credit environment on a bank's ratings, giving some information on the likely effect of bigger, stress circumstances. Third, banks should evaluate evidence of ratings migration in external ratings. This would include the bank broadly matching its buckets to rating categories.

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437. National supervisors may wish to issue guidance to their banks on how the tests to be used for this purpose should be designed, bearing in mind conditions in their jurisdiction. The results of the stress test may indicate no difference in the capital calculated under the IRB rules described in this section of this Framework if the bank already uses such an approach for its internal rating purposes. Where a bank operates in several markets, it does not need to test for such conditions in all of those markets, but a bank should stress portfolios containing the vast majority of its total exposures.

#### 5.8.5. *Corporate governance and oversight*

##### **(i) Corporate governance**

438. All material aspects of the rating and estimation processes must be approved by the bank's board of directors or a designated committee thereof and senior management.<sup>111</sup> These parties must possess a general understanding of the bank's risk rating system and detailed comprehension of its associated management reports. Senior management must provide notice to the board of directors or a designated committee thereof of material changes or exceptions from established policies that will materially impact the operations of the bank's rating system.

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

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

##### **(ii) Credit risk control**

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

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<sup>111</sup> This standard refers to a management structure composed of a board of directors and senior management. The Committee is aware that there are significant differences in legislative and regulatory frameworks across countries as regards the functions of the board of directors and senior management. In some countries, the board has the main, if not exclusive, function of supervising the executive body (senior management, general management) so as to ensure that the latter fulfils its tasks. For this reason, in some cases, it is known as a supervisory board. This means that the board has no executive functions. In other countries, by contrast, the board has a broader competence in that it lays down the general framework for the management of the bank. Owing to these differences, the notions of the board of directors and senior management are used in this paper not to identify legal constructs but rather to label two decision-making functions within a bank.



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

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

**(iii) Internal and external audit**

443. Internal audit or an equally independent function must review at least annually the bank's rating system and its operations, including the operations of the credit function and the estimation of PDs, LGDs and EADs. Areas of review include adherence to all applicable minimum requirements. Internal audit must document its findings. Some national supervisors may also require an external audit of the bank's rating assignment process and estimation of loss characteristics.

**OSFI Notes**

External audits of institutions' internal rating assignment processes are not mandated.

**5.8.6. Use of internal ratings**

444. Internal ratings and default and loss estimates must play an essential role in the credit approval, risk management, internal capital allocations, and corporate governance functions of banks using the IRB approach. Ratings systems and estimates designed and implemented exclusively for the purpose of qualifying for the IRB approach and used only to provide IRB inputs are not acceptable. It is recognised that banks will not necessarily be using exactly the same estimates for both IRB and all internal purposes. For example, pricing models are likely to use PDs and LGDs relevant to the life of the asset. Where there are such differences, a bank must document them and demonstrate their reasonableness to the supervisor.

445. A bank must have a credible track record in the use of internal ratings information. Thus, the bank must demonstrate that it has been using a rating system that was broadly in line with the minimum requirements articulated in this document for at least the three years prior to qualification. A bank using the advanced IRB approach must demonstrate that it has been estimating and employing LGDs and EADs in a manner that is broadly consistent with the minimum requirements for use of own estimates of LGDs and EADs for at least the three years



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prior to qualification. Improvements to a bank's rating system will not render a bank non-compliant with the three-year requirement.

#### 5.8.7. *Risk quantification*

##### **(i) Overall requirements for estimation**

###### *Structure and intent*

446. This section addresses the broad standards for own-estimates of PD, LGD, and EAD. Generally, all banks using the IRB approaches must estimate a PD<sup>112</sup> for each internal borrower grade for corporate, sovereign and bank exposures or for each pool in the case of retail exposures.

447. PD estimates must be a long-run average of one-year default rates for borrowers in the grade, with the exception of retail exposures (see below). Requirements specific to PD estimation are provided in paragraphs 461 to 467. Banks on the advanced approach must estimate an appropriate LGD (as defined in paragraphs 468 to 473) for each of its facilities (or retail pools). Banks on the advanced approach must also estimate an appropriate long-run default-weighted average EAD for each of its facilities as defined in paragraphs 474 and 475. Requirements specific to EAD estimation appear in paragraphs 474 to 479. For corporate, sovereign and bank exposures, banks that do not meet the requirements for own-estimates of EAD or LGD, above, must use the supervisory estimates of these parameters. Standards for use of such estimates are set out in paragraphs 506 to 524.

448. Internal estimates of PD, LGD, and EAD must incorporate all relevant, material and available data, information and methods. A bank may utilise internal data and data from external sources (including pooled data). Where internal or external data is used, the bank must demonstrate that its estimates are representative of long run experience.

449. Estimates must be grounded in historical experience and empirical evidence, and not based purely on subjective or judgmental considerations. Any changes in lending practice or the process for pursuing recoveries over the observation period must be taken into account. A bank's estimates must promptly reflect the implications of technical advances and new data and other information, as it becomes available. Banks must review their estimates on a yearly basis or more frequently.

450. The population of exposures represented in the data used for estimation, and lending standards in use when the data were generated, and other relevant characteristics should be closely matched to or at least comparable with those of the bank's exposures and standards. The bank must also demonstrate that economic or market conditions that underlie the data are relevant to current and foreseeable conditions. For estimates of LGD and EAD, banks must take into account paragraphs 468 to 479. The number of exposures in the sample and the data period used for quantification must be sufficient to provide the bank with confidence in the accuracy and robustness of its estimates. The estimation technique must perform well in out-of-sample tests.

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<sup>112</sup> Banks are not required to produce their own estimates of PD for certain equity exposures and certain exposures that fall within the SL sub-classes.

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

**(ii) Definition of default**

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

- The bank considers that the obligor is unlikely to pay its credit obligations to the banking group in full, without recourse by the bank to actions such as realising security (if held).
- The obligor is past due more than 90 days on any material credit obligation to the banking group.<sup>113</sup> Overdrafts will be considered as being past due once the customer has breached an advised limit or been advised of a limit smaller than current outstandings.

**OSFI Notes**

Footnote 113: Institutions are permitted, at their discretion, to use a definition in which Qualifying Revolving Retail Exposures (QRRE) that are 90 days past due may be considered to be in default for IRB purposes.

Any institution using the 90-day definition for regulatory capital purposes should be able to provide evidence that it uses the same definition in practice. The application of the use test in this case would impose several conditions on a bank using the earlier definition, the most important of which would be a requirement to establish allowances for credit losses for accounts that are 90 days past-due. An institution would also have to demonstrate that the 90 days past-due mark is a genuine actionable threshold after which it takes steps to manage the account actively.

For institutions adopting the 90-day definition, the following conditions apply:

- provisions must be booked at 90 days past due;
- the difference between 90-day and 180-day capital charges should not be significant;

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<sup>113</sup> In the case of retail and PSE obligations, for the 90 days figure, a supervisor may substitute a figure up to 180 days for different products, as it considers appropriate to local conditions. In one member country, local conditions make it appropriate to use a figure of up to 180 days also for lending by its banks to corporates; this applies for a transitional period of 5 years.

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- the institution must track the cure rate between 90 and 180 days. Cure rates exceeding 50%, or exhibiting significant variability over time will attract supervisory attention.

During the parallel reporting period, OSFI will closely monitor both the capital charge and the cure rate for institutions using the 90-day definition for this asset class. Any clear instances of capital arbitrage would be considered in future Pillar 2 assessments.

If a bank books general allowances instead of specific allowances, the methodology must be objective, transparent, replicable, and not subject to adjustment through management discretion or subjective criteria.

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

- The bank puts the credit obligation on non-accrued status.
- The bank makes a charge-off or account-specific provision resulting from a significant perceived decline in credit quality subsequent to the bank taking on the exposure.<sup>114</sup>
- The bank sells the credit obligation at a material credit-related economic loss.
- The bank consents to a distressed restructuring of the credit obligation where this is likely to result in a diminished financial obligation caused by the material forgiveness, or postponement, of principal, interest or (where relevant) fees.<sup>115</sup>
- The bank has filed for the obligor's bankruptcy or a similar order in respect of the obligor's credit obligation to the banking group.
- The obligor has sought or has been placed in bankruptcy or similar protection where this would avoid or delay repayment of the credit obligation to the banking group.

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

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

456. A bank must record actual defaults on IRB exposure classes using this reference definition. A bank must also use the reference definition for its estimation of PDs, and (where relevant) LGDs and EADs. In arriving at these estimations, a bank may use external data available to it that is not itself consistent with that definition, subject to the requirements set out in paragraph 462. However, in such cases, banks must demonstrate to their supervisors that appropriate adjustments to the data have been made to achieve broad equivalence with the reference definition. This same condition would apply to any internal data used up to implementation of this Framework. Internal data (including that pooled by banks) used in such

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<sup>114</sup> In some jurisdictions, specific provisions on equity exposures are set aside for price risk and do not signal default.

<sup>115</sup> Including, in the case of equity holdings assessed under a PD/LGD approach, such distressed restructuring of the equity itself.

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estimates beyond the date of implementation of this Framework must be consistent with the reference definition.

457. If the bank considers that a previously defaulted exposure's status is such that no trigger of the reference definition any longer applies, the bank must rate the borrower and estimate LGD as they would for a non-defaulted facility. Should the reference definition subsequently be triggered, a second default would be deemed to have occurred.

**(iii) Re-ageing**

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

**OSFI Notes**

More specific requirements for re-aging will not be established. OSFI will reconsider this position if it discovers deterioration in the conservatism of re-aging policies in the future.

**(iv) Treatment of overdrafts**

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

**(v) Definition of loss for all asset classes**

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

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**(vi) Requirements specific to PD estimation**

*Corporate, sovereign, and bank exposures*

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

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

- A bank may use data on internal default experience for the estimation of PD. A bank must demonstrate in its analysis that the estimates are reflective of underwriting standards and of any differences in the rating system that generated the data and the current rating system. Where only limited data are available, or where underwriting standards or rating systems have changed, the bank must add a greater margin of conservatism in its estimate of PD. The use of pooled data across institutions may also be recognised. A bank must demonstrate that the internal rating systems and criteria of other banks in the pool are comparable with its own.
- Banks may associate or map their internal grades to the scale used by an external credit assessment institution or similar institution and then attribute the default rate observed for the external institution's grades to the bank's grades. Mappings must be based on a comparison of internal rating criteria to the criteria used by the external institution and on a comparison of the internal and external ratings of any common borrowers. Biases or inconsistencies in the mapping approach or underlying data must be avoided. The external institution's criteria underlying the data used for quantification must be oriented to the risk of the borrower and not reflect transaction characteristics. The bank's analysis must include a comparison of the default definitions used, subject to the requirements in paragraph 452 to 457. The bank must document the basis for the mapping.
- A bank is allowed to use a simple average of default-probability estimates for individual borrowers in a given grade, where such estimates are drawn from statistical default prediction models. The bank's use of default probability models for this purpose must meet the standards specified in paragraph 417.

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

*Retail exposures*

464. Given the bank-specific basis of assigning exposures to pools, banks must regard internal data as the primary source of information for estimating loss characteristics. Banks are

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permitted to use external data or statistical models for quantification provided a strong link can be demonstrated between (a) the bank's process of assigning exposures to a pool and the process used by the external data source, and (b) between the bank's internal risk profile and the composition of the external data. In all cases banks must use all relevant and material data sources as points of comparison.

465. One method for deriving long-run average estimates of PD and default-weighted average loss rates given default (as defined in paragraph 468) for retail would be based on an estimate of the expected long-run loss rate. A bank may (i) use an appropriate PD estimate to infer the long-run default-weighted average loss rate given default, or (ii) use a long-run default-weighted average loss rate given default to infer the appropriate PD. In either case, it is important to recognise that the LGD used for the IRB capital calculation cannot be less than the long-run default-weighted average loss rate given default and must be consistent with the concepts defined in paragraph 468.

### **OSFI Notes**

#### Retail Margin lending

Institutions will have the option of using either the standardized approach without credit risk mitigation or the retail IRB approach using the method outlined in paragraph 465 that treats all margin loans as a single risk segment. Prime brokerage business may not be classified as a retail exposure.

##### (i) Standardized approach without credit risk mitigation

Notwithstanding that institutions are required to use the IRB approach for retail, appropriately margined retail loans are not considered a significant credit risk. Therefore retail margin loans are eligible for a permanent waiver to use the standardized approach without credit risk mitigation.

##### (ii) IRB approach

This approach is permitted for banks that wish to extend IRB retail methods to retail margin loans as a single risk segment. In such a case the institution would be eligible to derive either a PD or LGD for the segment from the segment's expected long-run loss rate (see paragraph 465).

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

467. The Committee recognises that seasoning can be quite material for some long-term retail exposures characterised by seasoning effects that peak several years after origination. Banks should anticipate the implications of rapid exposure growth and take steps to ensure that their estimation techniques are accurate, and that their current capital level and earnings and



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funding prospects are adequate to cover their future capital needs. In order to avoid gyrations in their required capital positions arising from short-term PD horizons, banks are also encouraged to adjust PD estimates upward for anticipated seasoning effects, provided such adjustments are applied in a consistent fashion over time. Within some jurisdictions, such adjustments might be made mandatory, subject to supervisory discretion.

**(vii) Requirements specific to own-LGD estimates**

*Standards for all asset classes*

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

469. In its analysis, the bank must consider the extent of any dependence between the risk of the borrower and that of the collateral or collateral provider. Cases where there is a significant degree of dependence must be addressed in a conservative manner. Any currency mismatch between the underlying obligation and the collateral must also be considered and treated conservatively in the bank's assessment of LGD.

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

471. Recognising the principle that realised losses can at times systematically exceed expected levels, the LGD assigned to a defaulted asset should reflect the possibility that the bank would have to recognise additional, unexpected losses during the recovery period. For each defaulted asset, the bank must also construct its best estimate of the expected loss on that asset based on current economic circumstances and facility status. The amount, if any, by which the LGD on a defaulted asset exceeds the bank's best estimate of expected loss on the asset represents the capital requirement for that asset, and should be set by the bank on a risk-sensitive basis in accordance with paragraphs 272 and 328 to 330. Instances where the best estimate of expected loss on a defaulted asset is less than the sum of specific provisions and



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partial charge-offs on that asset will attract supervisory scrutiny and must be justified by the bank.

*Additional standards for corporate, sovereign, and bank exposures*

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

*Additional standards for retail exposures*

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

**(viii) Requirements specific to own-EAD estimates**

*Standards for all asset classes*

474. EAD for an on-balance sheet or off-balance sheet item is defined as the expected gross exposure of the facility upon default of the obligor. For on-balance sheet items, banks must estimate EAD at no less than the current drawn amount, subject to recognising the effects of on-balance sheet netting as specified in the foundation approach. The minimum requirements for the recognition of netting are the same as those under the foundation approach. The additional minimum requirements for internal estimation of EAD under the advanced approach, therefore, focus on the estimation of EAD for off-balance sheet items (excluding transactions that expose banks to counterparty credit risk as set out in Annex 4). Advanced approach banks must have established procedures in place for the estimation of EAD for off-balance sheet items. These must specify the estimates of EAD to be used for each facility type. Banks estimates of EAD should reflect the possibility of additional drawings by the borrower up to and after the time a default event is triggered. Where estimates of EAD differ by facility type, the delineation of these facilities must be clear and unambiguous.

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

476. The criteria by which estimates of EAD are derived must be plausible and intuitive, and represent what the bank believes to be the material drivers of EAD. The choices must be

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

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

477 (i). For transactions that expose banks to counterparty credit risk, estimates of EAD must fulfil the requirements set forth in Annex 4.

*Additional standards for corporate, sovereign, and bank exposures*

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

*Additional standards for retail exposures*

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

**(ix) Minimum requirements for assessing effect of guarantees and credit derivatives**

*Standards for corporate, sovereign, and bank exposures where own estimates of LGD are used and standards for retail exposures*

*Guarantees*

480. When a bank uses its own estimates of LGD, it may reflect the risk-mitigating effect of guarantees through an adjustment to PD or LGD estimates. The option to adjust LGDs is available only to those banks that have been approved to use their own internal estimates of LGD. For retail exposures, where guarantees exist, either in support of an individual obligation or a pool of exposures, a bank may reflect the risk-reducing effect either through its estimates of PD or LGD, provided this is done consistently. In adopting one or the other technique, a bank must adopt a consistent approach, both across types of guarantees and over time.

## OSFI Notes

The risk-mitigating benefits of collateral from both borrowers and guarantors can be recognized for capital purposes only if an institution can establish that it can simultaneously and independently realize on both the collateral and guarantee. A guarantee is normally obtained to perfect an interest in collateral. In this case, the risk mitigation effect of the collateral, and not the guarantee, will be recognized.

Any recognition of the mitigating effect of a guarantee arrangement under the Canada Small Business Financing Act must recognize the risk of non-performance by the guarantor due to a cap on the total claims that can be made on defaulted loans covered by the guarantee arrangement.

The following requirements will apply to banks that reflect the effect of guarantees through adjustments to LGD:

No recognition of double default: Paragraphs 306-307 of the Framework permit banks to adjust either PD or LGD to reflect guarantees, but paragraphs 306 and 482 stipulate that the risk weight resulting from these adjustments must not be lower than that of a comparable exposure to the guarantor. A bank using LGD adjustments must demonstrate that its methodology does not incorporate the effects of double default. Furthermore, the bank must demonstrate that its LGD adjustments do not incorporate implicit assumptions about the correlation of guarantor default to that of the obligor. (Although paragraphs 284 and 307 permit recognition of double default in some instances, they stipulate that it must be recognized through adjustments to PD, not LGD. LGD adjustments will not be permitted for exposures that are recognised under the double default framework).

No recognition of double recovery: Under the double default framework, banks are prohibited from recognizing double recovery from both collateral and a guarantee on the same exposure. Since collateral is reflected through an adjustment to LGD, a bank using a separate adjustment to LGD to reflect a guarantee must be able to distinguish the effects of the two sources of mitigation and to demonstrate that its methodology does not incorporate double recovery.

Requirement to track guarantor PDs: Any institution that measures credit risk comprehensively must track exposures to guarantors for the purpose of assessing concentration risk, and by extension must still track the guarantors' PDs.

Requirement to recognize the possibility of guarantor default in the adjustment: Any LGD adjustment must fully reflect the likelihood of guarantor default – a bank may not assume that the guarantor will always perform under the guarantee. For this purpose, it will not be sufficient only to demonstrate that the risk weight resulting from an LGD adjustment is no lower than that of the guarantor.

Requirement for credible data: Any estimates used in an LGD adjustment must be based on credible, relevant data, and the relation between the source data and the amount of the

adjustment should be transparent. Banks should also analyse the degree of uncertainty inherent in the source data and resulting estimates.

Use of consistent methodology for similar types of guarantees: Under paragraph 306, a bank must use the same method for all guarantees of a given type. This means that a bank will be required to have one single method for guarantees, one for credit default swaps, one for insurance, and so on. Banks will not be permitted to selectively choose the exposures having a particular type of guarantee to receive an LGD adjustment, and any adjustment methodology must be broadly applicable to all exposures that are mitigated in the same way.

481. In all cases, both the borrower and all recognised guarantors must be assigned a borrower rating at the outset and on an ongoing basis. A bank must follow all minimum requirements for assigning borrower ratings set out in this document, including the regular monitoring of the guarantor's condition and ability and willingness to honour its obligations. Consistent with the requirements in paragraphs 430 and 431, a bank must retain all relevant information on the borrower absent the guarantee and the guarantor. In the case of retail guarantees, these requirements also apply to the assignment of an exposure to a pool, and the estimation of PD.

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

#### *Eligible guarantors and guarantees*

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

#### **OSFI Notes**

An institution may not reduce the risk weight of an exposure to a third party on account of a guarantee or credit protection provided by a related party (parent, subsidiary or affiliate) of the institution.

This treatment follows the principle that guarantees within a corporate group are not a substitute for capital in the regulated Canadian institution. . An exception is made for self-liquidating trade-related transactions that have a tenure of 360 days or less, are market-driven and are not structured to avoid the requirements of OSFI guidelines. The requirement that the transaction be "market-driven" necessitates that the guarantee or letter of credit is requested and paid for by the customer and/or that the market requires the guarantee in the normal course.

484. The guarantee must be evidenced in writing, non-cancellable on the part of the guarantor, in force until the debt is satisfied in full (to the extent of the amount and tenor of the guarantee) and legally enforceable against the guarantor in a jurisdiction where the guarantor

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has assets to attach and enforce a judgement. However, in contrast to the foundation approach to corporate, bank, and sovereign exposures, guarantees prescribing conditions under which the guarantor may not be obliged to perform (conditional guarantees) may be recognised under certain conditions. Specifically, the onus is on the bank to demonstrate that the assignment criteria adequately address any potential reduction in the risk mitigation effect.

#### *Adjustment criteria*

485. A bank must have clearly specified criteria for adjusting borrower grades or LGD estimates (or in the case of retail and eligible purchased receivables, the process of allocating exposures to pools) to reflect the impact of guarantees for regulatory capital purposes. These criteria must be as detailed as the criteria for assigning exposures to grades consistent with paragraphs 410 and 411, and must follow all minimum requirements for assigning borrower or facility ratings set out in this document.

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

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

#### *Credit derivatives*

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

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

#### *For banks using foundation LGD estimates*

490. The minimum requirements outlined in paragraphs 480 to 489 apply to banks using the foundation LGD estimates with the following exceptions:

- (1) The bank is not able to use an 'LGD-adjustment' option; and
- (2) The range of eligible guarantees and guarantors is limited to those outlined in paragraph 302.

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

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

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

*Minimum operational requirements*

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

*Legal certainty*

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

*Effectiveness of monitoring systems*

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

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



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- The bank must have clear and effective policies and procedures for determining seller and servicer eligibility. The bank or its agent must conduct periodic reviews of sellers and servicers in order to verify the accuracy of reports from the seller/servicer, detect fraud or operational weaknesses, and verify the quality of the seller's credit policies and servicer's collection policies and procedures. The findings of these reviews must be well documented.
  - The bank must have the ability to assess the characteristics of the receivables pool, including (a) over-advances; (b) history of the seller's arrears, bad debts, and bad debt allowances; (c) payment terms, and (d) potential contra accounts.
  - The bank must have effective policies and procedures for monitoring on an aggregate basis single-obligor concentrations both within and across receivables pools.
  - The bank must receive timely and sufficiently detailed reports of receivables ageings and dilutions to (a) ensure compliance with the bank's eligibility criteria and advancing policies governing purchased receivables, and (b) provide an effective means with which to monitor and confirm the seller's terms of sale (e.g. invoice date ageing) and dilution.

#### *Effectiveness of work-out systems*

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

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

#### *Effectiveness of systems for controlling collateral, credit availability, and cash*

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

- Written internal policies must specify all material elements of the receivables purchase programme, including the advancing rates, eligible collateral, necessary documentation, concentration limits, and how cash receipts are to be handled. These elements should take appropriate account of all relevant and material factors, including the seller's/servicer's financial condition, risk



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concentrations, and trends in the quality of the receivables and the seller's customer base.

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

#### *Compliance with the bank's internal policies and procedures*

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

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

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

#### *5.8.8. Validation of internal estimates*

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

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

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

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

504. Banks must have well-articulated internal standards for situations where deviations in realised PDs, LGDs and EADs from expectations become significant enough to call the validity

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of the estimates into question. These standards must take account of business cycles and similar systematic variability in default experiences. Where realised values continue to be higher than expected values, banks must revise estimates upward to reflect their default and loss experience.

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

#### 5.8.9. *Supervisory LGD and EAD estimates*

506. Banks under the foundation IRB approach, which do not meet the requirements for own-estimates of LGD and EAD, above, must meet the minimum requirements described in the standardised approach to receive recognition for eligible financial collateral (as set out in chapter 4). They must meet the following additional minimum requirements in order to receive recognition for additional collateral types.

##### **(i) Definition of eligibility of CRE and RRE as collateral**

507. Eligible CRE and RRE collateral for corporate, sovereign and bank exposures are defined as:

- Collateral where the risk of the borrower is not materially dependent upon the performance of the underlying property or project, but rather on the underlying capacity of the borrower to repay the debt from other sources. As such, repayment of the facility is not materially dependent on any cash flow generated by the underlying CRE/RRE serving as collateral;<sup>116</sup> and

#### **OSFI Notes**

Footnote 116 does not apply.

- Additionally, the value of the collateral pledged must not be materially dependent on the performance of the borrower. This requirement is not intended to preclude situations where purely macro-economic factors affect both the value of the collateral and the performance of the borrower.

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<sup>116</sup> The Committee recognises that in some countries where multifamily housing makes up an important part of the housing market and where public policy is supportive of that sector, including specially established public sector companies as major providers, the risk characteristics of lending secured by mortgage on such residential real estate can be similar to those of traditional corporate exposures. The national supervisor may under such circumstances recognise mortgage on multifamily residential real estate as eligible collateral for corporate exposures.

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508. In light of the generic description above and the definition of corporate exposures, income producing real estate that falls under the SL asset class is specifically excluded from recognition as collateral for corporate exposures.<sup>117</sup>

**(ii) Operational requirements for eligible CRE/RRE**

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

- *Legal enforceability:* any claim on a collateral taken must be legally enforceable in all relevant jurisdictions, and any claim on collateral must be properly filed on a timely basis. Collateral interests must reflect a perfected lien (i.e. all legal requirements for establishing the claim have been fulfilled). Furthermore, the collateral agreement and the legal process underpinning it must be such that they provide for the bank to realise the value of the collateral within a reasonable timeframe.
- *Objective market value of collateral:* the collateral must be valued at or less than the current fair value under which the property could be sold under private contract between a willing seller and an arm's-length buyer on the date of valuation.
- *Frequent revaluation:* the bank is expected to monitor the value of the collateral on a frequent basis and at a minimum once every year. More frequent monitoring is suggested where the market is subject to significant changes in conditions. Statistical methods of evaluation (e.g. reference to house price indices, sampling) may be used to update estimates or to identify collateral that may have declined in value and that may need re-appraisal. A qualified professional must evaluate the property when information indicates that the value of the collateral may have declined materially relative to general market prices or when a credit event, such as default, occurs.
- *Junior liens:* In some member countries, eligible collateral will be restricted to situations where the lender has a first charge over the property.<sup>118</sup> Junior liens may be taken into account where there is no doubt that the claim for collateral is legally enforceable and constitutes an efficient credit risk mitigant. When recognised, junior liens are to be treated using the C\*/C\*\* threshold, which is used for senior liens. In such cases, the C\* and C\*\* are calculated by taking into account the sum of the junior lien and all more senior liens.

**OSFI Notes**

Residential and commercial real estate may be recognized as collateral for FIRB only when the institution's collateral interest is the first lien on the property, and there is no more senior or

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<sup>117</sup> As noted in footnote 97, in exceptional circumstances for well-developed and long-established markets, mortgages on office and/or multi-purpose commercial premises and/or multi-tenanted commercial premises may have the potential to receive recognition as collateral in the corporate portfolio.

<sup>118</sup> In some of these jurisdictions, first liens are subject to the prior right of preferential creditors, such as outstanding tax claims and employees' wages.

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intervening claim. Junior liens are recognized as collateral only where the institution holds the senior lien and where no other party holds an intervening lien on the property.

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510. Additional collateral management requirements are as follows:

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

**(iii) Requirements for recognition of financial receivables**

*Definition of eligible receivables*

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

*Operational requirements*

*Legal certainty*

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

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

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

515. The collateral arrangements must be properly documented, with a clear and robust procedure for the timely collection of collateral proceeds. Banks' procedures should ensure that any legal conditions required for declaring the default of the customer and timely collection of collateral are observed. In the event of the obligor's financial distress or default, the bank should

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

### *Risk management*

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

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

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

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

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

### *Requirements for recognition of other collateral*

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

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

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522. In order for a given bank to receive recognition for additional physical collateral, it must meet all the standards in paragraphs 509 and 510, subject to the following modifications.

- First Claim: With the sole exception of permissible prior claims specified in footnote 112, only first liens on, or charges over, collateral are permissible. As such, the bank must have priority over all other lenders to the realised proceeds of the collateral.
- The loan agreement must include detailed descriptions of the collateral plus detailed specifications of the manner and frequency of revaluation.
- The types of physical collateral accepted by the bank and policies and practices in respect of the appropriate amount of each type of collateral relative to the exposure amount must be clearly documented in internal credit policies and procedures and available for examination and/or audit review.
- Bank credit policies with regard to the transaction structure must address appropriate collateral requirements relative to the exposure amount, the ability to liquidate the collateral readily, the ability to establish objectively a price or market value, the frequency with which the value can readily be obtained (including a professional appraisal or valuation), and the volatility of the value of the collateral. The periodic revaluation process must pay particular attention to “fashion-sensitive” collateral to ensure that valuations are appropriately adjusted downward of fashion, or model-year, obsolescence as well as physical obsolescence or deterioration.
- In cases of inventories (e.g. raw materials, work-in-process, finished goods, dealers’ inventories of autos) and equipment, the periodic revaluation process must include physical inspection of the collateral.

#### 5.8.10. *Requirements for recognition of leasing*

523. Leases other than those that expose the bank to residual value risk (see paragraph 524) will be accorded the same treatment as exposures collateralised by the same type of collateral. The minimum requirements for the collateral type must be met (CRE/RRE or other collateral). In addition, the bank must also meet the following standards:

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

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

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



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5.8.11. *Calculation of capital charges for equity exposures*

**(i) The internal models market-based approach**

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

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

**(ii) Capital charge and risk quantification**

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

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



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such that estimates from any single method will be of uncertain quality, banks must add appropriate margins of conservatism in order to avoid over-optimism.

- (c) No particular type of VaR model (e.g. variance-covariance, historical simulation, or Monte Carlo) is prescribed. However, the model used must be able to capture adequately all of the material risks embodied in equity returns including both the general market risk and specific risk exposure of the institution's equity portfolio. Internal models must adequately explain historical price variation, capture both the magnitude and changes in the composition of potential concentrations, and be robust to adverse market environments. The population of risk exposures represented in the data used for estimation must be closely matched to or at least comparable with those of the bank's equity exposures.
- (d) Banks may also use modelling techniques such as historical scenario analysis to determine minimum capital requirements for banking book equity holdings. The use of such models is conditioned upon the institution demonstrating to its supervisor that the methodology and its output can be quantified in the form of the loss percentile specified under (a).
- (e) Institutions must use an internal model that is appropriate for the risk profile and complexity of their equity portfolio. Institutions with material holdings with values that are highly non-linear in nature (e.g. equity derivatives, convertibles) must employ an internal model designed to capture appropriately the risks associated with such instruments.
- (f) Subject to supervisory review, equity portfolio correlations can be integrated into a bank's internal risk measures. The use of explicit correlations (e.g. utilisation of a variance/covariance VaR model) must be fully documented and supported using empirical analysis. The appropriateness of implicit correlation assumptions will be evaluated by supervisors in their review of model documentation and estimation techniques.
- (g) Mapping of individual positions to proxies, market indices, and risk factors should be plausible, intuitive, and conceptually sound. Mapping techniques and processes should be fully documented, and demonstrated with both theoretical and empirical evidence to be appropriate for the specific holdings. Where professional judgement is combined with quantitative techniques in estimating a holding's return volatility, the judgement must take into account the relevant and material information not considered by the other techniques utilised.
- (h) Where factor models are used, either single or multi-factor models are acceptable depending upon the nature of an institution's holdings. Banks are expected to ensure that the factors are sufficient to capture the risks inherent in the equity portfolio. Risk factors should correspond to the appropriate equity market characteristics (for example, public, private, market capitalisation industry sectors and sub-sectors, operational characteristics) in which the bank holds significant positions. While banks will have discretion in choosing the factors, they must demonstrate through empirical analyses the appropriateness of those factors, including their ability to cover both general and specific risk.

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

**(iii) Risk management process and controls**

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

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

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- (e) Parties responsible for any aspect of the modelling process must be adequately qualified. Management must allocate sufficient skilled and competent resources to the modelling function.

**(iv) Validation and documentation**

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

*Validation*

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

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

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

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

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

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

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internal models and the appropriateness of the proxies used in the model. Supervisors may ask banks to scale their quarterly forecasts to a different, in particular shorter, time horizon, store performance data for this time horizon and perform backtests on this basis.

### *Documentation*

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

- (a) A bank must document the rationale for its choice of internal modelling methodology and must be able to provide analyses demonstrating that the model and modelling procedures are likely to result in estimates that meaningfully identify the risk of the bank's equity holdings. Internal models and procedures must be periodically reviewed to determine whether they remain fully applicable to the current portfolio and to external conditions. In addition, a bank must document a history of major changes in the model over time and changes made to the modelling process subsequent to the last supervisory review. If changes have been made in response to the bank's internal review standards, the bank must document that these changes are consistent with its internal model review standards.
- (b) In documenting their internal models banks should:
  - provide a detailed outline of the theory, assumptions and/or mathematical and empirical basis of the parameters, variables, and data source(s) used to estimate the model;
  - establish a rigorous statistical process (including out-of-time and out-of-sample performance tests) for validating the selection of explanatory variables; and
  - indicate circumstances under which the model does not work effectively.
- (c) Where proxies and mapping are employed, institutions must have performed and documented rigorous analysis demonstrating that all chosen proxies and mappings are sufficiently representative of the risk of the equity holdings to which they correspond. The documentation should show, for instance, the relevant and material factors (e.g. business lines, balance sheet characteristics, geographic location, company age, industry sector and subsector, operating characteristics) used in mapping individual investments into proxies. In summary, institutions must demonstrate that the proxies and mappings employed:
  - are adequately comparable to the underlying holding or portfolio;
  - are derived using historical economic and market conditions that are relevant and material to the underlying holdings or, where not, that an appropriate adjustment has been made; and,
  - are robust estimates of the potential risk of the underlying holding.

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5.8.12. ***Disclosure requirements***

537. In order to be eligible for the IRB approach, banks must meet the disclosure requirements set out in Pillar 3. These are minimum requirements for use of IRB: failure to meet these will render banks ineligible to use the relevant IRB approach.

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## Annex 6 - Illustrative IRB Risk Weights

1. The following tables provide illustrative risk weights calculated for four asset classes types under the internal ratings-based (IRB) approach to credit risk. Each set of risk weights for unexpected loss (UL) was produced using the appropriate risk-weight function of the risk-weight functions set out in this chapter. The inputs used to calculate the illustrative risk weights include measures of the PD, LGD, and an assumed effective maturity (M) of 2.5 years.

2. A firm-size adjustment applies to exposures made to small- and medium-sized entity (SME) borrowers (defined as corporate exposures where the reported sales for the consolidated group of which the firm is a part is less than €50 million). Accordingly, the firm size adjustment was made in determining the second set of risk weights provided in column two given that the turnover of the firm receiving the exposure is assumed to be €5 million.

### OSFI Notes

Thresholds in the Basel II framework have been converted into Canadian dollar amounts at an exchange rate of 1.25. The rate for this one-time conversion was chosen to ensure competitive equity with US banks.

Illustrative IRB Risk Weights for UL

Asset Class:	Corporate Exposures		Residential Mortgages		Other Retail Exposures		Qualifying Revolving Retail Exposures	
<b>LGD:</b>	45%	45%	45%	25%	45%	85%	45%	85%
<b>Maturity: 2.5 years</b>								
<b>Turnover (millions of €)</b>	50	5						
<b>PD:</b>								
0.03%	14.44%	11.30%	4.15%	2.30%	4.45%	8.41%	0.98%	1.85%
0.05%	19.65%	15.39%	6.23%	3.46%	6.63%	12.52%	1.51%	2.86%
0.10%	29.65%	23.30%	10.69%	5.94%	11.16%	21.08%	2.71%	5.12%
0.25%	49.47%	39.01%	21.30%	11.83%	21.15%	39.96%	5.76%	10.88%
0.40%	62.72%	49.49%	29.94%	16.64%	28.42%	53.69%	8.41%	15.88%
0.50%	69.61%	54.91%	35.08%	19.49%	32.36%	61.13%	10.04%	18.97%
0.75%	82.78%	65.14%	46.46%	25.81%	40.10%	75.74%	13.80%	26.06%
1.00%	92.32%	72.40%	56.40%	31.33%	45.77%	86.46%	17.22%	32.53%
1.30%	100.95%	78.77%	67.00%	37.22%	50.80%	95.95%	21.02%	39.70%
1.50%	105.59%	82.11%	73.45%	40.80%	53.37%	100.81%	23.40%	44.19%
2.00%	114.86%	88.55%	87.94%	48.85%	57.99%	109.53%	28.92%	54.63%
2.50%	122.16%	93.43%	100.64%	55.91%	60.90%	115.03%	33.98%	64.18%
3.00%	128.44%	97.58%	111.99%	62.22%	62.79%	118.61%	38.66%	73.03%
4.00%	139.58%	105.04%	131.63%	73.13%	65.01%	122.80%	47.16%	89.08%
5.00%	149.86%	112.27%	148.22%	82.35%	66.42%	125.45%	54.75%	103.41%
6.00%	159.61%	119.48%	162.52%	90.29%	67.73%	127.94%	61.61%	116.37%
10.00%	193.09%	146.51%	204.41%	113.56%	75.54%	142.69%	83.89%	158.47%
15.00%	221.54%	171.91%	235.72%	130.96%	88.60%	167.36%	103.89%	196.23%
20.00%	238.23%	188.42%	253.12%	140.62%	100.28%	189.41%	117.99%	222.86%



## Annex 7 - Supervisory Slotting Criteria for Specialised Lending

**Table 1 – Supervisory Rating Grades for Project Finance Exposures**

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

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

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



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



	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
Reserve risks (e.g. natural resource development)	Independently audited, proven and developed reserves well in excess of requirements over lifetime of the project	Independently audited, proven and developed reserves in excess of requirements over lifetime of the project	Proven reserves can supply the project adequately through the maturity of the debt	Project relies to some extent on potential and undeveloped reserves
<b>Strength of Sponsor</b>				
Sponsor's track record, financial strength, and country/sector experience	Strong sponsor with excellent track record and high financial standing	Good sponsor with satisfactory track record and good financial standing	Adequate sponsor with adequate track record and good financial standing	Weak sponsor with no or questionable track record and/or financial weaknesses
Sponsor support, as evidenced by equity, ownership clause and incentive to inject additional cash if necessary	Strong. Project is highly strategic for the sponsor (core business – long-term strategy)	Good. Project is strategic for the sponsor (core business – long-term strategy)	Acceptable. Project is considered important for the sponsor (core business)	Limited. Project is not key to sponsor's long-term strategy or core business
<b>Security Package</b>				
Assignment of contracts and accounts	Fully comprehensive	Comprehensive	Acceptable	Weak
Pledge of assets, taking into account quality, value and liquidity of assets	First perfected security interest in all project assets, contracts, permits and accounts necessary to run the project	Perfected security interest in all project assets, contracts, permits and accounts necessary to run the project	Acceptable security interest in all project assets, contracts, permits and accounts necessary to run the project	Little security or collateral for lenders; weak negative pledge clause
Lender's control over cash flow (e.g. cash sweeps, independent escrow accounts)	Strong	Satisfactory	Fair	Weak



	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
Strength of the covenant package (mandatory prepayments, payment deferrals, payment cascade, dividend restrictions...)	Covenant package is strong for this type of project  Project may issue no additional debt	Covenant package is satisfactory for this type of project  Project may issue extremely limited additional debt	Covenant package is fair for this type of project  Project may issue limited additional debt	Covenant package is insufficient for this type of project  Project may issue unlimited additional debt
Reserve funds (debt service, O&M, renewal and replacement, unforeseen events, etc)	Longer than average coverage period, all reserve funds fully funded in cash or letters of credit from highly rated bank	Average coverage period, all reserve funds fully funded	Average coverage period, all reserve funds fully funded	Shorter than average coverage period, reserve funds funded from operating cash flows

**Table 2 – Supervisory Rating Grades for Income-Producing Real Estate Exposures and High-Volatility Commercial Real Estate Exposures**

	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
<b>Financial strength</b>				
Market conditions	The supply and demand for the project's type and location are currently in equilibrium. The number of competitive properties coming to market is equal or lower than forecasted demand	The supply and demand for the project's type and location are currently in equilibrium. The number of competitive properties coming to market is roughly equal to forecasted demand	Market conditions are roughly in equilibrium. Competitive properties are coming on the market and others are in the planning stages. The project's design and capabilities may not be state of the art compared to new projects	Market conditions are weak. It is uncertain when conditions will improve and return to equilibrium. The project is losing tenants at lease expiration. New lease terms are less favourable compared to those expiring

	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
Financial ratios and advance rate	The property's debt service coverage ratio (DSCR) is considered strong (DSCR is not relevant for the construction phase) and its loan to value ratio (LTV) is considered low given its property type. Where a secondary market exists, the transaction is underwritten to market standards	The DSCR (not relevant for development real estate) and LTV are satisfactory. Where a secondary market exists, the transaction is underwritten to market standards	The property's DSCR has deteriorated and its value has fallen, increasing its LTV	The property's DSCR has deteriorated significantly and its LTV is well above underwriting standards for new loans
Stress analysis	The property's resources, contingencies and liability structure allow it to meet its financial obligations during a period of severe financial stress (e.g. interest rates, economic growth)	The property can meet its financial obligations under a sustained period of financial stress (e.g. interest rates, economic growth). The property is likely to default only under severe economic conditions	During an economic downturn, the property would suffer a decline in revenue that would limit its ability to fund capital expenditures and significantly increase the risk of default	The property's financial condition is strained and is likely to default unless conditions improve in the near term
Cash-flow predictability				
(a) For complete and stabilised property.	The property's leases are long-term with creditworthy tenants and their maturity dates are scattered. The property has a track record of tenant retention upon lease expiration. Its vacancy rate is low. Expenses (maintenance, insurance, security, and property taxes) are predictable	Most of the property's leases are long-term, with tenants that range in creditworthiness. The property experiences a normal level of tenant turnover upon lease expiration. Its vacancy rate is low. Expenses are predictable	Most of the property's leases are medium rather than long-term with tenants that range in creditworthiness. The property experiences a moderate level of tenant turnover upon lease expiration. Its vacancy rate is moderate. Expenses are relatively predictable but vary in relation to revenue	The property's leases are of various terms with tenants that range in creditworthiness. The property experiences a very high level of tenant turnover upon lease expiration. Its vacancy rate is high. Significant expenses are incurred preparing space for new tenants





	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
(b) For complete but not stabilised property	Leasing activity meets or exceeds projections. The project should achieve stabilisation in the near future	Leasing activity meets or exceeds projections. The project should achieve stabilisation in the near future	Most leasing activity is within projections; however, stabilisation will not occur for some time	Market rents do not meet expectations. Despite achieving target occupancy rate, cash flow coverage is tight due to disappointing revenue
(c) For construction phase	The property is entirely pre-leased through the tenor of the loan or pre-sold to an investment grade tenant or buyer, or the bank has a binding commitment for take-out financing from an investment grade lender	The property is entirely pre-leased or pre-sold to a creditworthy tenant or buyer, or the bank has a binding commitment for permanent financing from a creditworthy lender	Leasing activity is within projections but the building may not be pre-leased and there may not exist a take-out financing. The bank may be the permanent lender	The property is deteriorating due to cost overruns, market deterioration, tenant cancellations or other factors. There may be a dispute with the party providing the permanent financing
<b>Asset characteristics</b>				
Location	Property is located in highly desirable location that is convenient to services that tenants desire	Property is located in desirable location that is convenient to services that tenants desire	The property location lacks a competitive advantage	The property's location, configuration, design and maintenance have contributed to the property's difficulties
Design and condition	Property is favoured due to its design, configuration, and maintenance, and is highly competitive with new properties	Property is appropriate in terms of its design, configuration and maintenance. The property's design and capabilities are competitive with new properties	Property is adequate in terms of its configuration, design and maintenance	Weaknesses exist in the property's configuration, design or maintenance
Property is under construction	Construction budget is conservative and technical hazards are limited. Contractors are highly qualified	Construction budget is conservative and technical hazards are limited. Contractors are highly qualified	Construction budget is adequate and contractors are ordinarily qualified	Project is over budget or unrealistic given its technical hazards. Contractors may be under qualified



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



	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
<b>Security Package</b>				
Nature of lien	Perfected first lien <sup>119</sup>	Perfected first lien <sup>94</sup>	Perfected first lien <sup>94</sup>	Ability of lender to foreclose is constrained
Assignment of rents (for projects leased to long-term tenants)	The lender has obtained an assignment. They maintain current tenant information that would facilitate providing notice to remit rents directly to the lender, such as a current rent roll and copies of the project's leases	The lender has obtained an assignment. They maintain current tenant information that would facilitate providing notice to the tenants to remit rents directly to the lender, such as current rent roll and copies of the project's leases	The lender has obtained an assignment. They maintain current tenant information that would facilitate providing notice to the tenants to remit rents directly to the lender, such as current rent roll and copies of the project's leases	The lender has not obtained an assignment of the leases or has not maintained the information necessary to readily provide notice to the building's tenants
Quality of the insurance coverage	Appropriate	Appropriate	Appropriate	Substandard

<sup>119</sup> Lenders in some markets extensively use loan structures that include junior liens. Junior liens may be indicative of this level of risk if the total LTV inclusive of all senior positions does not exceed a typical first loan LTV.

**Table 3 – Supervisory Rating Grades for Object Finance Exposures**

	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
<b>Financial strength</b>				
Market conditions	Demand is strong and growing, strong entry barriers, low sensitivity to changes in technology and economic outlook	Demand is strong and stable. Some entry barriers, some sensitivity to changes in technology and economic outlook	Demand is adequate and stable, limited entry barriers, significant sensitivity to changes in technology and economic outlook	Demand is weak and declining, vulnerable to changes in technology and economic outlook, highly uncertain environment
Financial ratios (debt service coverage ratio and loan-to-value ratio)	Strong financial ratios considering the type of asset. Very robust economic assumptions	Strong / acceptable financial ratios considering the type of asset. Robust project economic assumptions	Standard financial ratios for the asset type	Aggressive financial ratios considering the type of asset
Stress analysis	Stable long-term revenues, capable of withstanding severely stressed conditions through an economic cycle	Satisfactory short-term revenues. Loan can withstand some financial adversity. Default is only likely under severe economic conditions	Uncertain short-term revenues. Cash flows are vulnerable to stresses that are not uncommon through an economic cycle. The loan may default in a normal downturn	Revenues subject to strong uncertainties; even in normal economic conditions the asset may default, unless conditions improve
Market liquidity	Market is structured on a worldwide basis; assets are highly liquid	Market is worldwide or regional; assets are relatively liquid	Market is regional with limited prospects in the short term, implying lower liquidity	Local market and/or poor visibility. Low or no liquidity, particularly on niche markets
<b>Political and legal environment</b>				
Political risk, including transfer risk	Very low; strong mitigation instruments, if needed	Low; satisfactory mitigation instruments, if needed	Moderate; fair mitigation instruments	High; no or weak mitigation instruments
Legal and regulatory risks	Jurisdiction is favourable to repossession and enforcement of contracts	Jurisdiction is favourable to repossession and enforcement of contracts	Jurisdiction is generally favourable to repossession and enforcement of contracts, even if repossession might be long and/or difficult	Poor or unstable legal and regulatory environment. Jurisdiction may make repossession and enforcement of contracts lengthy or impossible

	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
<b>Transaction characteristics</b>				
Financing term compared to the economic life of the asset	Full payout profile/minimum balloon. No grace period	Balloon more significant, but still at satisfactory levels	Important balloon with potentially grace periods	Repayment in fine or high balloon
<b>Operating risk</b>				
Permits / licensing	All permits have been obtained; asset meets current and foreseeable safety regulations	All permits obtained or in the process of being obtained; asset meets current and foreseeable safety regulations	Most permits obtained or in process of being obtained, outstanding ones considered routine, asset meets current safety regulations	Problems in obtaining all required permits, part of the planned configuration and/or planned operations might need to be revised
Scope and nature of O & M contracts	Strong long-term O&M contract, preferably with contractual performance incentives, and/or O&M reserve accounts (if needed)	Long-term O&M contract, and/or O&M reserve accounts (if needed)	Limited O&M contract or O&M reserve account (if needed)	No O&M contract: risk of high operational cost overruns beyond mitigants
Operator's financial strength, track record in managing the asset type and capability to re-market asset when it comes off-lease	Excellent track record and strong re-marketing capability	Satisfactory track record and re-marketing capability	Weak or short track record and uncertain re-marketing capability	No or unknown track record and inability to re-market the asset

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

	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
<b>Security Package</b>				
Asset control	Legal documentation provides the lender effective control (e.g. a first perfected security interest, or a leasing structure including such security) on the asset, or on the company owning it	Legal documentation provides the lender effective control (e.g. a perfected security interest, or a leasing structure including such security) on the asset, or on the company owning it	Legal documentation provides the lender effective control (e.g. a perfected security interest, or a leasing structure including such security) on the asset, or on the company owning it	The contract provides little security to the lender and leaves room to some risk of losing control on the asset
Rights and means at the lender's disposal to monitor the location and condition of the asset	The lender is able to monitor the location and condition of the asset, at any time and place (regular reports, possibility to lead inspections)	The lender is able to monitor the location and condition of the asset, almost at any time and place	The lender is able to monitor the location and condition of the asset, almost at any time and place	The lender is able to monitor the location and condition of the asset are limited
Insurance against damages	Strong insurance coverage including collateral damages with top quality insurance companies	Satisfactory insurance coverage (not including collateral damages) with good quality insurance companies	Fair insurance coverage (not including collateral damages) with acceptable quality insurance companies	Weak insurance coverage (not including collateral damages) or with weak quality insurance companies

**Table 4 – Supervisory Rating Grades for Commodities Finance Exposures**

	<b>Strong</b>	<b>Good</b>	<b>Satisfactory</b>	<b>Weak</b>
<b>Financial strength</b>				
Degree of over-collateralisation of trade	Strong	Good	Satisfactory	Weak



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



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

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## Chapter 6      Structured Credit Products

This chapter contains an extract from the Basel II framework, *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version* (June 2006) that applies to Canadian institutions. The extract has been annotated to indicate OSFI's position on items of national discretion.

The Securitisation framework and Supervisory review process for securitisation, have been extracted in their entirety.

The Securitisation framework is to be applied in determining the risk-weighted capital treatment applicable to all securitisation exposures that meet the definitions and operational requirements below regardless of accounting treatment.

For greater clarity, and to ensure consistency with paragraph 539 below, all exposures to mortgage-backed securities that do not involve the tranching of credit risk (e.g. NHA MBS) will not be considered securitization exposures for risk-based capital purposes under the Securitisation Framework.

### 6.1.    Securitisation Framework

#### *Scope and definitions of transactions covered under the securitisation framework*

538. Banks must apply the securitisation framework for determining regulatory capital requirements on exposures arising from traditional and synthetic securitisations or similar structures that contain features common to both. Since securitisations may be structured in many different ways, the capital treatment of a securitisation exposure must be determined on the basis of its economic substance rather than its legal form. Similarly, supervisors will look to the economic substance of a transaction to determine whether it should be subject to the securitisation framework for purposes of determining regulatory capital. Banks are encouraged to consult with their national supervisors when there is uncertainty about whether a given transaction should be considered a securitisation. For example, transactions involving cash flows from real estate (e.g. rents) may be considered specialised lending exposures, if warranted.

539. A *traditional securitisation* is a structure where the cash flow from an underlying pool of exposures is used to service at least two different stratified risk positions or tranches reflecting different degrees of credit risk. Payments to the investors depend upon the performance of the specified underlying exposures, as opposed to being derived from an obligation of the entity originating those exposures. The stratified/tranched structures that characterise securitisations differ from ordinary senior/subordinated debt instruments in that junior securitisation tranches can absorb losses without interrupting contractual payments to more senior tranches, whereas subordination in a senior/subordinated debt structure is a matter of priority of rights to the proceeds of liquidation.

## OSFI Notes

In its simplest form, asset securitization is the transformation of generally illiquid assets into securities that can be traded in the capital markets. The asset securitization process generally begins with the segregation of financial assets into pools that are relatively homogeneous with respect to their cash flow characteristics and risk profiles, including both credit and market risks. These pools of assets are then sold to a bankruptcy-remote entity, generally referred to as a special-purpose entity (SPE), which issues asset-backed securities (ABS) to investors to finance the purchase. ABS are financial instruments that may take a variety of forms, including commercial paper, term debt and certificates of beneficial ownership. The cash flow from the underlying assets supports repayment of the ABS. Various forms of enhancement are used to provide credit protection for investors in the ABS.

Securitizations typically split the risk of credit losses from the underlying assets into tranches that are distributed to different parties. Each loss position functions as an enhancement if it protects the more senior positions in the structure from loss.

An institution may perform one or more functions in an asset securitization transaction. It may:

- invest in a debt instrument issued by an SPE,
- provide enhancements,
- provide liquidity support,
- set up, or cause to be set up, an SPE,
- collect principal and interest payments on the assets and transmit those funds to an SPE, investors in the SPE securities or a trustee representing them, and
- provide clean-up calls.

540. A *synthetic securitisation* is a structure with at least two different stratified risk positions or tranches that reflect different degrees of credit risk where credit risk of an underlying pool of exposures is transferred, in whole or in part, through the use of funded (e.g. credit-linked notes) or unfunded (e.g. credit default swaps) credit derivatives or guarantees that serve to hedge the credit risk of the portfolio. Accordingly, the investors' potential risk is dependent upon the performance of the underlying pool.

## OSFI Notes

Refer to chapter 4 - Credit Risk Mitigation for capital guidance on credit derivatives.

541. Banks' exposures to a securitisation are hereafter referred to as "securitisation exposures". Securitisation exposures can include but are not restricted to the following: asset-backed securities, mortgage-backed securities, credit enhancements, liquidity facilities, interest rate or currency swaps, credit derivatives and tranching cover as described in paragraph 199. Reserve accounts, such as cash collateral accounts, recorded as an asset by the originating bank must also be treated as securitisation exposures.

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541(1) A resecuritisation exposure is a securitisation exposure in which the risk associated with an underlying pool of exposures is tranching and at least one of the underlying exposures is a securitisation exposure. In addition, an exposure to one or more resecuritisation exposures is a resecuritisation exposure.

### **OSFI Notes**

The key factor in determining if an exposure is a resecuritisation exposure is the presence of two different levels of credit risk tranching in the structure, that is, one or more of assets to which the investors are ultimately exposed is itself a securitisation exposure. Two or more layers of special purpose entities does not in itself cause a structure to be a resecuritisation.

Examples of resecuritisation exposures include;

- CDOs of ABS,
- A tranching exposure to a pool of underlying loans and a single tranche of an ABS,
- A credit derivative whose performance is linked to one or more resecuritisation exposures,

Liquidity asset purchase agreements provided at the pool level are generally not resecuritisations as the seller-provided first loss protection represents tranching of risk, assuming the underlying assets are not securitisations. Programme-wide liquidity facilities covering all the CP issued by the conduit would also generally not be a resecuritisation exposure unless one of the conduits investments is a resecuritisation exposure.

ABCP conduits may contain both resecuritisation and non-resecuritisation exposures such as where there are pool-specific liquidity facilities in addition to certain types of programme-wide credit enhancement (PWCE) facilities. The seller-provided protection represents one layer of credit risk tranching and therefore any pool-specific liquidity facilities would be securitisation exposures for the liquidity providers. The presence of a PWCE facility and/or different tranches of ABCP issued by the conduit may create resecuritisation exposures at the conduit level and will need to be assessed on a case by case basis. Institutions are encouraged to consult with OSFI when there is uncertainty about whether a particular exposure should be considered a resecuritisation exposure.

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

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## 6.2. Definitions and general terminology

### 6.2.1. *Originating bank*

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

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

#### OSFI Notes

An institution is considered the supplier of the assets in any of the following circumstances:

- the assets are held on the balance sheet of the institution at any time prior to being transferred to an SPE,
- the institution lends to an SPE in order for that SPE to grant a loan to a borrower as though it were the institution\*, or
- the institution enables \*\* an SPE to directly originate assets that are financed with ABS.

OSFI reserves the right to adopt a look-through approach to determine the originator of the assets. The look-through approach may also be used to ensure appropriate capital is maintained by an institution in a securitization transaction.

\* This method of lending is known as remote origination. The institution is regarded as the supplier because the SPE is creating an asset that is branded by the institution. The institution will incur reputational risk through the association with the product.

\*\* For example, by providing credit approvals or administrative support.

### 6.2.2. *Asset-backed commercial paper (ABCP) programme*

544. An asset-backed commercial paper (ABCP) programme predominately issues commercial paper with an original maturity of one year or less that is backed by assets or other exposures held in a bankruptcy-remote, special purpose entity.

### 6.2.3. *Clean-up call*

545. A clean-up call is an option that permits the securitisation exposures (e.g. asset-backed securities) to be called before all of the underlying exposures or securitisation exposures have

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been repaid. In the case of traditional securitisations, this is generally accomplished by repurchasing the remaining securitisation exposures once the pool balance or outstanding securities have fallen below some specified level. In the case of a synthetic transaction, the clean-up call may take the form of a clause that extinguishes the credit protection.

#### 6.2.4. *Credit enhancement*

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

#### **OSFI Notes**

An enhancement is an arrangement provided to an SPE to cover the losses associated with the pool of assets. Enhancement is a method of protecting investors in the event that cash flows from the underlying assets are insufficient to pay the interest and principal due for the ABS in a timely manner. Enhancement is used to improve or support the credit rating on more senior tranches, and therefore the pricing and marketability of the ABS.

Common examples of these facilities include: recourse provisions; senior/subordinated security structures; subordinated standby lines of credit; subordinated loans; third party equity; swaps that are structured to provide an element of enhancement; and any amount of liquidity facilities in excess of 103% of the face value of outstanding paper. In addition, these facilities include any temporary financing facility, other than qualifying servicer advances, provided by an institution to an enhancer or to an SPE to bridge the gap between the date a claim is made against a third party enhancer and when payment is received.

#### 6.2.5. *Credit-enhancing interest-only strip*

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

#### 6.2.6. *Early amortisation*

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

- (a) The bank must have an appropriate capital/liquidity plan in place to ensure that it has sufficient capital and liquidity available in the event of an early amortisation.
- (b) Throughout the duration of the transaction, including the amortisation period, there is the same pro rata sharing of interest, principal, expenses, losses and recoveries based on the bank's and investors' relative shares of the receivables outstanding at the beginning of each month.



- (c) The bank must set a period for amortisation that would be sufficient for at least 90% of the total debt outstanding at the beginning of the early amortisation period to have been repaid or recognised as in default; and
- (d) The pace of repayment should not be any more rapid than would be allowed by straight-line amortisation over the period set out in criterion (c).

#### **OSFI Notes**

Securitization documentation should clearly state that early amortization cannot be precipitated by regulatory actions affecting the supplier of assets.

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

#### **6.2.7. Excess spread**

550. Excess spread is generally defined as gross finance charge collections and other income received by the trust or special purpose entity (SPE, specified in paragraph 552) minus certificate interest, servicing fees, charge-offs, and other senior trust or SPE expenses.

#### **6.2.8. Implicit support**

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

#### **6.2.9. Special purpose entity (SPE)**

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

#### **OSFI Notes**

OSFI expects an institution to minimize its exposure to risk arising from its relationship with an SPE. An institution that sets up, or causes to be set up, an SPE will not have to hold capital as a result of this activity if the following conditions are met:

- the institution does not own any share capital in a company, nor is it the beneficiary of a trust, used as an SPE for purchasing and securitizing financial assets. For this purpose, share capital includes all classes of common and preferred share capital.
- the institution's name is not included in the name of a company or trust used as an SPE, nor is any connection implied with the institution by, for example, using a symbol closely associated with the institution. If, however, the institution is performing a specific function for a particular transaction or transactions (e.g., collecting and transmitting payments or

providing enhancement), this may be indicated in the offering circular (subject to the *Name Use Regulations*).

- the institution does not have any of its directors, officers or employees on the board of directors of a company used as an SPE, unless the SPE's board has at least three members. Where the board consists of three or more members, the institution may not have more than one director. Where the SPE is a trust, the beneficiary and the indenture trustee and/or the issuer trustee must be third parties independent of the institution.
- the institution does not lend to the SPE on a subordinated basis, except as otherwise provided herein\*.
- the institution does not support, except as provided elsewhere in this guideline, any losses suffered by the SPE, or investors in it, or bear any of the recurring expenses of the SPE.

Where an institution does not meet all of these conditions, it is required to hold capital against all debt instruments issued to third parties by the SPE.

- \* A loan provided by an institution to an SPE to cover initial transaction or set-up costs is a deduction from capital as long as the loan is capped at its original amount; amortized over the life of the securities issued by the SPE; and the loan is not available as a form of enhancement to the assets or securities issued.

### **6.3. Operational requirements for the recognition of risk transference**

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

#### **6.3.1. Operational requirements for traditional securitisations**

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

- (a) Significant credit risk associated with the securitised exposures has been transferred to third parties.
- (b) The transferor does not maintain effective or indirect control over the transferred exposures. The assets are legally isolated from the transferor in such a way (e.g. through the sale of assets or through subparticipation) that the exposures are put beyond the reach of the transferor and its creditors, even in bankruptcy or receivership. These conditions must be supported by an opinion provided by a qualified legal counsel.

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

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- (c) The securities issued are not obligations of the transferor. Thus, investors who purchase the securities only have claim to the underlying pool of exposures.
  - (d) The transferee is an SPE and the holders of the beneficial interests in that entity have the right to pledge or exchange them without restriction.
  - (e) Clean-up calls must satisfy the conditions set out in paragraph 557.
  - (f) The securitisation does not contain clauses that (i) require the originating bank to alter systematically the underlying exposures such that the pool's weighted average credit quality is improved unless this is achieved by selling assets to independent and unaffiliated third parties at market prices; (ii) allow for increases in a retained first loss position or credit enhancement provided by the originating bank after the transaction's inception; or (iii) increase the yield payable to parties other than the originating bank, such as investors and third-party providers of credit enhancements, in response to a deterioration in the credit quality of the underlying pool.

### 6.3.2. *Operational requirements for synthetic securitisations*

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

- (a) Credit risk mitigants must comply with the requirements as set out in chapter 4 of this Framework.
- (b) Eligible collateral is limited to that specified in paragraphs 145 and 146. Eligible collateral pledged by SPEs may be recognised.
- (c) Eligible guarantors are defined in paragraph 195. Banks may not recognise SPEs as eligible guarantors in the securitisation framework.
- (d) Banks must transfer significant credit risk associated with the underlying exposure to third parties.
- (e) The instruments used to transfer credit risk may not contain terms or conditions that limit the amount of credit risk transferred, such as those provided below:
  - Clauses that materially limit the credit protection or credit risk transference (e.g. significant materiality thresholds below which credit protection is deemed not to be triggered even if a credit event occurs or those that allow for the termination of the protection due to deterioration in the credit quality of the underlying exposures);
  - Clauses that require the originating bank to alter the underlying exposures to improve the pool's weighted average credit quality;
  - Clauses that increase the banks' cost of credit protection in response to deterioration in the pool's quality;

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- Clauses that increase the yield payable to parties other than the originating bank, such as investors and third-party providers of credit enhancements, in response to a deterioration in the credit quality of the reference pool; and
  - Clauses that provide for increases in a retained first loss position or credit enhancement provided by the originating bank after the transaction's inception.
- (f) An opinion must be obtained from a qualified legal counsel that confirms the enforceability of the contracts in all relevant jurisdictions.
- (g) Clean-up calls must satisfy the conditions set out in paragraph 557.

556. For synthetic securitisations, the effect of applying CRM techniques for hedging the underlying exposure are treated according to paragraphs 109 to 210. In case there is a maturity mismatch, the capital requirement will be determined in accordance with paragraphs 202 to 205. When the exposures in the underlying pool have different maturities, the longest maturity must be taken as the maturity of the pool. Maturity mismatches may arise in the context of synthetic securitisations when, for example, a bank uses credit derivatives to transfer part or all of the credit risk of a specific pool of assets to third parties. When the credit derivatives unwind, the transaction will terminate. This implies that the effective maturity of the tranches of the synthetic securitisation may differ from that of the underlying exposures. Originating banks of synthetic securitisations must treat such maturity mismatches in the following manner. A bank using the standardised approach for securitisation must deduct all retained positions that are unrated or rated below investment grade. A bank using the IRB approach must deduct unrated, retained positions if the treatment of the position is deduction specified in paragraphs 609 to 643. Accordingly, when deduction is required, maturity mismatches are not taken into account. For all other securitisation exposures, the bank must apply the maturity mismatch treatment set forth in paragraphs 202 to 205.

#### **OSFI Notes**

The following apply to both traditional and synthetic securitizations:

- An institution should understand the inherent risks of the activity, be competent in structuring and managing such transactions, and have adequate staffing of the functions involved in the transactions.
- The terms and conditions of all transactions between the institution and the SPE should be at least at market terms and conditions (and any fees are paid in a timely manner) and meet the institution's normal credit standards. The Credit Committee or an equally independent committee should approve individual transactions.
- An institution's capital and liquidity plans should take into account the potential need to finance an increase in assets on its balance sheet as a result of early amortization or maturity events. If OSFI finds the planning inadequate, it may increase the institution's capital requirements.
- The capital requirements for asset securitization transactions will be limited to those set out in this guideline if the institution provides only the level of support (enhancement or liquidity) committed to in the various agreements that define and limit the levels of losses to be borne by the institution.

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### 6.3.3. *Operational requirements and treatment of clean-up calls*

557. For securitisation transactions that include a clean-up call, no capital will be required due to the presence of a clean-up call if the following conditions are met: (i) the exercise of the clean-up call must not be mandatory, in form or in substance, but rather must be at the discretion of the originating bank; (ii) the clean-up call must not be structured to avoid allocating losses to credit enhancements or positions held by investors or otherwise structured to provide credit enhancement; and (iii) the clean-up call must only be exercisable when 10% or less of the original underlying portfolio, or securities issued remain, or, for synthetic securitisations, when 10% or less of the original reference portfolio value remains.

#### **OSFI Notes**

An agreement that permits an institution to purchase the remaining assets in a pool when the balance of those assets is equal to or less than 10% of the original pool balance is considered a clean-up call and no capital is required. However, a clean-up call that permits the remaining loans to be repurchased when their balance is greater than 10% of the original pool balance or permits the purchase of non-performing loans is considered a first loss enhancement.

558. Securitisation transactions that include a clean-up call that does not meet all of the criteria stated in paragraph 557 result in a capital requirement for the originating bank. For a traditional securitisation, the underlying exposures must be treated as if they were not securitised. Additionally, banks must not recognise in regulatory capital any gain-on-sale, as defined in paragraph 562. For synthetic securitisations, the bank purchasing protection must hold capital against the entire amount of the securitised exposures as if they did not benefit from any credit protection. If a synthetic securitisation incorporates a call (other than a clean-up call) that effectively terminates the transaction and the purchased credit protection on a specific date, the bank must treat the transaction in accordance with paragraph 556 and paragraphs 202 to 205.

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

## **6.4. Treatment of securitisation exposures**

### 6.4.1. *Calculation of capital requirements*

560. Banks are required to hold regulatory capital against all of their securitisation exposures, including those arising from the provision of credit risk mitigants to a securitisation transaction, investments in asset-backed securities, retention of a subordinated tranche, and extension of a liquidity facility or credit enhancement, as set forth in the following sections. Repurchased securitisation exposures must be treated as retained securitisation exposures.

#### **(i) Deduction**

561. When a bank is required to deduct a securitisation exposure from regulatory capital, the deduction must be taken 50% from Tier 1 and 50% from Tier 2 with the one exception noted in

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paragraph 562. Credit enhancing I/Os (net of the amount that must be deducted from Tier 1 as in paragraph 562) are deducted 50% from Tier 1 and 50% from Tier 2. Deductions from capital may be calculated net of any specific provisions taken against the relevant securitisation exposures.

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

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

## **(ii) Implicit support**

564. When a bank provides implicit support to a securitisation, it must, at a minimum, hold capital against all of the exposures associated with the securitisation transaction as if they had not been securitised. Additionally, banks would not be permitted to recognise in regulatory capital any gain-on-sale, as defined in paragraph 562. Furthermore, the bank is required to disclose publicly that (a) it has provided non-contractual support and (b) the capital impact of doing so.

### **6.4.2. *Operational requirements for use of external credit assessments***

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

To be eligible for risk-weighting purposes, the external credit assessment must take into account and reflect the entire amount of credit risk exposure the bank has with regard to all payments owed to it. For example, if a bank is owed both principal and interest, the assessment must fully take into account and reflect the credit risk associated with timely repayment of both principal and interest.

- (b) The external credit assessments must be from an eligible ECAI as recognised by the bank’s national supervisor in accordance with paragraphs 90 to 108 with the following exception. In contrast with bullet three of paragraph 91, an eligible credit assessment must be publicly available. In other words, a rating must be published in an accessible form and included in the ECAI’s transition matrix. Consequently, ratings that are made available only to the parties to a transaction do not satisfy this requirement.
- (c) Eligible ECAs must have a demonstrated expertise in assessing securitisations, which may be evidenced by strong market acceptance.
- (d) A bank must apply external credit assessments from eligible ECAs consistently across a given type of securitisation exposure. Furthermore, a bank cannot use the credit assessments issued by one ECAI for one or more tranches and those of another ECAI for other positions (whether retained or purchased) within the same securitisation structure that may or may not be rated by the first ECAI. Where two or more eligible



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ECAIs can be used and these assess the credit risk of the same securitisation exposure differently, paragraphs 96 to 98 will apply.

- (e) Where CRM is provided directly to an SPE by an eligible guarantor defined in paragraph 195 and is reflected in the external credit assessment assigned to a securitisation exposure(s), the risk weight associated with that external credit assessment should be used. In order to avoid any double counting, no additional capital recognition is permitted. If the CRM provider is not recognised as an eligible guarantor in paragraph 195, the covered securitisation exposures should be treated as unrated.
- (f) In the situation where a credit risk mitigant is not obtained by the SPE but rather applied to a specific securitisation exposure within a given structure (e.g. ABS tranche), the bank must treat the exposure as if it is unrated and then use the CRM treatment outlined in chapter 4, to recognise the hedge.
- (g)
  - (i) A bank is not permitted to use any external credit assessment for risk-weighting purposes where the assessment is at least partly based on unfunded support provided by the bank. For example, if a bank buys ABCP where it provides an unfunded securitisation exposure extended to the ABCP programme (eg liquidity facility or credit enhancement), and that exposure plays a role in determining the credit assessment on the ABCP, the bank must treat the ABCP as if it were not rated. The bank must continue to hold capital against the other securitisation exposure it provides (eg against the liquidity facility and/or credit enhancement)
  - (ii) The treatment described in 565(g)(i) is also applicable to exposures held in the trading book. A bank's capital requirement for such exposures held in the trading book can be no less than the amount required under the banking book treatment.
  - (iii) Banks are permitted to recognise overlap in their exposures, consistent with paragraph 581. For example, a bank providing a liquidity facility supporting 100% of the ABCP issued by an ABCP programme and purchasing 20% of the outstanding ABCP of that programme could recognise an overlap of 20% (100% liquidity facility + 20% CP held – 100% CP issued = 20%). If a bank provided a liquidity facility that covered 90% of the outstanding ABCP and purchased 20% of the ABCP, the two exposures would be treated as if 10% of the two exposures overlapped (90% liquidity facility + 20% CP held – 100% CP issued = 10%). If a bank provided a liquidity facility that covered 50% of the outstanding ABCP and purchased 20% of the ABCP, the two exposures would be treated as if there were no overlap. Such overlap could also be recognised between specific risk capital charges for exposures in the trading book and capital charges for exposures in the banking book, provided that the bank is able to calculate and compare the capital charges for the relevant exposures.



## OSFI Notes

Exposures referred to in (i) above, such as ABCP, are to be treated as unrated securitisation exposures for regulatory capital purposes if the overlapping exposure treatment described in (iii) above and paragraph 581 is not applicable. The risk-based capital calculation would then require the application of one of the standardized or IRB approaches for unrated exposures.

If the two exposures, such as in the example provided in (iii), do overlap and meet the requirements, then no additional risk-based capital is required for the overlap. In addition, if the overlapping position that is not being recognized represents a balance sheet asset, then a reconciling item may be required within regulatory reporting schedules to ensure inclusion of that item in the asset-to-capital multiple.

### *6.4.2.1. Information on the underlying collateral supporting securitisation exposures*

565(i) In order for a bank to use the securitisation framework, it must have the information specified in paragraphs 565(ii) through 565(iv).

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

565(iii) Banks must be able to access performance information on the underlying pools on an on-going basis in a timely manner. Such information may include, as appropriate: exposure type; percentage of loans 30, 60 and 90 days past due; default rates; prepayment rates; loans in foreclosure; property type; occupancy; average credit score or other measures of creditworthiness; average loan-to-value ratio; and industry and geographic diversification. For resecuritisations, banks should have information not only on the underlying securitisation tranches, such as the issuer name and credit quality, but also on the characteristics and performance of the pools underlying the securitisation tranches.

565(iv) A bank must have a thorough understanding of all structural features of a securitisation transaction that would materially impact the performance of the bank's exposures to the transaction, such as the contractual waterfall and waterfall-related triggers, credit enhancements, liquidity enhancements, market value triggers, and deal-specific definitions of default.

## OSFI Notes

The correspondence of OSFI-recognized rating agency long- and short-term ratings to the rating categories in the Framework, described in sections 3.7.2.1 and 3.7.2.5, applies to this section as well. Note that the risk weights assigned to the rating categories in this section are in some cases different from those assigned to the rating categories in section 3.7.2.

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Effective October 31, 2008, new securities issued by securitization SPEs, other than securities issued as a result of the “Montreal Accord”<sup>120</sup>, must be rated by at least two recognized ECAIs to permit, in the case of any securitization exposure related to such securities, the use of a standardized or internal ratings-based approach<sup>121</sup>, or an Internal Assessment Approach<sup>122</sup>, by a FRE<sup>123</sup>. In all cases where a securitization exposure arises from a re-securitization and the exposure is acquired after October 31, 2008, the securities issued by the re-securitization SPE (or such securitization exposure), other than securities issued as a result of the “Montreal Accord”, must be rated by two recognized ECAIs to permit a FRE to use a ratings-based or Internal Assessment Approach for such exposure.<sup>124</sup> Further, in the case of a re-securitization exposure acquired after October 31, 2008, the Supervisory Formula under CAR can only be applied based on the ultimate underlying assets (e.g. the third party loans or receivables giving rise to cash flows) and not based upon securities issued by any underlying securitization. When a FRE uses two ratings which correspond to different risk weights, the higher of the two risk weights must be used. With innovative or highly structured products such as re-securitizations, FREs should exercise caution when relying on ratings if significant disagreement exists between ratings agencies as to the efficacy of using ratings to evaluate risk.

#### 6.4.3. *Standardised approach for securitisation exposures*

##### (i) **Scope**

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

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<sup>120</sup> The “Montreal Accord” is the restructuring agreement reached on December 23, 2007 by the Pan-Canadian Investors Committee for Third-Party Structured Asset-Backed Commercial Paper, approved by investors on April 25, 2008, and sanctioned by the Ontario Superior Court of Justice on June 5, 2008.

<sup>121</sup> This two rating requirement also applies to any inferred ratings used under the CAR Ratings-Based Approach. Such two rating requirement may be satisfied by a combination of an external rating from one ECAI and an inferred rating based on a reference securitization exposure rated by another ECAI or by two ratings (based on external credit ratings from two ECAIs) of the same reference securitization exposure.

<sup>122</sup> This two rating requirement for the CAR internal assessment approach requires, pursuant to CAR A-1 paragraph 620, that the unrated securitization exposure may only be rated under the IAA if the ABCP has two external ratings.

<sup>123</sup> This two rating requirement applies whenever a FRE is seeking to use an external credit rating to establish the capital required to support a securitization exposure. In the case of deposit-taking institutions subject to CAR, the two rating requirement applies to securitization exposures regardless of whether the standardized or the internal Ratings-Based Approach is utilized; Section 5.4 of CAR A and Section 6.4 of CAR A-1 are amended accordingly.

<sup>124</sup> This two rating requirement applies whenever a FRE is seeking to use an external credit rating to establish the capital required to support a re-securitization exposure and, as described in the preceding footnote, the existing guidance is amended accordingly.

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**(ii) Risk weights**

567. The risk-weighted asset amount of a securitisation exposure is computed by multiplying the amount of the position by the appropriate risk weight determined in accordance with the following tables. For off-balance sheet exposures, banks must apply a CCF and then risk weight the resultant credit equivalent amount. If such an exposure is rated, a CCF of 100% must be applied. For positions with long-term ratings of B+ and below and short-term ratings other than A-1/P-1, A-2/P-2, A-3/P-3, deduction from capital as defined in paragraph 561 is required. Deduction is also required for unrated positions with the exception of the circumstances described in paragraphs 571 to 575.

**Risk weights - Long-term rating category<sup>125</sup>**

<b>External Credit Assessment</b>	<b>AAA to AA-</b>	<b>A+ to A-</b>	<b>BBB+ to BBB-</b>	<b>BB+ to BB-</b>	<b>B+ and below or unrated</b>
<b>Securitisation Exposures</b>	20%	50%	100%	350%	Deduction
<b>Resecuritisation Exposures</b>	40%	100%	225%	650%	Deduction

**Risk Weights - Short-term rating category**

<b>External Credit Assessment</b>	<b>A-1/P-1</b>	<b>A-2/P-2</b>	<b>A-3/P-3</b>	<b>All other ratings or unrated</b>
<b>Securitisation Exposures</b>	20%	50%	100%	Deduction
<b>Resecuritisation Exposures</b>	40%	100%	225%	Deduction

568. The capital treatment of positions retained by originators, liquidity facilities, credit risk mitigants, and securitisations of revolving exposures are identified separately. The treatment of clean-up calls is provided in paragraphs 557 to 559.

*Investors may recognise ratings on below-investment grade exposures*

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

*Originators to deduct below-investment grade exposures*

570. Originating banks as defined in paragraph 543 must deduct all retained securitisation exposures rated below investment grade (i.e. BBB-).

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<sup>125</sup> The rating designations used in the following charts are for illustrative purposes only and do not indicate any preference for, or endorsement of, any particular external assessment system.

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### **(iii) Exceptions to general treatment of unrated securitisation exposures**

571. As noted in the tables above, unrated securitisation exposures must be deducted with the following exceptions: (i) the most senior exposure in a securitisation, (ii) exposures that are in a second loss position or better in ABCP programmes and meet the requirements outlined in paragraph 574, and (iii) eligible liquidity facilities.

#### *Treatment of unrated most senior securitisation exposures*

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

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

#### *Treatment of exposures in a second loss position or better in ABCP programmes*

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

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

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

#### *Risk weights for eligible liquidity facilities*

576. For eligible liquidity facilities as defined in paragraph 578 and where the conditions for use of external credit assessments in paragraph 565 are not met, the risk weight applied to the exposure’s credit equivalent amount is equal to the highest risk weight assigned to any of the underlying individual exposures covered by the facility.

### **(iv) Credit conversion factors for off-balance sheet exposures**

577. For risk-based capital purposes, banks must determine whether, according to the criteria outlined below, an off-balance sheet securitisation exposure qualifies as an ‘eligible liquidity

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facility' or an 'eligible servicer cash advance facility'. All other off-balance sheet securitisation exposures will receive a 100% CCF.

#### *Eligible liquidity facilities*

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

- (a) The facility documentation must clearly identify and limit the circumstances under which it may be drawn. Draws under the facility must be limited to the amount that is likely to be repaid fully from the liquidation of the underlying exposures and any seller-provided credit enhancements. In addition, the facility must not cover any losses incurred in the underlying pool of exposures prior to a draw, or be structured such that draw-down is certain (as indicated by regular or continuous draws);
- (b) The facility must be subject to an asset quality test that precludes it from being drawn to cover credit risk exposures that are in default as defined in paragraphs 452 to 459. In addition, if the exposures that a liquidity facility is required to fund are externally rated securities, the facility can only be used to fund securities that are externally rated investment grade at the time of funding;
- (c) The facility cannot be drawn after all applicable (e.g. transaction-specific and programme-wide) credit enhancements from which the liquidity would benefit have been exhausted; and
- (d) Repayment of draws on the facility (i.e. assets acquired under a purchase agreement or loans made under a lending agreement) must not be subordinated to any interests of any note holder in the programme (e.g. ABCP programme) or subject to deferral or waiver.

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

580. *Deleted*

#### *Treatment of overlapping exposures*

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

## OSFI Notes

For greater certainty with respect to paragraph 581, the securitisation exposure included for risk-based capital purposes must be that which produces the higher amount of regulatory capital.

### *Eligible servicer cash advance facilities*

582. Subject to national discretion, if contractually provided for, servicers may advance cash to ensure an uninterrupted flow of payments to investors so long as the servicer is entitled to full reimbursement and this right is senior to other claims on cash flows from the underlying pool of exposures. At national discretion, such undrawn servicer cash advances or facilities that are unconditionally cancellable without prior notice may be eligible for a 0% CCF.

## OSFI Notes

### (i) Collecting and transmitting payments

An institution whose only involvement with a particular asset securitization transaction is to collect interest and principal payments on the underlying assets and transmit these funds to the SPE or investors in the SPE securities (or a trustee representing them) should be under no obligation to remit funds to the SPE or the investors unless and until the funds are received from the obligors. Where this condition is met, this activity does not attract any capital.

An institution that is collecting interest and principal payments on the underlying assets and transmitting these funds to the SPE or investors in the SPE securities (or a trustee representing them) may also:

- structure transactions,
- analyse the underlying assets,
- perform due diligence and credit reviews,
- monitor the credit quality of the portfolio of underlying assets, and
- provide servicer advances (see conditions outlined in (ii) below).

In this role, an institution should:

- comply with the conditions specified for an institution setting up an SPE,
- have evidence available in its records that its legal advisers are satisfied that the terms of the asset securitization protect it from any liability to investors in the SPE (except normal contractual obligations relating to its role in collecting and transmitting payments), and
- ensure that any offering circular contains a highly visible, unequivocal statement that the institution, serving in this capacity, does not stand behind the issue or the SPE and will not make good on any losses in the portfolio.

Where an institution that is not making servicer advances meets all these conditions, this activity does not attract any capital.

Where an institution does not meet all these conditions, it is required to maintain capital against all debt instruments issued to third parties by the SPE.

(ii) Making servicer advances

An institution may be contractually obligated to provide funds to an SPE to ensure an uninterrupted flow of payments to investors in the SPE's securities, solely under the unusual circumstance that payments from the underlying assets have not been received due to temporary timing differences. An institution that provides such support is typically referred to as a servicing agent and the funds provided are typically referred to as servicer advances. Where an institution acts as a servicing agent, OSFI expects the following conditions to be met:

- Servicer advances are not made to offset shortfalls in cash flow that arise from assets in default.
- The credit facility under which servicer advances are funded is unconditionally cancellable by the servicing agent.
- The total value of cash advances is limited to the total amount transferable for that collection period.
- Servicer advances rank ahead of all claims by investors in SPE securities, expenses and other cash allocations.
- The repayment of servicer advances comes from subsequent collections or the available enhancement facilities.
- Servicer advances are repaid within thirty-one business days from the day the cash is advanced.
- The servicing agent performs an assessment of the likelihood of repayment of servicer advances prior to each advance and such advances should only be made if prudent lending standards are met.

Where all of the conditions in sections (i) and (ii) are met, institutions should treat undrawn facilities as off-balance sheet commitments. Drawn facilities will be treated as on-balance sheet loans.

In all other circumstances, the facilities will be treated as first loss enhancements.

(v) Treatment of credit risk mitigation for securitisation exposures

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

584. When a bank other than the originator provides credit protection to a securitisation exposure, it must calculate a capital requirement on the covered exposure as if it were an



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investor in that securitisation. If a bank provides protection to an unrated credit enhancement, it must treat the credit protection provided as if it were directly holding the unrated credit enhancement.

#### *Collateral*

585. Eligible collateral is limited to that recognised under the standardised approach for CRM (paragraphs 145 and 146). Collateral pledged by SPEs may be recognised.

#### *Guarantees and credit derivatives*

586. Credit protection provided by the entities listed in paragraph 195 may be recognised. SPEs cannot be recognised as eligible guarantors.

587. Where guarantees or credit derivatives fulfil the minimum operational conditions as specified in paragraphs 189 to 194, banks can take account of such credit protection in calculating capital requirements for securitisation exposures.

588. Capital requirements for the guaranteed/protected portion will be calculated according to CRM for the standardised approach as specified in paragraphs 196 to 201.

#### *Maturity mismatches*

589. For the purpose of setting regulatory capital against a maturity mismatch, the capital requirement will be determined in accordance with paragraphs 202 to 205. When the exposures being hedged have different maturities, the longest maturity must be used.

### **(vi) Capital requirement for early amortisation provisions**

#### *Scope*

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

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

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

592. For securitisation structures wherein the underlying pool comprises revolving and term exposures, a bank must apply the relevant early amortisation treatment (outlined below in paragraphs 594 to 605) to that portion of the underlying pool containing revolving exposures.

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

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

#### *Maximum capital requirement*

594. For a bank subject to the early amortisation treatment, the total capital charge for all of its positions will be subject to a maximum capital requirement (i.e. a 'cap') equal to the greater of (i) that required for retained securitisation exposures, or (ii) the capital requirement that would apply had the exposures not been securitised. In addition, banks must deduct the entire amount of any gain-on-sale and credit enhancing I/Os arising from the securitisation transaction in accordance with paragraphs 561 to 563.

#### *Mechanics*

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

#### **(vii) Determination of CCFs for controlled early amortisation features**

596. An early amortisation feature is considered controlled when the definition as specified in paragraph 548 is satisfied.

#### *Uncommitted retail exposures*

597. For uncommitted retail credit lines (e.g. credit card receivables) in securitisations containing controlled early amortisation features, banks must compare the three-month average excess spread defined in paragraph 550 to the point at which the bank is required to trap excess spread as economically required by the structure (i.e. excess spread trapping point).

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

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

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

600. Banks are required to apply the conversion factors set out above for controlled mechanisms to the investors' interest referred to in paragraph 595.

*Other exposures*

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

**(viii) Determination of CCFs for non-controlled early amortisation features**

602. Early amortisation features that do not satisfy the definition of a controlled early amortisation as specified in paragraph 548 will be considered non-controlled and treated as follows.

*Uncommitted retail exposures*

603. For uncommitted retail credit lines (e.g. credit card receivables) in securitisations containing non-controlled early amortisation features, banks must make the comparison described in paragraphs 597 and 598:

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

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

#### *Other exposures*

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

#### *6.4.4. Internal ratings-based approach for securitisation exposures*

##### **(i) Scope**

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

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

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

**(ii) Hierarchy of approaches**

609. The Ratings-Based Approach (RBA) must be applied to securitisation exposures that are rated, or where a rating can be inferred as described in paragraph 617. Where an external or an inferred rating is not available, either the Supervisory Formula (SF) or the Internal Assessment Approach (IAA) must be applied. The IAA is only available to exposures (e.g. liquidity facilities and credit enhancements) that banks (including third-party banks) extend to ABCP programmes. Such exposures must satisfy the conditions of paragraphs 619 and 620. For liquidity facilities to which none of these approaches can be applied, banks may apply the treatment specified in paragraph 639. Exceptional treatment for eligible servicer cash advance facilities is specified in paragraph 641. Securitisation exposures to which none of these approaches can be applied must be deducted.

**(iii) Maximum capital requirement**

610. For a bank using the IRB approach to securitisation, the maximum capital requirement for the securitisation exposures it holds is equal to the IRB capital requirement that would have been assessed against the underlying exposures had they not been securitised and treated under the appropriate sections of the IRB framework including section 5.7. In addition, banks must deduct the entire amount of any gain-on-sale and credit enhancing I/Os arising from the securitisation transaction in accordance with paragraphs 561 to 563.

**(iv) Ratings-Based Approach (RBA)**

611. Under the RBA, the risk-weighted assets are determined by multiplying the amount of the exposure by the appropriate risk weights, provided in the tables below.

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

613. For purposes of the RBA, a securitisation exposure is treated as a senior tranche if it is effectively backed or secured by a first claim on the entire amount of the assets in the underlying securitised pool. While this generally includes only the most senior position within a securitisation transaction, in some instances there may be some other claim that, in a technical sense, may be more senior in the waterfall (e.g. a swap claim) but may be disregarded for the purpose of determining which positions are subject to the “senior tranches” column.

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Examples:

- (a) In a typical synthetic securitisation, the “super-senior” tranche would be treated as a senior tranche, provided that all of the conditions for inferring a rating from a lower tranche are fulfilled.
- (b) In a traditional securitisation where all tranches above the first-loss piece are rated, the most highly rated position would be treated as a senior tranche. However, when there are several tranches that share the same rating, only the most senior one in the waterfall would be treated as senior.
- (c) Usually a liquidity facility supporting an ABCP programme would not be the most senior position within the programme; the commercial paper, which benefits from the liquidity support, typically would be the most senior position. However, a liquidity facility may be viewed as covering all losses on the underlying receivables pool that exceed the amount of over-collateralisation/reserves provided by the seller and as being most senior only if it is sized to cover all of the outstanding commercial paper and other senior debt supported by the pool, so that no cash flows from the underlying pool could be transferred to other creditors until any liquidity draws were repaid in full. In such a case, the RBA risk weights in the left-most column can be used. If these conditions are not satisfied, or if for other reasons the liquidity facility constitutes a mezzanine position in economic substance rather than a senior position in the underlying pool, then the “Base risk weights” column is applicable.

Senior resecuritisation exposures are defined as resecuritisation exposures satisfying the following two conditions: (a) the exposure is a senior position, and (b) none of the underlying exposures are themselves resecuritisation exposures.

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

615. Banks may apply the risk weights for senior positions if the effective number of underlying exposures (N, as defined in paragraph 633) is 6 or more and the position is senior as defined above. When N is less than 6, the risk weights in column 4 of the first table below apply. In all other cases, the risk weights in column 3 of the first table below apply.

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

External Rating (Illustrative)	Securitisation Exposures			Resecuritisation Exposures	
	Risk weights for senior positions and eligible senior IAA exposures	Base risk weights	Risk weights for tranches backed by non-granular pools	Senior	Non-senior
AAA	7%	12%	20%	20%	30%
AA	8%	15%	25%	25%	40%
A+	10%	18%	35%	35%	50%
A	12%	20%		40%	65%
A-	20%	35%		60%	100%
BBB+	35%	50%		100%	150%
BBB	60%	75%		150%	225%
BBB-	100%			200%	350%
BB+	250%			300%	500%
BB	425%			500%	650%
BB-	650%			750%	850%
Below BB- and unrated	Deduction				

616. The risk weights in the table below apply when the external assessment represents a short-term credit rating, as well as when an inferred rating based on a short-term rating is available. The decision rules outlined in paragraph 615 also apply for short-term credit ratings.

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

External Rating (Illustrative)	Securitisation Exposures			Resecuritisation Exposures	
	Risk weights for senior positions and eligible senior IAA exposures	Base risk weights	Risk weights for tranches backed by non-granular pools	Senior	Non-senior
A-1/P-1	7%	12%	20%	20%	30%
A-2/P-2	12%	20%	35%	40%	65%
A-3/P-3	60%	75%	75%	150%	225%
All other ratings/unrated	Deduction				



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### *Use of inferred ratings*

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

### *Operational requirements for inferred ratings*

618. The following operational requirements must be satisfied to recognise inferred ratings.

- (a) The reference securitisation exposure (e.g. ABS) must be subordinate in all respects to the unrated securitisation exposure. Credit enhancements, if any, must be taken into account when assessing the relative subordination of the unrated exposure and the reference securitisation exposure. For example, if the reference securitisation exposure benefits from any third-party guarantees or other credit enhancements that are not available to the unrated exposure, then the latter may not be assigned an inferred rating based on the reference securitisation exposure.
- (b) The maturity of the reference securitisation exposure must be equal to or longer than that of the unrated exposure.
- (c) On an ongoing basis, any inferred rating must be updated continuously to reflect any changes in the external rating of the reference securitisation exposure.
- (d) The external rating of the reference securitisation exposure must satisfy the general requirements for recognition of external ratings as delineated in paragraph 565.
- (v) **Internal Assessment Approach (IAA)**

619. A bank may use its internal assessments of the credit quality of the securitisation exposures the bank extends to ABCP programmes (e.g. liquidity facilities and credit enhancements) if the bank's internal assessment process meets the operational requirements below. Internal assessments of exposures provided to ABCP programmes must be mapped to equivalent external ratings of an ECAI. Those rating equivalents are used to determine the appropriate risk weights under the RBA for purposes of assigning the notional amounts of the exposures.

620. A bank's internal assessment process must meet the following operational requirements in order to use internal assessments in determining the IRB capital requirement arising from liquidity facilities, credit enhancements, or other exposures extended to an ABCP programme.

- (a) For the unrated exposure to qualify for the IAA, the ABCP must be externally rated. The ABCP itself is subject to the RBA.
- (b) The internal assessment of the credit quality of a securitisation exposure to the ABCP programme must be based on an ECAI criteria for the asset type purchased and must be the equivalent of at least investment grade when initially assigned to an exposure. In addition, the internal assessment must be used in the bank's internal risk management

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processes, including management information and economic capital systems, and generally must meet all the relevant requirements of the IRB framework.

- (c) In order for banks to use the IAA, their supervisors must be satisfied (i) that the ECAI meets the ECAI eligibility criteria outlined in paragraphs 90 to 108 and (ii) with the ECAI rating methodologies used in the process. In addition, banks have the responsibility to demonstrate to the satisfaction of their supervisors how these internal assessments correspond with the relevant ECAI's standards.

For instance, when calculating the credit enhancement level in the context of the IAA, supervisors may, if warranted, disallow on a full or partial basis any seller-provided recourse guarantees or excess spread, or any other first loss credit enhancements that provide limited protection to the bank.

- (d) The bank's internal assessment process must identify gradations of risk. Internal assessments must correspond to the external ratings of ECAs so that supervisors can determine which internal assessment corresponds to each external rating category of the ECAs.
- (e) The bank's internal assessment process, particularly the stress factors for determining credit enhancement requirements, must be at least as conservative as the publicly available rating criteria of the major ECAs that are externally rating the ABCP programme's commercial paper for the asset type being purchased by the programme. However, banks should consider, to some extent, all publicly available ECAI ratings methodologies in developing their internal assessments.
- In the case where (i) the commercial paper issued by an ABCP programme is externally rated by two or more ECAs and (ii) the different ECAs' benchmark stress factors require different levels of credit enhancement to achieve the same external rating equivalent, the bank must apply the ECAI stress factor that requires the most conservative or highest level of credit protection. For example, if one ECAI required enhancement of 2.5 to 3.5 times historical losses for an asset type to obtain a single A rating equivalent and another required 2 to 3 times historical losses, the bank must use the higher range of stress factors in determining the appropriate level of seller-provided credit enhancement.
  - When selecting ECAs to externally rate an ABCP, a bank must not choose only those ECAs that generally have relatively less restrictive rating methodologies. In addition, if there are changes in the methodology of one of the selected ECAs, including the stress factors, that adversely affect the external rating of the programme's commercial paper, then the revised rating methodology must be considered in evaluating whether the internal assessments assigned to ABCP programme exposures are in need of revision.
  - A bank cannot utilise an ECAI's rating methodology to derive an internal assessment if the ECAI's process or rating criteria is not publicly available. However, banks should consider the non-publicly available methodology – to the extent that they have access to such information – in developing their internal assessments, particularly if it is more conservative than the publicly available criteria.
  - In general, if the ECAI rating methodologies for an asset or exposure are not publicly available, then the IAA may not be used. However, in certain instances, for example, for new or uniquely structured transactions, which are not currently addressed by the

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rating criteria of an ECAI rating the programme's commercial paper, a bank may discuss the specific transaction with its supervisor to determine whether the IAA may be applied to the related exposures.

- (f) Internal or external auditors, an ECAI, or the bank's internal credit review or risk management function must perform regular reviews of the internal assessment process and assess the validity of those internal assessments. If the bank's internal audit, credit review, or risk management functions perform the reviews of the internal assessment process, then these functions must be independent of the ABCP programme business line, as well as the underlying customer relationships.
- (g) The bank must track the performance of its internal assessments over time to evaluate the performance of the assigned internal assessments and make adjustments, as necessary, to its assessment process when the performance of the exposures routinely diverges from the assigned internal assessments on those exposures.
- (h) The ABCP programme must have credit and investment guidelines, i.e. underwriting standards, for the ABCP programme. In the consideration of an asset purchase, the ABCP programme (i.e. the programme administrator) should develop an outline of the structure of the purchase transaction. Factors that should be discussed include the type of asset being purchased; type and monetary value of the exposures arising from the provision of liquidity facilities and credit enhancements; loss waterfall; and legal and economic isolation of the transferred assets from the entity selling the assets.
- (i) A credit analysis of the asset seller's risk profile must be performed and should consider, for example, past and expected future financial performance; current market position; expected future competitiveness; leverage, cash flow, and interest coverage; and debt rating. In addition, a review of the seller's underwriting standards, servicing capabilities, and collection processes should be performed.
- (j) The ABCP programme's underwriting policy must establish minimum asset eligibility criteria that, among other things,
- exclude the purchase of assets that are significantly past due or defaulted;
  - limit excess concentration to individual obligor or geographic area; and
  - limit the tenor of the assets to be purchased.
- (k) The ABCP programme should have collections processes established that consider the operational capability and credit quality of the servicer. The programme should mitigate to the extent possible seller/servicer risk through various methods, such as triggers based on current credit quality that would preclude co-mingling of funds and impose lockbox arrangements that would help ensure the continuity of payments to the ABCP programme.
- (l) The aggregate estimate of loss on an asset pool that the ABCP programme is considering purchasing must consider all sources of potential risk, such as credit and dilution risk. If the seller-provided credit enhancement is sized based on only credit-related losses, then a separate reserve should be established for dilution risk, if dilution risk is material for the particular exposure pool. In addition, in sizing the required

enhancement level, the bank should review several years of historical information, including losses, delinquencies, dilutions, and the turnover rate of the receivables. Furthermore, the bank should evaluate the characteristics of the underlying asset pool, e.g. weighted average credit score, identify any concentrations to an individual obligor or geographic region, and the granularity of the asset pool.

- (m) The ABCP programme must incorporate structural features into the purchase of assets in order to mitigate potential credit deterioration of the underlying portfolio. Such features may include wind down triggers specific to a pool of exposures.

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

622. If a bank's internal assessment process is no longer considered adequate, the bank's supervisor may preclude the bank from applying the internal assessment approach to its ABCP exposures, both existing and newly originated, for determining the appropriate capital treatment until the bank has remedied the deficiencies. In this instance, the bank must revert to the SF or, if not available, to the method described in paragraph 639.

**(vi) Supervisory Formula (SF)**

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

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

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

For resecuritisation exposures (a) above would equal  $0.0160 \times T$  based on lowest risk weight of 20% divided by 12.5.

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

$$(2) S[L] = \begin{cases} L & \text{when } L \leq K_{IRB} \\ K_{IRB} + K[L] - K[K_{IRB}] + (d \cdot K_{IRB} / \omega)(1 - e^{\omega(K_{IRB} - L) / K_{IRB}}) & \text{when } K_{IRB} < L \end{cases}$$

where

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

625. In these expressions, Beta [L; a, b] refers to the cumulative beta distribution with parameters a and b evaluated at L.<sup>126</sup>

626. The supervisory-determined parameters in the above expressions are as follows:

$$\tau = 1000, \text{ and } \omega = 20$$

#### Definition of $K_{IRB}$

627.  $K_{IRB}$  is the ratio of (a) the IRB capital requirement including the EL portion for the underlying exposures in the pool to (b) the exposure amount of the pool (e.g. the sum of drawn amounts related to securitised exposures plus the EAD associated with undrawn commitments related to securitised exposures). Quantity (a) above must be calculated in accordance with the applicable minimum IRB standards (as set out in chapter 5 of this document) as if the exposures in the pool were held directly by the bank. This calculation should reflect the effects of any credit risk mitigant that is applied on the underlying exposures (either individually or to the entire pool), and hence benefits all of the securitisation exposures.  $K_{IRB}$  is expressed in decimal form (e.g. a capital charge equal to 15% of the pool would be expressed as 0.15). For structures involving an SPE, all the assets of the SPE that are related to the securitisations are to be treated as exposures in the pool, including assets in which the SPE may have invested a reserve account, such as a cash collateral account.

628. If the risk weight resulting from the SF is 1250%, banks must deduct the securitisation exposure subject to that risk weight in accordance with paragraphs 561 to 563.

<sup>126</sup> The cumulative beta distribution function is available, for example, in Excel as the function BETADIST.

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629. In cases where a bank has set aside a specific provision or has a non-refundable purchase price discount on an exposure in the pool, quantity (a) defined above and quantity (b) also defined above must be calculated using the gross amount of the exposure without the specific provision and/or non-refundable purchase price discount. In this case, the amount of the non-refundable purchase price discount on a defaulted asset or the specific provision can be used to reduce the amount of any deduction from capital associated with the securitisation exposure.

*Credit enhancement level (L)*

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

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

*Thickness of exposure (T)*

632. T is measured as the ratio of (a) the nominal size of the tranche of interest to (b) the notional amount of exposures in the pool. In the case of an exposure arising from an interest rate or currency swap, the bank must incorporate potential future exposure. If the current value of the instrument is non-negative, the exposure size should be measured by the current value plus the add-on as in the 1988 Accord. If the current value is negative, the exposure should be measured by using the potential future exposure only.

*Effective number of exposures (N)*

633. The effective number of exposures is calculated as:

$$(3) \quad N = \frac{(\sum_i EAD_i)^2}{\sum_i EAD_i^2}$$

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

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### Exposure-weighted average LGD

634. The exposure-weighted average LGD is calculated as follows:

$$(4) \quad LGD = \frac{\sum_i LGD_i \cdot EAD_i}{\sum_i EAD_i}$$

where  $LGD_i$  represents the average LGD associated with all exposures to the  $i^{\text{th}}$  obligor. In the case of re-securitisation, an LGD of 100% must be assumed for the underlying securitised exposures. When default and dilution risks for purchased receivables are treated in an aggregate manner (e.g. a single reserve or over-collateralisation is available to cover losses from either source) within a securitisation, the LGD input must be constructed as a weighted-average of the LGD for default risk and the 100% LGD for dilution risk. The weights are the stand-alone IRB capital charges for default risk and dilution risk, respectively.

### Simplified method for computing N and LGD

635. For securitisations involving retail exposures, subject to supervisory review, the SF may be implemented using the simplifications:  $h = 0$  and  $v = 0$

636. Under the conditions provided below, banks may employ a simplified method for calculating the effective number of exposures and the exposure-weighted average LGD. Let  $C_m$  in the simplified calculation denote the share of the pool corresponding to the sum of the largest 'm' exposures (e.g. a 15% share corresponds to a value of 0.15). The level of m is set by each bank.

If the portfolio share associated with the largest exposure,  $C_1$ , is no more than 0.03 (or 3% of the underlying pool), then for purposes of the SF, the bank may set  $LGD=0.50$  and N equal to the following amount.

$$(5) \quad N = \left( C_1 C_m + \left( \frac{C_m - C_1}{m - 1} \right) \max\{1 - m C_1, 0\} \right)^{-1}$$

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

### (vii) Liquidity facilities

637. Liquidity facilities are treated as any other securitisation exposure and receive a CCF of 100% unless specified differently in paragraphs 638 to 641. If the facility is externally rated, the bank may rely on the external rating under the RBA. If the facility is not rated and an inferred rating is not available, the bank must apply the SF, unless the IAA can be applied.

638. Deleted



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639. When it is not practical for the bank to use either the bottom-up approach or the top-down approach for calculating  $K_{IRB}$ , the bank may, on an exceptional basis and subject to supervisory consent, temporarily be allowed to apply the following method. If the liquidity facility meets the definition in paragraph 578, the highest risk weight assigned under the standardised approach to any of the underlying individual exposures covered by the liquidity facility can be applied to the liquidity facility. If the liquidity facility meets the definition in paragraph 578, the CCF must be 100%. In all other cases, the notional amount of the liquidity facility must be deducted.

**(viii) Treatment of overlapping exposures**

640. Overlapping exposures are treated as described in paragraph 581.

**(ix) Eligible servicer cash advance facilities**

641. Eligible servicer cash advance facilities are treated as specified in paragraph 582.

**(x) Treatment of credit risk mitigation for securitisation exposures**

642. As with the RBA, banks are required to apply the CRM techniques as specified in the foundation IRB approach of chapter 4 when applying the SF. The bank may reduce the capital charge proportionally when the credit risk mitigant covers first losses or losses on a proportional basis. For all other cases, the bank must assume that the credit risk mitigant covers the most senior portion of the securitisation exposure (i.e. that the most junior portion of the securitisation exposure is uncovered). Examples for recognising collateral and guarantees under the SF are provided in Annex 7.

**(xi) Capital requirement for early amortisation provisions**

643. An originating bank must use the methodology and treatment described in paragraphs 590 to 605 for determining if any capital must be held against the investors' interest. For banks using the IRB approach to securitisation, investors' interest is defined as investors' drawn balances related to securitisation exposures and EAD associated with investors' undrawn lines related to securitisation exposures. For determining the EAD, the undrawn balances of securitised exposures would be allocated between the seller's and investors' interests on a pro rata basis, based on the proportions of the seller's and investors' shares of the securitised drawn balances. For IRB purposes, the capital charge attributed to the investors' interest is determined by the product of (a) the investors' interest, (b) the appropriate CCF, and (c)  $K_{IRB}$ .

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## Annex 7 - Illustrative Examples: Calculating the Effect of Credit Risk Mitigation under Supervisory Formula

Some examples are provided below for determining how collateral and guarantees are to be recognised under the SF.

### Illustrative Example Involving Collateral — proportional cover

Assume an originating bank purchases a €100 securitisation exposure with a credit enhancement level in excess of  $K_{IRB}$  for which an external or inferred rating is not available. Additionally, assume that the SF capital charge on the securitisation exposure is €1.6 (when multiplied by 12.5 results in risk weighted assets of €20). Further assume that the originating bank has received €80 of collateral in the form of cash that is denominated in the same currency as the securitisation exposure. The capital requirement for the position is determined by multiplying the SF capital requirement by the ratio of adjusted exposure amount and the original exposure amount, as illustrated below.

**Step 1:** Adjusted Exposure Amount ( $E^*$ ) =  $\max \{0, [E \times (1 + H_e) - C \times (1 - H_c - H_{fx})]\}$

$$E^* = \max \{0, [100 \times (1 + 0) - 80 \times (1 - 0 - 0)]\} = €20$$

Where (based on the information provided above):

$E^*$  = the exposure value after risk mitigation (€20)

$E$  = current value of the exposure (€100)

$H_e$  = haircut appropriate to the exposure (This haircut is not relevant because the originating bank is not lending the securitisation exposure in exchange for collateral).

$C$  = the current value of the collateral received (€80)

$H_c$  = haircut appropriate to the collateral (0)

$H_{fx}$  = haircut appropriate for mismatch between the collateral and exposure (0)

**Step 2:** Capital requirement =  $(E^* / E) \times$  SF capital requirement

Where (based on the information provide above):

$$\text{Capital requirement} = €20 / €100 \times €1.6 = €0.32.$$

### Illustrative Example Involving a Guarantee — proportional cover

All of the assumptions provided in the illustrative example involving collateral apply except for the form of credit risk mitigant. Assume that the bank has received an eligible, unsecured guarantee in the amount of €80 from a bank. Therefore, a haircut for currency mismatch will not apply. The capital requirement is determined as follows.

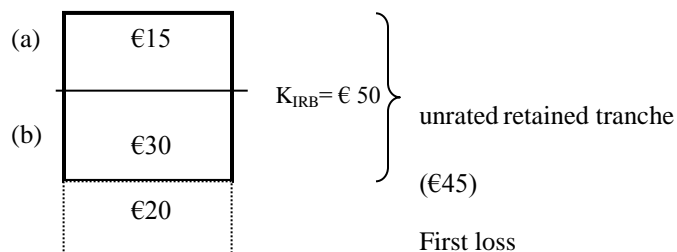
- The protected portion of the securitisation exposure (€80) is to receive the risk weight of the protection provider. The risk weight for the protection provider is equivalent to that for an unsecured loan to the guarantor bank, as determined under the IRB approach. Assume that this risk weight is 10%. Then, the capital charge on the protected portion would be:  $€80 \times 10\% \times 0.08 = €0.64$ .
- The capital charge for the unprotected portion (€20) is derived by multiplying the capital charge on the securitisation exposure by the share of the unprotected portion to the exposure amount. The share of the unprotected portion is:  $€20 / €100 = 20\%$ . Thus, the capital requirement will be:  $€1.6 \times 20\% = €0.32$ .

The total capital requirement for the protected and unprotected portions is:

$$€0.64 \text{ (protected portion)} + €0.32 \text{ (unprotected portion)} = €0.96.$$

### Illustrative example — the case of credit risk mitigants covering the most senior parts

Assume an originating bank that securitises a pool of loans of €1000. The  $K_{IRB}$  of this underlying pool is 5% (capital charge of €50). There is a first loss position of €20. The originator retains only the second most junior tranche: an unrated tranche of €45. We can summarise the situation as follows:



#### 1. Capital charge without collateral or guarantees

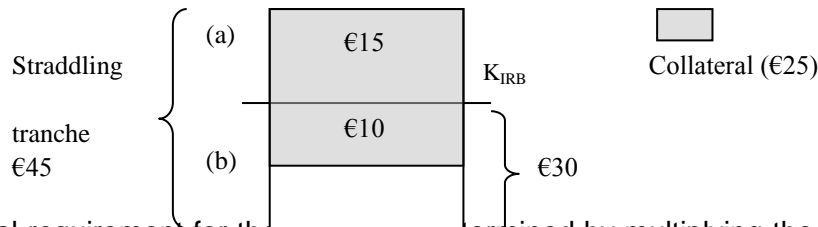
According to this example, the capital charge for the unrated retained tranche that is straddling the  $K_{IRB}$  line is the sum of the capital requirements for tranches (a) and (b) in the graph above:

- Assume the SF risk weight for this subtranche is 820%. Thus, risk-weighted assets are  $€15 \times 820\% = €123$ . Capital charge is  $€123 \times 8\% = €9.84$
- The subtranche below  $K_{IRB}$  must be deducted. Risk-weighted assets:  $€30 \times 1250\% = €375$ . Capital charge of  $€375 \times 8\% = €30$

$$\text{Total capital charge for the unrated straddling tranche} = €9.84 + €30 = €39.84$$

#### 2. Capital charge with collateral

Assume now that the originating bank has received €25 of collateral in the form of cash that is denominated in the same currency as the securitisation exposure. Because the tranche is straddling the  $K_{IRB}$  level, we must assume that the collateral is covering the most senior subtranche above  $K_{IRB}$  ((a) subtranche covered by €15 of collateral) and, only if there is some collateral left, the coverage must be applied to the subtranche below  $K_{IRB}$  beginning with the most senior portion (e.g. tranche (b) covered by €10 of collateral). Thus, we have:



The capital requirement for the position is determined by multiplying the SF capital requirement by the ratio of adjusted exposure amount and the original exposure amount, as illustrated below. We must apply this for the two subtranches.

- (a) The first subtranche has an initial exposure of €15 and collateral of €15, so in this case it is completely covered. In other words:

**Step 1: Adjusted Exposure Amount**

$$E^* = \max \{0, [E \times (1 + H_e) - C \times (1 - H_c - H_{fx})]\} = \max \{0, [15 - 15]\} = \text{€}0$$

Where:

$E^*$  = the exposure value after risk mitigation (€0)

$E$  = current value of the exposure (€15)

$C$  = the current value of the collateral received (€15)

$H_e$  = haircut appropriate to the exposure (not relevant here, thus 0)

$H_c$  and  $H_{fx}$  = haircut appropriate to the collateral and that for the mismatch between the collateral and exposure (to simplify, 0)

**Step 2: Capital requirement =  $(E^* / E) \times$  SF capital requirement**

$$\text{Capital requirement} = 0 \times \text{€}9.84 = \text{€}0$$

- (b) The second subtranche has an initial exposure of €30 and collateral of €10, which is the amount left after covering the subtranche above  $K_{IRB}$ . Thus, these €10 must be allocated to the most senior portion of the €30 subtranche.

**Step1: Adjusted Exposure Amount**

$$E^* = \max \{0, [30 \times (1 + 0) - 10 \times (1 - 0 - 0)]\} = \text{€}20$$

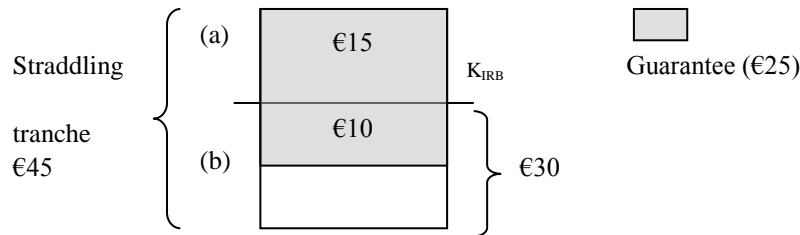
**Step 2: Capital requirement =  $(E^* / E) \times$  SF capital requirement**

$$\text{Capital requirement} = \text{€}20/\text{€}30 \times \text{€}30 = \text{€}20$$

Finally, the total capital charge for the unrated straddling tranche = €0 + €20 = €20

### 3. Guarantee

Assume now that instead of collateral, the bank has received an eligible, unsecured guarantee in the amount of €25 from a bank. Therefore the haircut for currency mismatch will not apply. The situation can be summarised as:



The capital requirement for the two subtranches is determined as follows:

- (a) The first subtranche has an initial exposure of €15 and a guarantee of €15, so in this case it is completely covered. The €15 will receive the risk weight of the protection provider. The risk weight for the protection provider is equivalent to that for an unsecured loan to the guarantor bank, as determined under the IRB approach. Assume that this risk weight is 20%.

capital charge on the protected portion is  $€15 \times 20\% \times 8\% = €0.24$

- (b) The second subtranche has an initial exposure of €30 and guarantee of €10 which must be applied to the most senior portion of this subtranche. Accordingly, the protected part is €10 and the unprotected part is €20.

- Again, the protected portion of the securitisation exposure is to receive the risk weight of the guarantor bank.

capital charge on the protected portion is  $€10 \times 20\% \times 8\% = €0.16$

The capital charge for the unprotected portion (for an unrated position below  $K_{IRB}$ ) is  $€20 \times 1250\% \times 8\% = €20$

**Total capital charge for the unrated straddling tranche** = €0.24 (protected portion, above  $K_{IRB}$ ) + €0.16 (protected portion, below  $K_{IRB}$ ) + €20 (unprotected portion, below  $K_{IRB}$ ) = €20

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## 6.5. Appendix 6-I - Pillar 2 Considerations

### OSFI Notes

Some of the items identified in the supervisory review process for securitization are sufficiently detailed that they may be addressed by a set of operational requirements or a specific capital treatment. For this reason, the Pillar 2 requirements for securitization set out in the Basel II framework are included in Chapter 6. Institutions are encouraged to consider both Pillar 1 and Pillar 2 requirements when undertaking securitization transactions.

The Supplemental Pillar 2 Guidance included in the July 2009 Basel Enhancements guidance covers a wide range of risk management policies and practices. OSFI has appended the key topics specifically related to structured credit products at the end of this section.

#### *Supervisory review process for securitisation*

784. Further to the Pillar 1 principle that banks should take account of the economic substance of transactions in their determination of capital adequacy, supervisory authorities will monitor, as appropriate, whether banks have done so adequately. As a result, regulatory capital treatments for specific securitisation exposures might differ from those specified in Pillar 1 of the Framework, particularly in instances where the general capital requirement would not adequately and sufficiently reflect the risks to which an individual banking organisation is exposed.

785. Amongst other things, supervisory authorities may review where relevant a bank's own assessment of its capital needs and how that has been reflected in the capital calculation as well as the documentation of certain transactions to determine whether the capital requirements accord with the risk profile (e.g. substitution clauses). Supervisors will also review the manner in which banks have addressed the issue of maturity mismatch in relation to retained positions in their economic capital calculations. In particular, they will be vigilant in monitoring for the structuring of maturity mismatches in transactions to artificially reduce capital requirements. Additionally, supervisors may review the bank's economic capital assessment of actual correlation between assets in the pool and how they have reflected that in the calculation. Where supervisors consider that a bank's approach is not adequate, they will take appropriate action. Such action might include denying or reducing capital relief in the case of originated assets, or increasing the capital required against securitisation exposures acquired.

#### *Significance of risk transfer*

786. Securitisation transactions may be carried out for purposes other than credit risk transfer (e.g. funding). Where this is the case, there might still be a limited transfer of credit risk. However, for an originating bank to achieve reductions in capital requirements, the risk transfer arising from a securitisation has to be deemed significant by the national supervisory authority. If the risk transfer is considered to be insufficient or non-existent, the supervisory authority can require the application of a higher capital requirement than prescribed under Pillar 1 or, alternatively, may deny a bank from obtaining any capital relief from the securitisations. Therefore, the capital relief that can be achieved will correspond to the amount of credit risk that is effectively transferred. The following includes a set of examples where supervisors may have

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concerns about the degree of risk transfer, such as retaining or repurchasing significant amounts of risk or “cherry picking” the exposures to be transferred via a securitisation.

787. Retaining or repurchasing significant securitisation exposures, depending on the proportion of risk held by the originator, might undermine the intent of a securitisation to transfer credit risk. Specifically, supervisory authorities might expect that a significant portion of the credit risk and of the nominal value of the pool be transferred to at least one independent third party at inception and on an ongoing basis. Where banks repurchase risk for market making purposes, supervisors could find it appropriate for an originator to buy part of a transaction but not, for example, to repurchase a whole tranche. Supervisors would expect that where positions have been bought for market making purposes, these positions should be resold within an appropriate period, thereby remaining true to the initial intention to transfer risk.

788. Another implication of realising only a non-significant risk transfer, especially if related to good quality unrated exposures, is that both the poorer quality unrated assets and most of the credit risk embedded in the exposures underlying the securitised transaction are likely to remain with the originator. Accordingly, and depending on the outcome of the supervisory review process, the supervisory authority may increase the capital requirement for particular exposures or even increase the overall level of capital the bank is required to hold.

#### *Market innovations*

789. As the minimum capital requirements for securitisation may not be able to address all potential issues, supervisory authorities are expected to consider new features of securitisation transactions as they arise. Such assessments would include reviewing the impact new features may have on credit risk transfer and, where appropriate, supervisors will be expected to take appropriate action under Pillar 2. A Pillar 1 response may be formulated to take account of market innovations. Such a response may take the form of a set of operational requirements and/or a specific capital treatment.

#### *Provision of implicit support*

790. Support to a transaction, whether contractual (i.e. credit enhancements provided at the inception of a securitised transaction) or non-contractual (implicit support) can take numerous forms. For instance, contractual support can include over collateralisation, credit derivatives, spread accounts, contractual recourse obligations, subordinated notes, credit risk mitigants provided to a specific tranche, the subordination of fee or interest income or the deferral of margin income, and clean-up calls that exceed 10 percent of the initial issuance. Examples of implicit support include the purchase of deteriorating credit risk exposures from the underlying pool, the sale of discounted credit risk exposures into the pool of securitised credit risk exposures, the purchase of underlying exposures at above market price or an increase in the first loss position according to the deterioration of the underlying exposures.

791. The provision of implicit (or non-contractual) support, as opposed to contractual credit support (i.e. credit enhancements), raises significant supervisory concerns. For traditional securitisation structures the provision of implicit support undermines the clean break criteria, which when satisfied would allow banks to exclude the securitised assets from regulatory capital calculations. For synthetic securitisation structures, it negates the significance of risk transference. By providing implicit support, banks signal to the market that the risk is still with the bank and has not in effect been transferred. The institution’s capital calculation therefore



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understates the true risk. Accordingly, national supervisors are expected to take appropriate action when a banking organisation provides implicit support.

792. When a bank has been found to provide implicit support to a securitisation, it will be required to hold capital against all of the underlying exposures associated with the structure as if they had not been securitised. It will also be required to disclose publicly that it was found to have provided non-contractual support, as well as the resulting increase in the capital charge (as noted above). The aim is to require banks to hold capital against exposures for which they assume the credit risk, and to discourage them from providing non-contractual support.

793. If a bank is found to have provided implicit support on more than one occasion, the bank is required to disclose its transgression publicly and national supervisors will take appropriate action that may include, but is not limited to, one or more of the following:

- The bank may be prevented from gaining favourable capital treatment on securitised assets for a period of time to be determined by the national supervisor;
- The bank may be required to hold capital against all securitised assets as though the bank had created a commitment to them, by applying a conversion factor to the risk weight of the underlying assets;
- For purposes of capital calculations, the bank may be required to treat all securitised assets as if they remained on the balance sheet;
- The bank may be required by its national supervisory authority to hold regulatory capital in excess of the minimum risk-based capital ratios.

794. Supervisors will be vigilant in determining implicit support and will take appropriate supervisory action to mitigate the effects. Pending any investigation, the bank may be prohibited from any capital relief for planned securitisation transactions (moratorium). National supervisory response will be aimed at changing the bank's behaviour with regard to the provision of implicit support, and to correct market perception as to the willingness of the bank to provide future recourse beyond contractual obligations.

#### *Residual risks*

795. As with credit risk mitigation techniques more generally, supervisors will review the appropriateness of banks' approaches to the recognition of credit protection. In particular, with regard to securitisations, supervisors will review the appropriateness of protection recognised against first loss credit enhancements. On these positions, expected loss is less likely to be a significant element of the risk and is likely to be retained by the protection buyer through the pricing. Therefore, supervisors will expect banks' policies to take account of this in determining their economic capital. Where supervisors do not consider the approach to protection recognised is adequate, they will take appropriate action. Such action may include increasing the capital requirement against a particular transaction or class of transactions.

#### *Call provisions*

796. Supervisors expect a bank not to make use of clauses that entitles it to call the securitisation transaction or the coverage of credit protection prematurely if this would increase the bank's exposure to losses or deterioration in the credit quality of the underlying exposures.

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797. Besides the general principle stated above, supervisors expect banks to only execute clean-up calls for economic business purposes, such as when the cost of servicing the outstanding credit exposures exceeds the benefits of servicing the underlying credit exposures.

798. Subject to national discretion, supervisory authorities may require a review prior to the bank exercising a call which can be expected to include consideration of:

- The rationale for the bank's decision to exercise the call; and
- The impact of the exercise of the call on the bank's regulatory capital ratio.

799. The supervisory authority may also require the bank to enter into a follow-up transaction, if necessary, depending on the bank's overall risk profile, and existing market conditions.

800. Date related calls should be set at a date no earlier than the duration or the weighted average life of the underlying securitisation exposures. Accordingly, supervisory authorities may require a minimum period to elapse before the first possible call date can be set, given, for instance, the existence of up-front sunk costs of a capital market securitisation transaction.

#### *Early amortisation*

801. Supervisors should review how banks internally measure, monitor, and manage risks associated with securitisations of revolving credit facilities, including an assessment of the risk and likelihood of early amortisation of such transactions. At a minimum, supervisors should ensure that banks have implemented reasonable methods for allocating economic capital against the economic substance of the credit risk arising from revolving securitisations and should expect banks to have adequate capital and liquidity contingency plans that evaluate the probability of an early amortisation occurring and address the implications of both scheduled and early amortisation. In addition, the capital contingency plan should address the possibility that the bank will face higher levels of required capital under the early amortisation Pillar 1 capital requirement.

802. Because most early amortisation triggers are tied to excess spread levels, the factors affecting these levels should be well understood, monitored, and managed, to the extent possible (see paragraphs 790 to 794 on implicit support), by the originating bank. For example, the following factors affecting excess spread should generally be considered:

- Interest payments made by borrowers on the underlying receivable balances;
- Other fees and charges to be paid by the underlying obligors (e.g. late-payment fees, cash advance fees, over-limit fees);
- Gross charge-offs;
- Principal payments;
- Recoveries on charged-off loans;
- Interchange income;
- Interest paid on investors' certificates;
- Macroeconomic factors such as bankruptcy rates, interest rate movements, unemployment rates; etc.

803. Banks should consider the effects that changes in portfolio management or business strategies may have on the levels of excess spread and on the likelihood of an early

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amortisation event. For example, marketing strategies or underwriting changes that result in lower finance charges or higher charge-offs, might also lower excess spread levels and increase the likelihood of an early amortisation event.

804. Banks should use techniques such as static pool cash collections analyses and stress tests to better understand pool performance. These techniques can highlight adverse trends or potential adverse impacts. Banks should have policies in place to respond promptly to adverse or unanticipated changes. Supervisors will take appropriate action where they do not consider these policies adequate. Such action may include, but is not limited to, directing a bank to obtain a dedicated liquidity line or raising the early amortisation credit conversion factor, thus, increasing the bank's capital requirements.

805. While the early amortisation capital charge described in Pillar 1 is meant to address potential supervisory concerns associated with an early amortisation event, such as the inability of excess spread to cover potential losses, the policies and monitoring described in this section recognise that a given level of excess spread is not, by itself, a perfect proxy for credit performance of the underlying pool of exposures. In some circumstances, for example, excess spread levels may decline so rapidly as to not provide a timely indicator of underlying credit deterioration. Further, excess spread levels may reside far above trigger levels, but still exhibit a high degree of volatility which could warrant supervisory attention. In addition, excess spread levels can fluctuate for reasons unrelated to underlying credit risk, such as a mismatch in the rate at which finance charges reprice relative to investor certificate rates. Routine fluctuations of excess spread might not generate supervisory concerns, even when they result in different capital requirements. This is particularly the case as a bank moves in or out of the first step of the early amortisation credit conversion factors. On the other hand, existing excess spread levels may be maintained by adding (or designating) an increasing number of new accounts to the master trust, an action that would tend to mask potential deterioration in a portfolio. For all of these reasons, supervisors will place particular emphasis on internal management, controls, and risk monitoring activities with respect to securitisations with early amortisation features.

806. Supervisors expect that the sophistication of a bank's system in monitoring the likelihood and risks of an early amortisation event will be commensurate with the size and complexity of the bank's securitisation activities that involve early amortisation provisions.

807. For controlled amortisations specifically, supervisors may also review the process by which a bank determines the minimum amortisation period required to pay down 90% of the outstanding balance at the point of early amortisation. Where a supervisor does not consider this adequate it will take appropriate action, such as increasing the conversion factor associated with a particular transaction or class of transactions.

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## Supplemental Pillar 2 Guidance (Supervisory review process)

### Specific risk management topics

#### A. *Risk concentration*

28. Unmanaged risk concentrations are an important cause of major problems in banks. A bank should aggregate all similar direct and indirect exposures regardless of where the exposures have been booked. A risk concentration is any single exposure or group of similar exposures (eg to the same borrower or counterparty, including protection providers, geographic area, industry or other risk factors) with the potential to produce (i) losses large enough (relative to a bank's earnings, capital, total assets or overall risk level) to threaten a bank's creditworthiness or ability to maintain its core operations or (ii) a material change in a bank's risk profile. Risk concentrations should be analysed on both a bank legal entity and consolidated basis, as an unmanaged concentration at a subsidiary bank may appear immaterial at the consolidated level, but can nonetheless threaten the viability of the subsidiary organisation.

29. Risk concentrations should be viewed in the context of a single or a set of closely related risk-drivers that may have different impacts on a bank. These concentrations should be integrated when assessing a bank's overall risk exposure. A bank should consider concentrations that are based on common or correlated risk factors that reflect more subtle or more situation-specific factors than traditional concentrations, such as correlations between market, credit risks and liquidity risk.

30. The growth of market-based intermediation has increased the possibility that different areas of a bank are exposed to a common set of products, risk factors or counterparties. This has created new challenges for risk aggregation and concentration management. Through its risk management processes and MIS, a bank should be able to identify and aggregate similar risk exposures across the firm, including across legal entities, asset types (eg loans, derivatives and structured products), risk areas (eg the trading book) and geographic regions. The typical situations in which risk concentrations can arise include:

- exposures to a single counterparty, borrower or group of connected counterparties or borrowers;
- industry or economic sectors, including exposures to both regulated and non-regulated financial institutions such as hedge funds and private equity firms;
- geographical regions;
- exposures arising from credit risk mitigation techniques, including exposure to similar collateral types or to a single or closely related credit protection provider;
- trading exposures/market risk;
- exposures to counterparties (eg hedge funds and hedge counterparties) through the execution or processing of transactions (either product or service);
- funding sources;

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- assets that are held in the banking book or trading book, such as loans, derivatives and structured products; and
  - off-balance sheet exposures, including guarantees, liquidity lines and other commitments.

31. Risk concentrations can also arise through a combination of exposures across these broad categories. A bank should have an understanding of its firm-wide risk concentrations resulting from similar exposures across its different business lines. Examples of such business lines include subprime exposure in lending books; counterparty exposures; conduit exposures and SIVs; contractual and non-contractual exposures; trading activities; and underwriting pipelines.

32. While risk concentrations often arise due to direct exposures to borrowers and obligors, a bank may also incur a concentration to a particular asset type indirectly through investments backed by such assets (eg collateralised debt obligations – CDOs), as well as exposure to protection providers guaranteeing the performance of the specific asset type (eg monoline insurers). A bank should have in place adequate, systematic procedures for identifying high correlation between the creditworthiness of a protection provider and the obligors of the underlying exposures due to their performance being dependent on common factors beyond systematic risk (ie “wrong way risk”).

33. Procedures should be in place to communicate risk concentrations to the board of directors and senior management in a manner that clearly indicates where in the organisation each segment of a risk concentration resides. A bank should have credible risk mitigation strategies in place that have senior management approval. This may include altering business strategies, reducing limits or increasing capital buffers in line with the desired risk profile. While it implements risk mitigation strategies, the bank should be aware of possible concentrations that might arise as a result of employing risk mitigation techniques.

34. Banks should employ a number of techniques, as appropriate, to measure risk concentrations. These techniques include shocks to various risk factors; use of business level and firm-wide scenarios; and the use of integrated stress testing and economic capital models. Identified concentrations should be measured in a number of ways, including for example consideration of gross versus net exposures, use of notional amounts, and analysis of exposures with and without counterparty hedges. As set out in paragraph 21 above, a bank should establish internal position limits for concentrations to which it may be exposed. When conducting periodic stress tests (see section III(F)), a bank should incorporate all major risk concentrations and identify and respond to potential changes in market conditions that could adversely impact their performance and capital adequacy.

35. The assessment of such risks under a bank’s ICAAP and the supervisory review process should not be a mechanical process, but one in which each bank determines, depending on its business model, its own specific vulnerabilities. An appropriate level of capital for risk concentrations should be incorporated in a bank’s ICAAP, as well as in Pillar 2 assessments. Each bank should discuss such issues with its supervisor.

36. A bank should have in place effective internal policies, systems and controls to identify, measure, monitor, manage, control and mitigate its risk concentrations in a timely manner. Not only should normal market conditions be considered, but also the potential build-up of concentrations under stressed market conditions, economic downturns and periods of general

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market illiquidity. In addition, the bank should assess scenarios that consider possible concentrations arising from contractual and non-contractual contingent claims. The scenarios should also combine the potential build-up of pipeline exposures together with the loss of market liquidity and a significant decline in asset values.

### ***B. Off-balance sheet exposures and securitisation risk***

37. Banks' use of securitisation has grown dramatically over the last several years. It has been used as an alternative source of funding and as a mechanism to transfer risk to investors. While the risks associated with securitisation are not new to banks, the recent financial turmoil highlighted unexpected aspects of credit risk, concentration risk, market risk, liquidity risk, legal risk and reputational risk, which banks failed to adequately address. For instance, a number of banks that were not contractually obligated to support sponsored securitisation structures were unwilling to allow those structures to fail due to concerns about reputational risk and future access to capital markets. The support of these structures exposed the banks to additional and unexpected credit, market and liquidity risk as they brought assets onto their balance sheets, which put significant pressure on their financial profile and capital ratios.

38. Weaknesses in banks' risk management of securitisation and off-balance sheet exposures resulted in large unexpected losses during the financial crisis. To help mitigate these risks, a bank's on- and off-balance sheet securitisation activities should be included in its risk management disciplines, such as product approval, risk concentration limits, and estimates of market, credit and operational risk (as discussed above in section II).

39. In light of the wide range of risks arising from securitisation activities, which can be compounded by rapid innovation in securitisation techniques and instruments, minimum capital requirements calculated under Pillar 1 are often insufficient. All risks arising from securitisation, particularly those that are not fully captured under Pillar 1, should be addressed in a bank's ICAAP. These risks include:

- Credit, market, liquidity and reputational risk of each exposure;
- Potential delinquencies and losses on the underlying securitised exposures;
- Exposures from credit lines or liquidity facilities to special purpose entities; and
- Exposures from guarantees provided by monolines and other third parties.

40. Securitisation exposures should be included in the bank's MIS to help ensure that senior management understands the implications of such exposures for liquidity, earnings, risk concentration and capital. More specifically, a bank should have the necessary processes in place to capture in a timely manner updated information on securitisation transactions including market data, if available, and updated performance data from the securitisation trustee or servicer.

#### ***6.5.1. Risk evaluation and management***

41. A bank should conduct analyses of the underlying risks when investing in the structured products and must not solely rely on the external credit ratings assigned to securitisation exposures by the CRAs. A bank should be aware that external ratings are a useful starting point for credit analysis, but are no substitute for full and proper understanding of the underlying risk,



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especially where ratings for certain asset classes have a short history or have been shown to be volatile. Moreover, a bank also should conduct credit analysis of the securitisation exposure at acquisition and on an ongoing basis. It should also have in place the necessary quantitative tools, valuation models and stress tests of sufficient sophistication to reliably assess all relevant risks.

42. When assessing securitisation exposures, a bank should ensure that it fully understands the credit quality and risk characteristics of the underlying exposures in structured credit transactions, including any risk concentrations. In addition, a bank should review the maturity of the exposures underlying structured credit transactions relative to the issued liabilities in order to assess potential maturity mismatches.

43. A bank should track credit risk in securitisation exposures at the transaction level and across securitisations exposures within each business line and across business lines. It should produce reliable measures of aggregate risk. A bank also should track all meaningful concentrations in securitisation exposures, such as name, product or sector concentrations, and feed this information to firm-wide risk aggregation systems that track, for example, credit exposure to a particular obligor.

44. A bank's own assessment of risk needs to be based on a comprehensive understanding of the structure of the securitisation transaction. It should identify the various types of triggers, credit events and other legal provisions that may affect the performance of its on- and off-balance sheet exposures and integrate these triggers and provisions into its funding/liquidity, credit and balance sheet management. The impact of the events or triggers on a bank's liquidity and capital position should also be considered.

45. Banks either underestimated or did not anticipate that a market-wide disruption could prevent them from securitising warehoused or pipeline exposures and did not anticipate the effect this could have on liquidity, earnings and capital adequacy. As part of its risk management processes, a bank should consider and, where appropriate, mark-to-market warehoused positions, as well as those in the pipeline, regardless of the probability of securitising the exposures. It should consider scenarios which may prevent it from securitising its assets as part of its stress testing (as discussed below in section III(F)) and identify the potential effect of such exposures on its liquidity, earnings and capital adequacy.

46. A bank should develop prudent contingency plans specifying how it would respond to funding, capital and other pressures that arise when access to securitisation markets is reduced. The contingency plans should also address how the bank would address valuation challenges for potentially illiquid positions held for sale or for trading. The risk measures, stress testing results and contingency plans should be incorporated into the bank's risk management processes and its ICAAP, and should result in an appropriate level of capital under Pillar 2 in excess of the minimum requirements.

47. A bank that employs risk mitigation techniques should fully understand the risks to be mitigated, the potential effects of that mitigation and whether or not the mitigation is fully effective. This is to help ensure that the bank does not understate the true risk in its assessment of capital. In particular, it should consider whether it would provide support to the securitisation structures in stressed scenarios due to the reliance on securitisation as a funding tool.



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### ***C. Reputational risk and implicit support***

48. Reputational risk can be defined as the risk arising from negative perception on the part of customers, counterparties, shareholders, investors, debt-holders, market analysts or regulators that can adversely affect a bank's ability to maintain existing, or establish new, business relationships and continued access to sources of funding (eg through the interbank or securitisation markets). Reputational risk is multidimensional and reflects the perception of other market participants. Furthermore, it exists throughout the organisation and exposure to reputational risk is essentially a function of the adequacy of the bank's internal risk management processes, as well as the manner and efficiency with which management responds to external influences on bank-related transactions.

49. Reputational risk can often lead to the provision of implicit support, which may give rise to credit, liquidity, market and legal risk – all of which can have a negative impact on a bank's earnings, liquidity and capital position. A bank should identify potential sources of reputational risk to which it is exposed. These include the bank's business lines, liabilities, affiliated operations, off-balance sheet vehicles and the markets in which it operates. The risks that arise should be incorporated into the bank's risk management processes and appropriately addressed in its ICAAP and liquidity contingency plans.

50. Prior to the 2007 upheaval, many banks failed to recognise the reputational risk associated with their off-balance sheet vehicles. In stressed conditions some firms went beyond their contractual obligations to support their sponsored securitisations and off-balance sheet vehicles. A bank should incorporate the exposures that could give rise to reputational risk into its assessments of whether the requirements under the securitisation framework have been met and the potential adverse impact of providing implicit support.

51. Reputational risk may arise, for example, from a bank's sponsorship of securitisation structures such as ABCP conduits and SIVs, as well as from the sale of credit exposures to securitisation trusts. It may also arise from a bank's involvement in asset or funds management, particularly when financial instruments are issued by owned or sponsored entities and are distributed to the customers of the sponsoring bank. In the event that the instruments were not correctly priced or the main risk drivers not adequately disclosed, a sponsor may feel some responsibility to its customers, or be economically compelled, to cover any losses. Reputational risk also arises when a bank sponsors activities such as money market mutual funds, in-house hedge funds and real estate investment trusts (REITs). In these cases, a bank may decide to support the value of shares/units held by investors even though is not contractually required to provide the support.

52. The financial market crisis has provided several examples of banks providing financial support that exceeded their contractual obligations. In order to preserve their reputation, some banks felt compelled to provide liquidity support to their SIVs, which was beyond their contractual obligations. In other cases, banks purchased ABCP issued by vehicles they sponsored in order to maintain market liquidity. As a result, these banks assumed additional liquidity and credit risks, and also put pressure on capital ratios.

53. Reputational risk also may affect a bank's liabilities, since market confidence and a bank's ability to fund its business are closely related to its reputation. For instance, to avoid damaging its reputation, a bank may call its liabilities even though this might negatively affect its

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liquidity profile. This is particularly true for liabilities that are components of regulatory capital, such as hybrid/subordinated debt. In such cases, a bank's capital position is likely to suffer.

54. Bank management should have appropriate policies in place to identify sources of reputational risk when entering new markets, products or lines of activities. In addition, a bank's stress testing procedures should take account of reputational risk so management has a firm understanding of the consequences and second round effects of reputational risk.

55. Once a bank identifies potential exposures arising from reputational concerns, it should measure the amount of support it might have to provide (including implicit support of securitisations) or losses it might experience under adverse market conditions. In particular, in order to avoid reputational damages and to maintain market confidence, a bank should develop methodologies to measure as precisely as possible the effect of reputational risk in terms of other risk types (eg credit, liquidity, market or operational risk) to which it may be exposed. This could be accomplished by including reputational risk scenarios in regular stress tests. For instance, non-contractual off-balance sheet exposures could be included in the stress tests to determine the effect on a bank's credit, market and liquidity risk profiles. Methodologies also could include comparing the actual amount of exposure carried on the balance sheet versus the maximum exposure amount held off-balance sheet, that is, the potential amount to which the bank could be exposed.

56. A bank should pay particular attention to the effects of reputational risk on its overall liquidity position, taking into account both possible increases in the asset side of the balance sheet and possible restrictions on funding, should the loss of reputation result in various counterparties' loss of confidence. (See section III(E) on the management of liquidity risk.)

57. In contrast to contractual credit exposures, such as guarantees, implicit support is a more subtle form of exposure. Implicit support arises when a bank provides post-sale support to a securitisation transaction in excess of any contractual obligation. Such non-contractual support exposes a bank to the risk of loss, such as loss arising from deterioration in the credit quality of the securitisation's underlying assets.

58. By providing implicit support, a bank signals to the market that all of the risks inherent in the securitised assets are still held by the organisation and, in effect, had not been transferred. Since the risk arising from the potential provision of implicit support is not captured *ex ante* under Pillar 1, it must be considered as part of the Pillar 2 process. In addition, the processes for approving new products or strategic initiatives should consider the potential provision of implicit support and should be incorporated in a bank's ICAAP.

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## Chapter 7      Operational Risk

This chapter contains an extract from the Basel II framework, *Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version* (June 2006) that applies to Canadian institutions. The extract has been annotated to indicate OSFI's position on items of national discretion.

### 7.1. Definition of operational risk

644. Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk,<sup>127</sup> but excludes strategic and reputational risk.

### 7.2. The measurement methodologies

645. The framework outlined below presents three methods for calculating operational risk capital charges in a continuum of increasing sophistication and risk sensitivity: (i) the Basic Indicator Approach; (ii) the Standardised Approach; and (iii) Advanced Measurement Approaches (AMA).

646. Banks are encouraged to move along the spectrum of available approaches as they develop more sophisticated operational risk measurement systems and practices. Qualifying criteria for the Standardised Approach and AMA are presented below.

647. Internationally active banks and banks with significant operational risk exposures (for example, specialised processing banks) are expected to use an approach that is more sophisticated than the Basic Indicator Approach and that is appropriate for the risk profile of the institution.<sup>128</sup> A bank will be permitted to use the Basic Indicator or Standardised Approach for some parts of its operations and an AMA for others provided certain minimum criteria are met, see paragraphs 680 to 683.

648. A bank will not be allowed to choose to revert to a simpler approach once it has been approved for a more advanced approach without supervisory approval. However, if a supervisor determines that a bank using a more advanced approach no longer meets the qualifying criteria for this approach, it may require the bank to revert to a simpler approach for some or all of its operations, until it meets the conditions specified by the supervisor for returning to a more advanced approach.

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<sup>127</sup> Legal risk includes, but is not limited to, exposure to fines, penalties, or punitive damages resulting from supervisory actions, as well as private settlements.

<sup>128</sup> Supervisors will review the capital requirement produced by the operational risk approach used by a bank (whether Basic Indicator Approach, Standardised Approach or AMA) for general credibility, especially in relation to a firm's peers. In the event that credibility is lacking, appropriate supervisory action under Pillar 2 will be considered.

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### 7.2.1. *The Basic Indicator Approach*

649. Banks using the Basic Indicator Approach must hold capital for operational risk equal to the average over the previous three years of a fixed percentage (denoted alpha) of positive annual gross income. Figures for any year in which annual gross income is negative or zero should be excluded from both the numerator and denominator when calculating the average.<sup>129</sup> The charge may be expressed as follows:

$$K_{\text{BIA}} = [\Sigma(\text{GI}_{1\dots n} \times \alpha)]/n$$

Where

$K_{\text{BIA}}$  = the capital charge under the Basic Indicator Approach

GI = annual gross income, where positive, over the previous three years

n = number of the previous three years for which gross income is positive

$\alpha$  = 15%, which is set by the Committee, relating the industry wide level of required capital to the industry wide level of the indicator.

#### **OSFI Notes**

Newly incorporated institutions using the Basic Indicator Approach having fewer than 12 quarters of gross income data should calculate the operational risk capital charge using available gross income data to develop proxies for the missing portions of the required three years' data. Institutions should refer to the reporting instructions for OSFI's capital adequacy return for further guidance.

650. Gross income is defined as net interest income plus net non-interest income.<sup>130</sup> It is intended that this measure should: (i) be gross of any provisions (e.g. for unpaid interest); (ii) be gross of operating expenses, including fees paid to outsourcing service providers;<sup>131</sup> (iii) exclude realised profits/losses from the sale of securities in the banking book;<sup>132</sup> and (iv) exclude extraordinary or irregular items as well as income derived from insurance.

#### **OSFI Notes**

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<sup>129</sup> If negative gross income distorts a bank's Pillar 1 capital charge, supervisors will consider appropriate supervisory action under Pillar 2.

<sup>130</sup> As defined by national supervisors and/or national accounting standards.

<sup>131</sup> In contrast to fees paid for services that are outsourced, fees received by banks that provide outsourcing services shall be included in the definition of gross income.

<sup>132</sup> Realised profits/losses from securities classified as "held to maturity" and "available for sale", which typically constitute items of the banking book (e.g. under certain accounting standards), are also excluded from the definition of gross income.

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Institutions should refer to the reporting instructions for the capital adequacy return for the definition of gross income to be used when calculating operational risk capital under the Basic Indicator Approach or the Standardized Approach.

The gross income definition excludes extraordinary items as reported under line 33 on the Consolidated Statement of Income. Extraordinary items should be reported on the basis of Canadian generally accepted accounting principles (GAAP). Where an institution reports an extraordinary item on its Consolidated Statement of Income (P3) return and including that item in the definition of Gross Income would have had a material impact on the calculation of operational risk regulatory capital, the institution should provide its OSFI relationship manager with an explanation of the nature and significance of the extraordinary item.

### **OSFI Notes**

Institutions should perform a reconciliation between the gross income reported on the capital adequacy return and the amounts reported on the Consolidated Statement of Income (P3) regulatory return. In addition, OSFI expects institutions to perform a reconciliation between the gross income amount reported on the capital adequacy return and amounts reported on the audited financial statements. This information should be available to OSFI upon request.

These reconciliations should identify any items that are excluded from the operational risk calculation as per the definition of gross income but are included in the Consolidated Statement of Income (P3) regulatory return or audited financial statements.

### **OSFI Notes**

When an institution makes a material acquisition, the operational risk capital calculation should be adjusted to reflect those activities. Since the gross income calculation is based on a rolling 12-quarter average, the most recent four quarters of gross income for the acquired business should be based on actual gross income amounts reported by the acquired business. Estimates may be used for the previous eight quarters when actual amounts are not available.

For institutions using the Basic Indicator Approach, actual gross income amounts must be used for the most recent four quarters. Estimates may be used for the previous eight quarters when actual amounts are not available.

When an institution makes a divestiture, the gross income calculation may be adjusted, with supervisory approval, to reflect this divestiture.

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651. As a point of entry for capital calculation, no specific criteria for use of the Basic Indicator Approach are set out in this Framework. Nevertheless, banks using this approach are encouraged to comply with the Committee's guidance on *Sound Practices for the Management and Supervision of Operational Risk*, February 2003.

### 7.2.2. *The Standardised Approach*<sup>133, 134</sup>

652. In the Standardised Approach, banks' activities are divided into eight business lines: corporate finance, trading & sales, retail banking, commercial banking, payment & settlement, agency services, asset management, and retail brokerage. The business lines are defined in detail in Annex 8.

653. Within each business line, gross income is a broad indicator that serves as a proxy for the scale of business operations and thus the likely scale of operational risk exposure within each of these business lines. The capital charge for each business line is calculated by multiplying gross income by a factor (denoted beta) assigned to that business line. Beta serves

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<sup>133</sup> The Committee intends to reconsider the calibration of the Basic Indicator and Standardised Approaches when more risk-sensitive data are available to carry out this recalibration. Any such recalibration would not be intended to affect significantly the overall calibration of the operational risk component of the Pillar 1 capital charge.

<sup>134</sup> **The Alternative Standardised Approach**

At national supervisory discretion a supervisor can choose to allow a bank to use the Alternative Standardised Approach (ASA) provided the bank is able to satisfy its supervisor that this alternative approach provides an improved basis by, for example, avoiding double counting of risks. Once a bank has been allowed to use the ASA, it will not be allowed to revert to use of the Standardised Approach without the permission of its supervisor. It is not envisaged that large diversified banks in major markets would use the ASA.

Under the ASA, the operational risk capital charge/methodology is the same as for the Standardised Approach except for two business lines – retail banking and commercial banking. For these business lines, loans and advances – multiplied by a fixed factor 'm' – replaces gross income as the exposure indicator. The betas for retail and commercial banking are unchanged from the Standardised Approach. The ASA operational risk capital charge for retail banking (with the same basic formula for commercial banking) can be expressed as:

$$K_{RB} = \beta_{RB} \times m \times LA_{RB}$$

Where

$K_{RB}$  is the capital charge for the retail banking business line

$\beta_{RB}$  is the beta for the retail banking business line

$LA_{RB}$  is total outstanding retail loans and advances (non-risk weighted and gross of provisions), averaged over the past three years

m is 0.035

For the purposes of the ASA, total loans and advances in the retail banking business line consists of the total drawn amounts in the following credit portfolios: retail, SMEs treated as retail, and purchased retail receivables. For commercial banking, total loans and advances consists of the drawn amounts in the following credit portfolios: corporate, sovereign, bank, specialised lending, SMEs treated as corporate and purchased corporate receivables. The book value of securities held in the banking book should also be included.

Under the ASA, banks may aggregate retail and commercial banking (if they wish to) using a beta of 15%. Similarly, those banks that are unable to disaggregate their gross income into the other six business lines can aggregate the total gross income for these six business lines using a beta of 18%, with negative gross income treated as described in paragraph 654.

As under the Standardised Approach, the total capital charge for the ASA is calculated as the simple summation of the regulatory capital charges across each of the eight business lines.

as a proxy for the industry-wide relationship between the operational risk loss experience for a given business line and the aggregate level of gross income for that business line. It should be noted that in the Standardised Approach gross income is measured for each business line, not the whole institution, i.e. in corporate finance, the indicator is the gross income generated in the corporate finance business line.

654. The total capital charge is calculated as the three-year average of the simple summation of the regulatory capital charges across each of the business lines in each year. In any given year, negative capital charges (resulting from negative gross income) in any business line may offset positive capital charges in other business lines without limit.<sup>135</sup> However, where the aggregate capital charge across all business lines within a given year is negative, then the input to the numerator for that year will be zero.<sup>136</sup> The total capital charge may be expressed as:

$$K_{TSA} = \{\sum_{\text{years } 1-3} \max[\sum(GI_{1-8} \times \beta_{1-8}), 0]\} / 3$$

Where:

$K_{TSA}$  = the capital charge under the Standardised Approach

$GI_{1-8}$  = annual gross income in a given year, as defined above in the Basic Indicator Approach, for each of the eight business lines

$\beta_{1-8}$  = a fixed percentage, set by the Committee, relating the level of required capital to the level of the gross income for each of the eight business lines. The values of the betas are detailed below.

Business Lines	Beta Factors
Corporate finance ( $\beta_1$ )	18%
Trading and sales ( $\beta_2$ )	18%
Retail banking ( $\beta_3$ )	12%
Commercial banking ( $\beta_4$ )	15%
Payment and settlement ( $\beta_5$ )	18%
Agency services ( $\beta_6$ )	15%
Asset management ( $\beta_7$ )	12%
Retail brokerage ( $\beta_8$ )	12%

<sup>135</sup> At national discretion, supervisors may adopt a more conservative treatment of negative gross income.

<sup>136</sup> As under the Basic Indicator Approach, if negative gross income distorts a bank's Pillar 1 capital charge under the Standardised Approach, supervisors will consider appropriate supervisory action under Pillar 2.



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**OSFI Notes**

Newly incorporated institutions intending to use the Standardized Approach having fewer than 12 quarters of gross income data will be expected to meet all of the qualifying criteria for the Standardized Approach, including the business line mapping requirements outlined in Annex 8. These institutions should use available gross income data to develop proxies for the missing portions of the required three years' data. Institutions should refer to the reporting instructions for OSFI's capital adequacy return for further guidance.

**OSFI Notes**

When an institution makes a material acquisition, the operational risk capital calculation should be adjusted to reflect those activities. Since the gross income calculation is based on a rolling 12-quarter average, the most recent four quarters of gross income for the acquired business should be based on actual gross income amounts reported by the acquired business. Estimates may be used for the previous eight quarters when actual amounts are not available.

For institutions using the Standardized Approach, the gross income from the most recent four quarters for the acquired business must be mapped into the eight Basel business lines. Once an institution has obtained the percentage allocation of the gross income from the acquired entity across the eight Basel business lines for the most recent four quarters, it may apply this allocation to the previous eight quarters of gross income. Thus, the mapping exercise for the acquired business need only be performed for the most recent four quarters. The mapping results can be applied to the total gross income of the acquired business for the previous eight quarters to determine the percentage assigned to the eight Basel business lines.

When an institution makes a divestiture, the gross income calculation may be adjusted, with supervisory approval, to reflect this divestiture.

**OSFI Notes**

Institutions incorporated in Canada are not permitted to use the Alternative Standardized Approach for any part of their operations.

**OSFI Notes**

For domestic institutions implementing the Standardized Approach, OSFI will allow subsidiaries of these institutions to use either the Basic Indicator Approach or the Standardized Approach to determine operational risk regulatory capital for the subsidiary.

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### 7.2.3. *Advanced Measurement Approaches (AMA)*

655. Under the AMA, the regulatory capital requirement will equal the risk measure generated by the bank's internal operational risk measurement system using the quantitative and qualitative criteria for the AMA discussed below. Use of the AMA is subject to supervisory approval.

656. A bank adopting the AMA may, with the approval of its host supervisors and the support of its home supervisor, use an allocation mechanism for the purpose of determining the regulatory capital requirement for internationally active banking subsidiaries that are not deemed to be significant relative to the overall banking group but are themselves subject to this Framework in accordance with Part 1. Supervisory approval would be conditional on the bank demonstrating to the satisfaction of the relevant supervisors that the allocation mechanism for these subsidiaries is appropriate and can be supported empirically. The board of directors and senior management of each subsidiary are responsible for conducting their own assessment of the subsidiary's operational risks and controls and ensuring the subsidiary is adequately capitalised in respect of those risks.

#### **OSFI Notes**

OSFI will allow a Canadian subsidiary of a foreign bank or a subsidiary of a domestic institution to use an allocated amount from its parent's AMA provided the conditions set out in paragraph 656 are met.

657. Subject to supervisory approval as discussed in paragraph 669(d), the incorporation of a well-reasoned estimate of diversification benefits may be factored in at the group-wide level or at the banking subsidiary level. However, any banking subsidiaries whose host supervisors determine that they must calculate stand-alone capital requirements (see Part 1) may not incorporate group-wide diversification benefits in their AMA calculations (e.g. where an internationally active banking subsidiary is deemed to be significant, the banking subsidiary may incorporate the diversification benefits of its own operations – those arising at the sub-consolidated level – but may not incorporate the diversification benefits of the parent).

#### **OSFI Notes**

In those very limited instances where it may be determined that a Canadian subsidiary of a foreign bank should use an AMA on stand-alone basis, OSFI will work with the foreign bank's home supervisor.

658. The appropriateness of the allocation methodology will be reviewed with consideration given to the stage of development of risk-sensitive allocation techniques and the extent to which it reflects the level of operational risk in the legal entities and across the banking group. Supervisors expect that AMA banking groups will continue efforts to develop increasingly risk-sensitive operational risk allocation techniques, notwithstanding initial approval of techniques based on gross income or other proxies for operational risk.

659. Banks adopting the AMA will be required to calculate their capital requirement using this approach as well as the 1988 Accord as outlined in section 1.7.

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## 7.3. Qualifying criteria

### 7.3.1. *The Standardised Approach*<sup>137</sup>

660. In order to qualify for use of the Standardised Approach, a bank must satisfy its supervisor that, at a minimum:

- Its board of directors and senior management, as appropriate, are actively involved in the oversight of the operational risk management framework;
- It has an operational risk management system that is conceptually sound and is implemented with integrity; and
- It has sufficient resources in the use of the approach in the major business lines as well as the control and audit areas.

661. Supervisors will have the right to insist on a period of initial monitoring of a bank's Standardised Approach before it is used for regulatory capital purposes.

662. A bank must develop specific policies and have documented criteria for mapping gross income for current business lines and activities into the standardised framework. The criteria must be reviewed and adjusted for new or changing business activities as appropriate. The principles for business line mapping are set out in Annex 8.

663. As some internationally active banks will wish to use the Standardised Approach, it is important that such banks have adequate operational risk management systems. Consequently, an internationally active bank using the Standardised Approach must meet the following additional criteria.<sup>138</sup>

#### OSFI Notes

All institutions implementing the Standardized Approach should meet the criteria set out in paragraph 663. OSFI will consider the institution's risk profile and complexity when reviewing the institution's self-assessment of compliance with these criteria.

- (a) The bank must have an operational risk management system with clear responsibilities assigned to an operational risk management function. The operational risk management function is responsible for developing strategies to identify, assess, monitor and control/mitigate operational risk; for codifying firm-level policies and procedures concerning operational risk management and controls; for the design and implementation of the firm's operational risk assessment methodology; and for the design and implementation of a risk-reporting system for operational risk.

#### OSFI Notes

<sup>137</sup> Supervisors allowing banks to use the Alternative Standardised Approach must decide on the appropriate qualifying criteria for that approach, as the criteria set forth in paragraphs 662 and 663 of this section may not be appropriate.

<sup>138</sup> For other banks, these criteria are recommended, with national discretion to impose them as requirements.

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The size and complexity of an institution may not warrant the existence of a specific organizational unit dedicated to operational risk management. Where this is the case, an institution should be able to demonstrate to OSFI how its operational risk management framework is appropriate to the size and complexity of the institution's operations. Where an independent unit does not exist, the above responsibilities should be assigned to individuals within the institution, who are independent from the relevant business line.

The term operational risk management system does not necessarily refer to a technology application for implementing operational risk management across the institution, although this may be a part of an institution's approach to managing operational risk. Rather, the term system refers to the collective policies and processes in place for identifying, assessing, monitoring and controlling operational risk across the institution.

- (b) As part of the bank's internal operational risk assessment system, the bank must systematically track relevant operational risk data including material losses by business line. Its operational risk assessment system must be closely integrated into the risk management processes of the bank. Its output must be an integral part of the process of monitoring and controlling the bank's operational risk profile. For instance, this information must play a prominent role in risk reporting, management reporting, and risk analysis. The bank must have techniques for creating incentives to improve the management of operational risk throughout the firm.

#### **OSFI Notes**

All institutions implementing the Standardized Approach should be able to track and report relevant operational risk data including material operational risk losses by significant business line. The sophistication of this tracking and reporting mechanism should be appropriate for the size of the institution, taking into account its reporting structure as well as the operational risk exposure of the institution.

- (c) There must be regular reporting of operational risk exposures, including material operational losses, to business unit management, senior management, and to the board of directors. The bank must have procedures for taking appropriate action according to the information within the management reports.

#### **OSFI Notes**

All institutions implementing the Standardized Approach should develop regular reporting of operational risk exposures within the institution and to the board of directors. The frequency and content of this reporting should be appropriate for the reporting structure as well as the nature, complexity and risk profile of the institution. The need to formalize this reporting should also reflect the internal structure of the institution (e.g., the number of employees, the reporting hierarchy). All institutions should develop procedures for taking appropriate action based on the information contained in the operational risk reports.

- (c) The bank's operational risk management system must be well documented. The bank must have a routine in place for ensuring compliance with a documented set of internal

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policies, controls and procedures concerning the operational risk management system, which must include policies for the treatment of non-compliance issues.

**OSFI Notes**

All institutions should develop processes for ensuring compliance with a documented set of internal policies, controls and procedures concerning the management of operational risk.

- (e) The bank's operational risk management processes and assessment system must be subject to validation and regular independent review. These reviews must include both the activities of the business units and of the operational risk management function.

**OSFI Notes**

Where the size and complexity of the institution may not warrant the existence of a specific organizational unit dedicated to operational risk management, independent review should focus on the operational risk management processes and may be integrated with the review of the respective business activities.

- (f) The bank's operational risk assessment system (including the internal validation processes) must be subject to regular review by external auditors and/or supervisors.

**OSFI Notes**

External audit reviews of an institution's operational risk assessment system are not mandated by OSFI.

7.3.2. *Advanced Measurement Approaches (AMA)*

(i) **General standards**

664. In order to qualify for use of the AMA a bank must satisfy its supervisor that, at a minimum:

- Its board of directors and senior management, as appropriate, are actively involved in the oversight of the operational risk management framework;
- It has an operational risk management system that is conceptually sound and is implemented with integrity; and
- It has sufficient resources in the use of the approach in the major business lines as well as the control and audit areas.

665. A bank's AMA will be subject to a period of initial monitoring by its supervisor before it can be used for regulatory purposes. This period will allow the supervisor to determine whether the approach is credible and appropriate. As discussed below, a bank's internal measurement system must reasonably estimate unexpected losses based on the combined use of internal

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and relevant external loss data, scenario analysis and bank-specific business environment and internal control factors. The bank's measurement system must also be capable of supporting an allocation of economic capital for operational risk across business lines in a manner that creates incentives to improve business line operational risk management.

**(ii) Qualitative standards**

666. A bank must meet the following qualitative standards before it is permitted to use an AMA for operational risk capital:

- (a) The bank must have an independent operational risk management function that is responsible for the design and implementation of the bank's operational risk management framework. The operational risk management function is responsible for codifying firm-level policies and procedures concerning operational risk management and controls; for the design and implementation of the firm's operational risk measurement methodology; for the design and implementation of a risk-reporting system for operational risk; and for developing strategies to identify, measure, monitor and control/mitigate operational risk.
- (b) The bank's internal operational risk measurement system must be closely integrated into the day-to-day risk management processes of the bank. Its output must be an integral part of the process of monitoring and controlling the bank's operational risk profile. For instance, this information must play a prominent role in risk reporting, management reporting, internal capital allocation, and risk analysis. The bank must have techniques for allocating operational risk capital to major business lines and for creating incentives to improve the management of operational risk throughout the firm.
- (c) There must be regular reporting of operational risk exposures and loss experience to business unit management, senior management, and to the board of directors. The bank must have procedures for taking appropriate action according to the information within the management reports.
- (d) The bank's operational risk management system must be well documented. The bank must have a routine in place for ensuring compliance with a documented set of internal policies, controls and procedures concerning the operational risk management system, which must include policies for the treatment of non-compliance issues.
- (e) Internal and/or external auditors must perform regular reviews of the operational risk management processes and measurement systems. This review must include both the activities of the business units and of the independent operational risk management function.
- (f) The validation of the operational risk measurement system by external auditors and/or supervisory authorities must include the following:
  - Verifying that the internal validation processes are operating in a satisfactory manner; and

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- Making sure that data flows and processes associated with the risk measurement system are transparent and accessible. In particular, it is necessary that auditors and supervisory authorities are in a position to have easy access, whenever they judge it necessary and under appropriate procedures, to the system's specifications and parameters.

### OSFI Notes

External audit reviews of an institution's operational risk management processes and measurement systems are not mandated by OSFI.

### (iii) Quantitative standards

#### *AMA soundness standard*

667. Given the continuing evolution of analytical approaches for operational risk, the Committee is not specifying the approach or distributional assumptions used to generate the operational risk measure for regulatory capital purposes. However, a bank must be able to demonstrate that its approach captures potentially severe 'tail' loss events. Whatever approach is used, a bank must demonstrate that its operational risk measure meets a soundness standard comparable to that of the internal ratings-based approach for credit risk, (i.e. comparable to a one year holding period and a 99.9<sup>th</sup> percentile confidence interval).

668. The Committee recognises that the AMA soundness standard provides significant flexibility to banks in the development of an operational risk measurement and management system. However, in the development of these systems, banks must have and maintain rigorous procedures for operational risk model development and independent model validation. Prior to implementation, the Committee will review evolving industry practices regarding credible and consistent estimates of potential operational losses. It will also review accumulated data, and the level of capital requirements estimated by the AMA, and may refine its proposals if appropriate.

#### *Detailed criteria*

669. This section describes a series of quantitative standards that will apply to internally-generated operational risk measures for purposes of calculating the regulatory minimum capital charge.

- (a) Any internal operational risk measurement system must be consistent with the scope of operational risk defined by the Committee in paragraph 644 and the loss event types defined in Annex 9.
- (b) Supervisors will require the bank to calculate its regulatory capital requirement as the sum of expected loss (EL) and unexpected loss (UL), unless the bank can demonstrate that it is adequately capturing EL in its internal business practices. That is, to base the minimum regulatory capital requirement on UL alone, the bank must be able to demonstrate to the satisfaction of its national supervisor that it has measured and accounted for its EL exposure.



## OSFI Notes

An institution may hold capital against UL alone provided that it can demonstrate that it has measured and accounted for its EL exposure. For EL to be “measured” to OSFI’s satisfaction, the institution’s measure of EL should be consistent with the EL-plus-UL capital charge calculated using the institution’s AMA approved by OSFI.

OSFI may allow offsets to EL that take the following form: (i) allowances for operational loss created under Canadian generally accepted accounting principles (GAAP) and (ii) other means (e.g., pricing, budgeting) provided that it can demonstrate that the corresponding losses are highly predictable and reasonably stable, and that the estimation process is consistent over time.

The maximum offset for operational risk EL is bounded by the EL exposure calculated by the institution’s approved AMA.

Allowable offsets for operational risk EL should be available to cover EL with a high degree of certainty over a one-year time horizon. Where the offset is something other than allowances, its availability should be limited to those business lines and event types with highly predictable, routine losses. Because exceptional operational risk losses do not fall within EL, specific allowances for any such events that have already occurred will not qualify as allowable EL offsets.

The institution should clearly document how its operational risk EL is measured and accounted for, including how any EL offsets meet the conditions outlined above.

- (c) A bank’s risk measurement system must be sufficiently ‘granular’ to capture the major drivers of operational risk affecting the shape of the tail of the loss estimates.
- (d) Risk measures for different operational risk estimates must be added for purposes of calculating the regulatory minimum capital requirement. However, the bank may be permitted to use internally determined correlations in operational risk losses across individual operational risk estimates, provided it can demonstrate to the satisfaction of the national supervisor that its systems for determining correlations are sound, implemented with integrity, and take into account the uncertainty surrounding any such correlation estimates (particularly in periods of stress). The bank must validate its correlation assumptions using appropriate quantitative and qualitative techniques.
- (e) Any operational risk measurement system must have certain key features to meet the supervisory soundness standard set out in this section. These elements must include the use of internal data, relevant external data, scenario analysis and factors reflecting the business environment and internal control systems.
- (f) A bank needs to have a credible, transparent, well-documented and verifiable approach for weighting these fundamental elements in its overall operational risk measurement system. For example, there may be cases where estimates of the 99.9<sup>th</sup> percentile confidence interval based primarily on internal and external loss event data would be unreliable for business lines with a heavy-tailed loss distribution and a small number of observed losses. In such cases, scenario analysis, and business environment and control factors, may play a more dominant role in the risk

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measurement system. Conversely, operational loss event data may play a more dominant role in the risk measurement system for business lines where estimates of the 99.9<sup>th</sup> percentile confidence interval based primarily on such data are deemed reliable. In all cases, the bank's approach for weighting the four fundamental elements should be internally consistent and avoid the double counting of qualitative assessments or risk mitigants already recognised in other elements of the framework.

### *Internal data*

670. Banks must track internal loss data according to the criteria set out in this section. The tracking of internal loss event data is an essential prerequisite to the development and functioning of a credible operational risk measurement system. Internal loss data is crucial for tying a bank's risk estimates to its actual loss experience. This can be achieved in a number of ways, including using internal loss data as the foundation of empirical risk estimates, as a means of validating the inputs and outputs of the bank's risk measurement system, or as the link between loss experience and risk management and control decisions.

671. Internal loss data is most relevant when it is clearly linked to a bank's current business activities, technological processes and risk management procedures. Therefore, a bank must have documented procedures for assessing the on-going relevance of historical loss data, including those situations in which judgement overrides, scaling, or other adjustments may be used, to what extent they may be used and who is authorised to make such decisions.

672. Internally generated operational risk measures used for regulatory capital purposes must be based on a minimum five-year observation period of internal loss data, whether the internal loss data is used directly to build the loss measure or to validate it. When the bank first moves to the AMA, a three-year historical data window is acceptable (this includes the parallel calculations in section 1.7).

673. To qualify for regulatory capital purposes, a bank's internal loss collection processes must meet the following standards:

- To assist in supervisory validation, a bank must be able to map its historical internal loss data into the relevant level 1 supervisory categories defined in Annexes 8 and 9 and to provide these data to supervisors upon request. It must have documented, objective criteria for allocating losses to the specified business lines and event types. However, it is left to the bank to decide the extent to which it applies these categorisations in its internal operational risk measurement system.
- A bank's internal loss data must be comprehensive in that it captures all material activities and exposures from all appropriate sub-systems and geographic locations. A bank must be able to justify that any excluded activities or exposures, both individually and in combination, would not have a material impact on the overall risk estimates. A bank must have an appropriate *de minimis* gross loss threshold for internal loss data collection, for example CAD \$12500. The appropriate threshold may vary somewhat between banks, and within a bank across business lines and/or event types. However, particular thresholds should be broadly consistent with those used by peer banks.
- Aside from information on gross loss amounts, a bank should collect information about the date of the event, any recoveries of gross loss amounts, as well as

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some descriptive information about the drivers or causes of the loss event. The level of detail of any descriptive information should be commensurate with the size of the gross loss amount.

- A bank must develop specific criteria for assigning loss data arising from an event in a centralised function (e.g. an information technology department) or an activity that spans more than one business line, as well as from related events over time.
- Operational risk losses that are related to credit risk and have historically been included in banks' credit risk databases (e.g. collateral management failures) will continue to be treated as credit risk for the purposes of calculating minimum regulatory capital under this Framework. Therefore, such losses will not be subject to the operational risk capital charge.<sup>139</sup> Nevertheless, for the purposes of internal operational risk management, banks must identify all material operational risk losses consistent with the scope of the definition of operational risk (as set out in paragraph 644 and the loss event types outlined in Annex 9), including those related to credit risk. Such material operational risk-related credit risk losses should be flagged separately within a bank's internal operational risk database. The materiality of these losses may vary between banks, and within a bank across business lines and/or event types. Materiality thresholds should be broadly consistent with those used by peer banks.
- Operational risk losses that are related to market risk are treated as operational risk for the purposes of calculating minimum regulatory capital under this Framework and will therefore be subject to the operational risk capital charge.

#### *External data*

674. A bank's operational risk measurement system must use relevant external data (either public data and/or pooled industry data), especially when there is reason to believe that the bank is exposed to infrequent, yet potentially severe, losses. These external data should include data on actual loss amounts, information on the scale of business operations where the event occurred, information on the causes and circumstances of the loss events, or other information that would help in assessing the relevance of the loss event for other banks. A bank must have a systematic process for determining the situations for which external data must be used and the methodologies used to incorporate the data (e.g. scaling, qualitative adjustments, or informing the development of improved scenario analysis). The conditions and practices for external data use must be regularly reviewed, documented, and subject to periodic independent review.

#### *Scenario analysis*

675. A bank must use scenario analysis of expert opinion in conjunction with external data to evaluate its exposure to high-severity events. This approach draws on the knowledge of experienced business managers and risk management experts to derive reasoned assessments of plausible severe losses. For instance, these expert assessments could be expressed as parameters of an assumed statistical loss distribution. In addition, scenario analysis should be used to assess the impact of deviations from the correlation assumptions embedded in the

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<sup>139</sup> This applies to all banks, including those that may only now be designing their credit risk and operational risk databases.

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bank's operational risk measurement framework, in particular, to evaluate potential losses arising from multiple simultaneous operational risk loss events. Over time, such assessments need to be validated and re-assessed through comparison to actual loss experience to ensure their reasonableness.

*Business environment and internal control factors*

676. In addition to using loss data, whether actual or scenario-based, a bank's firm-wide risk assessment methodology must capture key business environment and internal control factors that can change its operational risk profile. These factors will make a bank's risk assessments more forward-looking, more directly reflect the quality of the bank's control and operating environments, help align capital assessments with risk management objectives, and recognise both improvements and deterioration in operational risk profiles in a more immediate fashion. To qualify for regulatory capital purposes, the use of these factors in a bank's risk measurement framework must meet the following standards:

- The choice of each factor needs to be justified as a meaningful driver of risk, based on experience and involving the expert judgment of the affected business areas. Whenever possible, the factors should be translatable into quantitative measures that lend themselves to verification.
- The sensitivity of a bank's risk estimates to changes in the factors and the relative weighting of the various factors need to be well reasoned. In addition to capturing changes in risk due to improvements in risk controls, the framework must also capture potential increases in risk due to greater complexity of activities or increased business volume.
- The framework and each instance of its application, including the supporting rationale for any adjustments to empirical estimates, must be documented and subject to independent review within the bank and by supervisors.
- Over time, the process and the outcomes need to be validated through comparison to actual internal loss experience, relevant external data, and appropriate adjustments made.

**(iv) Risk mitigation**<sup>140</sup>

677. Under the AMA, a bank will be allowed to recognise the risk mitigating impact of insurance in the measures of operational risk used for regulatory minimum capital requirements. The recognition of insurance mitigation will be limited to 20% of the total operational risk capital charge calculated under the AMA.

678. A bank's ability to take advantage of such risk mitigation will depend on compliance with the following criteria:

- The insurance provider has a minimum claims paying ability rating of A (or equivalent).

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<sup>140</sup> The Committee intends to continue an ongoing dialogue with the industry on the use of risk mitigants for operational risk and, in due course, may consider revising the criteria for and limits on the recognition of operational risk mitigants on the basis of growing experience.

- The insurance policy must have an initial term of no less than one year. For policies with a residual term of less than one year, the bank must make appropriate haircuts reflecting the declining residual term of the policy, up to a full 100% haircut for policies with a residual term of 90 days or less.
- The insurance policy has a minimum notice period for cancellation of 90 days.
- The insurance policy has no exclusions or limitations triggered by supervisory actions or, in the case of a failed bank, that preclude the bank, receiver or liquidator from recovering for damages suffered or expenses incurred by the bank, except in respect of events occurring after the initiation of receivership or liquidation proceedings in respect of the bank, provided that the insurance policy may exclude any fine, penalty, or punitive damages resulting from supervisory actions.
- The risk mitigation calculations must reflect the bank's insurance coverage in a manner that is transparent in its relationship to, and consistent with, the actual likelihood and impact of loss used in the bank's overall determination of its operational risk capital.
- The insurance is provided by a third-party entity. In the case of insurance through captives and affiliates, the exposure has to be laid off to an independent third-party entity, for example through re-insurance, that meets the eligibility criteria.
- The framework for recognising insurance is well reasoned and documented.
- The bank discloses a description of its use of insurance for the purpose of mitigating operational risk.

679. A bank's methodology for recognising insurance under the AMA also needs to capture the following elements through appropriate discounts or haircuts in the amount of insurance recognition:

- The residual term of a policy, where less than one year, as noted above;
- A policy's cancellation terms, where less than one year; and
- The uncertainty of payment as well as mismatches in coverage of insurance policies.

#### **7.4. Partial use**

680. A bank will be permitted to use an AMA for some parts of its operations and the Basic Indicator Approach or Standardised Approach for the balance (partial use), provided that the following conditions are met:

- All operational risks of the bank's global, consolidated operations are captured;
- All of the bank's operations that are covered by the AMA meet the qualitative criteria for using an AMA, while those parts of its operations that are using one of the simpler approaches meet the qualifying criteria for that approach;
- On the date of implementation of an AMA, a significant part of the bank's operational risks are captured by the AMA; and
- The bank provides its supervisor with a plan specifying the timetable to which it intends to roll out the AMA across all but an immaterial part of its operations. The plan should be driven by the practicality and feasibility of moving to the AMA over time, and not for other reasons.

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## OSFI Notes

An institution may make partial use of an AMA provided that it can demonstrate that this partial use is not intended for capital arbitrage. An institution implementing an AMA will not be restricted to using only one of the simpler approaches (i.e., the Basic Indicator Approach and the Standardized Approach) for operations not covered under the AMA. Institutions may use the Standardized Approach in combination with the Basic Indicator Approach for any operations not captured by the AMA (refer to the OSFI note following paragraph 683 for partial use application of the Standardized Approach).

Upon implementation of a partial use AMA, a “significant” part (defined as 75%) of a bank’s operations must adopt the AMA. The bank has five years to roll out the AMA to a “material” part (defined as 90%) of its operations.

To determine whether an institution meets the conditions of “material” and “significant” defined above, the institution must calculate the capital charge using the Standardized Approach for those business activities adopting an AMA and compare this amount to the total capital charge calculated for the entire bank using the Standardized Approach (and the Basic Indicator Approach as applicable). This ratio must be at least 75% for AMA operations to be considered “significant” and 90% for AMA operations to be considered “material”.

681. Subject to the approval of its supervisor, a bank opting for partial use may determine which parts of its operations will use an AMA on the basis of business line, legal structure, geography, or other internally determined basis.

## OSFI Notes

Institutions may determine partial use on a business line or legal entity basis, or a combination of the two. Any activity that is excluded from the AMA calculation cannot be included in the determination of group-wide diversification benefits within the AMA.

682. Subject to the approval of its supervisor, where a bank intends to implement an approach other than the AMA on a global, consolidated basis and it does not meet the third and/or fourth conditions in paragraph 680, the bank may, in limited circumstances:

- Implement an AMA on a permanent partial basis; and
- Include in its global, consolidated operational risk capital requirements the results of an AMA calculation at a subsidiary where the AMA has been approved by the relevant host supervisor and is acceptable to the bank’s home supervisor.

## OSFI Notes

An institution that chooses to adopt the Standardized Approach may be required to implement an AMA for a subsidiary operating in another jurisdiction. In this case, the institution may, with

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supervisory approval, incorporate that AMA capital amount in its operational risk capital calculation.

683. Approvals of the nature described in paragraph 682 should be granted only on an exceptional basis. Such exceptional approvals should generally be limited to circumstances where a bank is prevented from meeting these conditions due to implementation decisions of supervisors of the bank's subsidiary operations in foreign jurisdictions.

#### **OSFI Notes**

OSFI will allow partial use for an institution adopting the Standardized Approach on a transitional basis only. An institution will be permitted to use the Basic Indicator Approach for part of its operations for a period not exceeding three years after implementation of the Standardized Approach. OSFI will permit partial use only where the institution can demonstrate that it is not being implemented for capital arbitrage purposes. OSFI expects partial use to be used only under specific circumstances where the bank can develop a clear rationale for why it is needed.



## Annex 8 - Mapping of Business Lines

### Mapping of Business Lines

Level 1	Level 2	Activity Groups
Corporate Finance	Corporate Finance	Mergers and acquisitions, underwriting, privatisations, securitisation, research, debt (government, high yield), equity, syndications, IPO, secondary private placements
	Municipal/Government Finance	
	Merchant Banking	
	Advisory Services	
Trading & Sales	Sales	Fixed income, equity, foreign exchanges, commodities, credit, funding, own position securities, lending and repos, brokerage, debt, prime brokerage
	Market Making	
	Proprietary Positions	
	Treasury	
Retail Banking	Retail Banking	Retail lending and deposits, banking services, trust and estates
	Private Banking	Private lending and deposits, banking services, trust and estates, investment advice
	Card Services	Merchant/commercial/corporate cards, private labels and retail
Commercial Banking	Commercial Banking	Project finance, real estate, export finance, trade finance, factoring, leasing, lending, guarantees, bills of exchange
Payment and Settlement <sup>141</sup>	External Clients	Payments and collections, funds transfer, clearing and settlement
Agency Services	Custody	Escrow, depository receipts, securities lending (customers) corporate actions
	Corporate Agency	Issuer and paying agents
	Corporate Trust	
Asset Management	Discretionary Fund Management	Pooled, segregated, retail, institutional, closed, open, private equity
	Non-Discretionary Fund Management	Pooled, segregated, retail, institutional, closed, open
Retail Brokerage	Retail Brokerage	Execution and full service

<sup>141</sup> Payment and settlement losses related to a bank's own activities would be incorporated in the loss experience of the affected business line.

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## Principles for business line mapping<sup>142</sup>

- (a) All activities must be mapped into the eight level 1 business lines in a mutually exclusive and jointly exhaustive manner.
- (b) Any banking or non-banking activity which cannot be readily mapped into the business line framework, but which represents an ancillary function to an activity included in the framework, must be allocated to the business line it supports. If more than one business line is supported through the ancillary activity, an objective mapping criteria must be used.
- (c) When mapping gross income, if an activity cannot be mapped into a particular business line then the business line yielding the highest charge must be used. The same business line equally applies to any associated ancillary activity.
- (d) Banks may use internal pricing methods to allocate gross income between business lines provided that total gross income for the bank (as would be recorded under the Basic Indicator Approach) still equals the sum of gross income for the eight business lines.
- (e) The mapping of activities into business lines for operational risk capital purposes must be consistent with the definitions of business lines used for regulatory capital calculations in other risk categories, i.e. credit and market risk. Any deviations from this principle must be clearly motivated and documented.

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### <sup>142</sup> Supplementary business line mapping guidance

There are a variety of valid approaches that banks can use to map their activities to the eight business lines, provided the approach used meets the business line mapping principles. Nevertheless, the Committee is aware that some banks would welcome further guidance. The following is therefore an example of one possible approach that could be used by a bank to map its gross income:

Gross income for retail banking consists of net interest income on loans and advances to retail customers and SMEs treated as retail, plus fees related to traditional retail activities, net income from swaps and derivatives held to hedge the retail banking book, and income on purchased retail receivables. To calculate net interest income for retail banking, a bank takes the interest earned on its loans and advances to retail customers less the weighted average cost of funding of the loans (from whatever source — retail or other deposits).

Similarly, gross income for commercial banking consists of the net interest income on loans and advances to corporate (plus SMEs treated as corporate), interbank and sovereign customers and income on purchased corporate receivables, plus fees related to traditional commercial banking activities including commitments, guarantees, bills of exchange, net income (e.g. from coupons and dividends) on securities held in the banking book, and profits/losses on swaps and derivatives held to hedge the commercial banking book. Again, the calculation of net interest income is based on interest earned on loans and advances to corporate, interbank and sovereign customers less the weighted average cost of funding for these loans (from whatever source).

For trading and sales, gross income consists of profits/losses on instruments held for trading purposes (i.e. in the mark-to-market book), net of funding cost, plus fees from wholesale broking.

For the other five business lines, gross income consists primarily of the net fees/commissions earned in each of these businesses. Payment and settlement consists of fees to cover provision of payment/settlement facilities for wholesale counterparties. Asset management is management of assets on behalf of others.

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- (f) The mapping process used must be clearly documented. In particular, written business line definitions must be clear and detailed enough to allow third parties to replicate the business line mapping. Documentation must, among other things, clearly motivate any exceptions or overrides and be kept on record.
  - (g) Processes must be in place to define the mapping of any new activities or products.
  - (h) Senior management is responsible for the mapping policy (which is subject to the approval by the board of directors).
  - (i) The mapping process to business lines must be subject to independent review.

### **OSFI Notes**

Institutions should develop a business line mapping process consistent with these principles. The mapping process should be objective, verifiable and repeatable such that the overall operational risk capital would not change by a material amount based on misclassification of business line mapping.

When an institution undergoes internal management restructuring, the regulatory mapping would not have to be restated for prior periods if the institution can demonstrate that this type of restructuring would not result in material differences in the operational risk capital charge. When management restructuring occurs, this assessment should be documented by the institution and be made available to OSFI upon request.

## Annex 9 - Detailed Loss Event Type Classification

### Detailed Loss Event Type Classification

Event-Type Category (Level 1)	Definition	Categories (Level 2)	Activity Examples (Level 3)
Internal fraud	Losses due to acts of a type intended to defraud, misappropriate property or circumvent regulations, the law or company policy, excluding diversity/discrimination events, which involves at least one internal party	Unauthorised Activity	Transactions not reported (intentional) Transaction type unauthorised (w/monetary loss) Mismarking of position (intentional)
		Theft and Fraud	Fraud / credit fraud / worthless deposits Theft / extortion / embezzlement / robbery Misappropriation of assets Malicious destruction of assets Forgery Check kiting Smuggling Account take-over / impersonation / etc. Tax non-compliance / evasion (wilful) Bribes / kickbacks Insider trading (not on firm's account)
External fraud	Losses due to acts of a type intended to defraud, misappropriate property or circumvent the law, by a third party	Theft and Fraud	Theft/Robbery Forgery Check kiting
		Systems Security	Hacking damage Theft of information (w/monetary loss)
Employment Practices and Workplace Safety	Losses arising from acts inconsistent with employment, health or safety laws or agreements, from payment of personal injury claims, or from diversity / discrimination events	Employee Relations	Compensation, benefit, termination issues Organised labour activity
		Safe Environment	General liability (slip and fall, etc.) Employee health & safety rules events Workers compensation
		Diversity & Discrimination	All discrimination types
Clients, Products & Business Practices	Losses arising from an unintentional or negligent failure to meet a professional obligation to specific clients (including fiduciary and suitability requirements), or from the nature or design of a product.	Suitability, Disclosure & Fiduciary	Fiduciary breaches / guideline violations Suitability / disclosure issues (KYC, etc.) Retail customer disclosure violations Breach of privacy Aggressive sales Account churning Misuse of confidential information Lender liability

Event-Type Category (Level 1)	Definition	Categories (Level 2)	Activity Examples (Level 3)
		Improper Business or Market Practices	Antitrust Improper trade / market practices Market manipulation Insider trading (on firm's account) Unlicensed activity Money laundering
		Product Flaws	Product defects (unauthorised, etc.) Model errors
		Selection, Sponsorship & Exposure	Failure to investigate client per guidelines Exceeding client exposure limits
		Advisory Activities	Disputes over performance of advisory activities
Damage to Physical Assets	Losses arising from loss or damage to physical assets from natural disaster or other events.	Disasters and other events	Natural disaster losses Human losses from external sources (terrorism, vandalism)
Business disruption and system failures	Losses arising from disruption of business or system failures	Systems	Hardware Software Telecommunications Utility outage / disruptions
Execution, Delivery & Process Management	Losses from failed transaction processing or process management, from relations with trade counterparties and vendors	Transaction Capture, Execution & Maintenance	Miscommunication Data entry, maintenance or loading error Missed deadline or responsibility Model / system misoperation Accounting error / entity attribution error Other task misperformance Delivery failure Collateral management failure Reference Data Maintenance
		Monitoring and Reporting	Failed mandatory reporting obligation Inaccurate external report (loss incurred)
		Customer Intake and Documentation	Client permissions / disclaimers missing Legal documents missing / incomplete
		Customer / Client Account Management	Unapproved access given to accounts Incorrect client records (loss incurred) Negligent loss or damage of client assets
		Trade Counterparties	Non-client counterparty misperformance Misc. non-client counterparty disputes
		Vendors & Suppliers	Outsourcing Vendor disputes

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## Chapter 8      Market Risk

This section provides detailed information of the capital adequacy requirements for market risk for Canadian deposit-taking institutions.

These requirements apply only to those institutions where the greater of the value of trading book assets or the value of trading book liabilities:

- is at least 10% of total assets, and
- exceeds \$1 billion.

OSFI retains the right to apply the framework to other institutions, on a case by case basis, if trading activities are a large proportion of overall operations.

### 8.1.    The Entity

The capital requirements for market risk are to apply on a consolidated basis. OSFI will permit financial entities in a group which is running a global consolidated book and whose capital is being assessed on a global basis to report short and long positions in exactly the same instrument (e.g., currencies, commodities, equities or bonds), on a net basis, no matter where they are booked. Nonetheless, there may be circumstances in which individual positions should be taken into the measurement system without any offsetting against positions in the remainder of the group. This may be needed, for example, where there are obstacles to the quick repatriation of profits from a foreign subsidiary or where there are legal and procedural difficulties in carrying out the timely management of risks on a consolidated basis. Institutions should document the rationale and procedures for determining when positions should be netted and not netted. These should be available for OSFI review. Moreover, OSFI will retain the right to monitor the market risks of individual entities on a non-consolidated basis to ensure that significant imbalances within a group do not escape supervision.

### 8.2.    Market Risk Framework

*Definitions:*

*Market risk* is the risk of losses in on- and off-balance sheet positions arising from movements in market prices. The risks pertaining to this requirement are:

- for instruments in the trading book:
  - interest rate position risk,
  - equity position risk.
- throughout the institution:

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- foreign exchange risk<sup>143</sup>,
  - commodities risk.

A *trading book* consists of positions in financial instruments and commodities held either with trading intent or in order to hedge other elements of the trading book. To be eligible for trading book capital treatment, financial instruments must either be free of any restrictive covenants on their tradability or be able to be hedged completely. In addition, positions should be frequently and accurately valued, and the portfolio should be actively managed. Each institution should have a policy that specifies what items are allocated to the trading book.

Positions *held with trading intent* are those held intentionally for short-term resale and/or with the intent of benefiting from actual or expected short-term price movements or to lock in arbitrage profits. They may include, for example, proprietary positions, positions arising from client servicing (e.g. matched principal brokering) and market making.

### 8.3. Application

On-balance sheet assets held in the trading book are subject to only the market risk capital requirements. On-balance sheet assets held outside the trading book and funded by another currency and unhedged for foreign exchange exposure are subject to both the market risk (i.e., foreign exchange) and credit risk capital requirements.

Derivative, repurchase/reverse repurchase, securities lending and other transactions booked in the trading book are subject to both the market risk and the counterparty credit risk capital requirements. This is because they face the risk of loss due to market fluctuations in the value of the underlying instrument and due to the failure of the counterparty to the contract. The counterparty risk weights used to calculate the credit risk capital requirements for these transactions must be consistent with those used for calculating the capital requirements in the banking book. Thus, an institution using the standardized approach in the banking book must use the standardized approach risk weights in the trading book, and an institution using the IRB approach in the banking book must use the IRB risk weights in the trading book in a manner consistent with its banking book IRB roll out as described in chapter 5, paragraphs 256-262. IRB risk weights must be used for counterparties included in portfolios where the IRB approach is being used.

### 8.4. Measurement Approaches

In measuring their market risks, institutions may choose between two broad methodologies: the standardized approach or internal models.

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<sup>143</sup> Excluding structural positions as defined in section 8.10.3. – Foreign Exchange Position Risk.



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#### 8.4.1. *Standardized approach*

The standardized methodology uses a "building-block" approach. The capital charge for each risk category is determined separately. Within the interest rate and equity position risk categories, separate capital charges for specific risk and the general market risk arising from debt and equity positions are calculated. Specific risk is defined as the risk of loss caused by an adverse price movement of a debt instrument or security due principally to factors related to the issuer. General market risk is defined as the risk of loss arising from adverse changes in market prices. For commodities and foreign exchange, there is only a general market risk capital requirement. Appendix 8-1 contains a summary of the capital charges by instrument.

The standardized approach is described in section 8.10. The first four parts of that section deal with interest rate, equity position, foreign exchange and commodities risk. The fifth part sets out two possible methods for measuring the market risk in options of all kinds.

#### 8.4.2. *Internal models*

The focus of most internal models is an institution's general market risk exposure, leaving specific risk to be measured through separate component measurement systems. Institutions using models are subject to capital charges for the specific risk not captured by their models.

Institutions using their own internal risk management models to calculate the capital charge(s) must meet seven sets of conditions, which are described in detail in section 8.11. The conditions include:

- certain general criteria concerning the adequacy of the risk management system,
- qualitative standards for internal oversight of the use of models, notably by management,
- guidelines for specifying an appropriate set of market risk factors (i.e., the market rates and prices that affect the value of institutions' positions),
- quantitative standards setting out the use of common minimum statistical parameters for measuring risk,
- guidelines for stress testing and back testing,
- validation procedures for external oversight of the use of models, and
- rules for institutions that use a mixture of models and the standardized approach.

Institutions with significant trading activities are encouraged to move towards a models approach. The need for the standardized approach will be reviewed in future when the industry's internal measurement systems are more refined.

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## 8.5. Trading book

### 8.5.1. *General Criteria*

Institutions must have clearly defined policies and procedures for determining which exposures to include in, and to exclude from, the trading book for purposes of calculating their regulatory capital, to ensure compliance with the criteria for the trading book set forth in this section and taking into account the institution's risk management capabilities and practices. Compliance with these policies and procedures must be fully documented and be subject to periodic internal audit.

These policies and procedures should, at a minimum, address the general considerations listed below. This list is not intended to provide a series of tests that a product or group of related products must pass to be eligible for inclusion in the trading book. Rather, the list provides a minimum set of key points that must be addressed by the policies and procedures for overall management of a firm's trading book:

- The activities the institution considers to be trading and as constituting part of the trading book for regulatory capital purposes;
- The extent to which an exposure can be marked-to-market daily by reference to an active, liquid two-way market;
- For exposures that are marked-to-model, the extent to which the institution can:
  - (i) Identify the material risks of the exposure;
  - (ii) Hedge the material risks of the exposure and the extent to which hedging instruments would have an active, liquid two-way market;
  - (iii) Derive reliable estimates for the key assumptions and parameters used in the model.
- The extent to which the institution can and is required to generate valuations for the exposure that can be validated externally in a consistent manner;
- The extent to which legal restrictions or other operational requirements would impede the institution's ability to effect an immediate liquidation of the exposure;
- The extent to which the institution is required to, and can, actively risk manage the exposure within its trading operations; and
- The extent to which the institution may transfer risk or exposures between the banking and the trading books and criteria for such transfers.

The following are the basic requirements in order for positions to be eligible to receive trading book capital treatment:

- The trading strategy (including the expected holding period) for the position, instrument or portfolio must be clearly documented, and approved by senior management.

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- There must be clearly defined policies and procedures for the active management of the position that establish, at a minimum, a structure for trading activities under which:
    - positions are managed at a trading desk,
    - position limits are set and monitored for appropriateness,
    - dealers have the autonomy to enter into or manage the position within agreed limits and according to the agreed strategy,
    - positions are marked to market at least daily (with the results reflected in the institution's earnings statement), and when marking to model the parameters are assessed on a daily basis,
    - positions are reported to senior management as an integral part of the institution's risk management process, and
    - the positions are actively monitored, using market information sources, with regard to their market liquidity, or with regard to the ability of the positions or the portfolio risk profile to be hedged. This includes assessments of the quality and availability of market inputs to the valuation process, the level of market turnover, and the sizes of positions traded in the market.
  - There must be clearly defined policies and procedures to monitor the positions against the institution's trading strategy, including the monitoring of turnover and stale positions in the trading book.

Notwithstanding these requirements for trading book, open equity investments in hedge funds, private equity investments, positions in a securitization warehouse and real estate holdings do not meet the definition of the trading book, owing to significant constraints on the ability of institutions to liquidate these positions and value them reliably on a daily basis.

Institutions should closely monitor securities, commodities, and foreign exchange transactions that have failed, starting the first day they fail. A capital charge for failed transactions should be calculated in accordance with Annex 3. With respect to unsettled securities, commodities, and foreign exchange transactions that are not processed through a delivery-versus-payment (DvP) or payment-versus-payment (PvP) mechanism, institutions should calculate a capital charge as set forth in Annex 3.

#### 8.5.2. *Criteria for Specific Instruments*

##### *Internal Hedges*

When an institution hedges a banking book credit risk exposure using a credit derivative booked in the trading book (i.e. using an internal hedge), the banking book exposure is not deemed to be hedged for capital purposes unless the institution purchases, from an eligible third-party protection provider, a credit derivative meeting the requirements of paragraph 191 vis-à-vis the banking book exposure. Where such third-party protection is purchased and is recognized as a hedge of a banking book exposure for regulatory capital purposes, neither the internal nor

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external credit derivative hedge would be included in the trading book for regulatory capital purposes.

### *Regulatory Capital Instruments*

Positions in an institution's own eligible regulatory capital instruments are deducted from capital. Positions in other banks', securities firms', and other financial entities' eligible regulatory capital instruments, as well as intangible assets, will receive the same treatment as stipulated under this guideline for such assets held in the banking book. Where an institution demonstrates that it is an active market maker, OSFI may establish a dealer exception for holdings of other banks', securities firms', and other financial entities' capital instruments in the trading book. In order to qualify for the dealer exception, the institution must have adequate systems and controls surrounding the trading of financial institutions' eligible regulatory capital instruments.

#### **OSFI Notes**

This preceding treatment will continue to apply on an interim basis until OSFI revises the CAR Guidelines to reflect the new Basel III standards.

### *Repo-style Transactions*

Term trading-related repo-style transactions that an institution accounts for in its banking book may be included in the institution's trading book for regulatory capital purposes so long as all such repo-style transactions are included. For this purpose, trading-related repo-style transactions are defined as only those that meet the requirements of this section and for which both legs are in the form of either cash or securities eligible for inclusion in the trading book. Regardless of where they are booked, all repo-style transactions are subject to a banking book counterparty credit risk charge.

## **8.6. Credit risk requirements for collateralised transactions**

For collateralised OTC derivative transactions, the charge for counterparty credit risk should be calculated using the same methodology as used in the banking book.

The credit risk charge for repo-style transactions should be calculated using the comprehensive approach to credit risk mitigation, as described in chapter 4, paragraphs 147-181(i) and Annex 4.<sup>144</sup> Where an institution has had a VaR model approved for repo-style transactions in the banking book, the same model may be used for transactions in the trading book, subject to the conditions set out in chapter 4, paragraphs 178-181(i) and Annex 4.

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<sup>144</sup> The firm-size adjustment for SMEs that is applicable under the IRB approach for corporate credits remains applicable in the trading book.

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If an institution is using supervisory or own-estimate haircuts under the comprehensive approach in the banking book, then collateral in the trading book that falls within the banking book definition of eligible collateral is subject to the same haircuts. Collateral in the trading book that does not meet the criteria for inclusion in the banking book as eligible collateral may still be considered in the credit risk charge calculation, but is subject to the following haircuts:

- If an institution is using supervisory haircuts in the banking book, then the collateral is subject to a haircut of 25%.
- If an institution is using its own estimates for collateral haircuts in the banking book, then it must calculate a haircut for each individual security comprising the collateral, using the same methodology as for instruments in the banking book.

## 8.7. Credit derivatives

All credit derivatives held in the trading book are subject to counterparty credit risk capital requirements, with the exception of credit derivatives that are used to hedge counterparty credit risk on other derivatives in the trading book. Many credit derivative products are also subject to general market risk capital requirements and to the specific risk capital requirement of the reference asset. Unless otherwise stated, the specific risk associated with a credit derivative is equivalent to that associated with a cash position in the reference asset (i.e. a loan or bond).

The trading book treatment of credit derivatives that reference loans raises issues that are not explicitly addressed in this guideline. Market risk capital requirements are premised on assumptions about accurate valuation and effective tradability that may not be appropriate for bank loans and loan-based credit derivatives. Accordingly, an institution that believes its unique circumstances justify booking loans or loan-based credit derivatives in its trading account should, in advance, provide its Relationship Manager with a detailed justification that addresses, among other things, the nature of the trading activity, the ability to fair value the instruments on a daily basis, and the availability of a history of price movements over a relevant time frame. Where such instruments are included in the trading book for capital purposes, OSFI may, based on its review of the justification provided, increase the institution's capital requirements for this activity if the determination of price or liquidity presents additional risks.

### 8.7.1. Counterparty credit risk

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

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

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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.

Annex 4 requires a counterparty credit risk charge that is calculated by adding:

- the replacement cost (positive mark-to-market value) of the derivative, and
- the potential future exposure, which is the result of multiplying the notional principal amount of the derivative by an add-on factor (the add-on factor to be used depends on the type and maturity of the derivative transaction).

As alternative to the Current Exposure Method for the calculation of the counterparty credit risk, institutions may also use, subject to OSFI approval, the IMM as set out in Annex 4.

The appropriate add-on factor to use to calculate the potential future 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 8.10.1.1. 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.

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.

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.

#### 8.7.2. *Models approach*

Institutions may use their internal models to determine the amount of capital required if such models meet OSFI's requirements and they have been approved for the credit derivatives portfolio. Questions on the use of models for credit derivatives should be directed to an institution's Relationship Manager.

### 8.8. Prudent valuation guidance

Institutions calculating the capital requirement for market risk must meet conditions for the prudent valuation of positions in the trading book set out below.

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This section provides institutions with guidance on prudent valuation for positions that are accounted for at the fair value, whether they are in the trading book or in the banking book. This guidance is especially important for positions without actual market prices or observable inputs to valuation, as well as less liquid positions, which raise supervisory concerns about prudent valuation. The valuation guidance set forth below is not intended to require banks to change valuation procedures for financial reporting purposes. Supervisors should assess a bank's valuation procedures for consistency with this guidance. That assessment will determine whether a bank must take a valuation adjustment for regulatory purposes (as described in subsection 8.8.4).

A framework for prudent valuation practices should at a minimum include components described in subsections 8.8.1 – 8.8.3.

#### *8.8.1. Systems and controls*

Institutions must establish and maintain adequate systems and controls sufficient to give management and supervisors the confidence that their valuations estimates are prudent and reliable. These systems must be integrated with other risk management systems within the organisation (such as credit analysis). Such systems must include:

- Documented policies and procedures for the process of valuation. This includes clearly defined responsibilities of the various areas involved in the determination of the valuation, sources of market information and review of their appropriateness, frequency of independent valuation, timing of closing prices, procedures for adjusting valuations, and end of the month and ad-hoc verification procedures; and
- Clear and independent (i.e. independent of the front office) reporting lines for the department accountable for the valuation process. The reporting line should ultimately be to a main board executive director.

#### **OSFI Notes**

In Canada, “main board executive director” should be interpreted as the Chief Risk Officer, Chief Financial Officer or equivalent.

#### *8.8.2. Valuation methodologies*

##### *Marking to market*

Marking-to-market is at least the daily valuation of positions at readily available close out prices that are sourced independently. Examples of readily available close out prices include exchange prices, screen prices, or quotes from several independent reputable brokers.



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Institutions must mark-to-market as much as possible. The more prudent side of the bid/offer should be used unless the institution is a significant market maker in a particular position type and it can close out at mid-market. Institutions should maximise the use of relevant observable inputs and minimise the use of unobservable inputs when estimating fair value using a valuation technique. However, observable inputs or transactions may not be relevant, such as in a forced liquidation or distressed sale, or transactions may not be observable, such as when markets are inactive. In such cases, the observable data should be considered, but may not be determinative.

### *Marking to model*

Only where marking-to-market is not possible should institutions mark-to-model, but this must be demonstrated to be prudent. Marking-to-model is defined as any valuation which has to be benchmarked, extrapolated or otherwise calculated from a market input. When marking to model, an extra degree of conservatism is appropriate. OSFI will consider the following in assessing whether a mark-to-model valuation is prudent:

- Senior management should be aware of the elements of the trading book or of other fair-valued positions that are subject to mark to model and should understand the materiality of the uncertainty this creates in the reporting of the risk/performance of the business. Market inputs should be sourced, to the extent possible, in line with market prices (as discussed above). The appropriateness of the market inputs, for the particular position being valued should be reviewed regularly.
- Where available, generally accepted valuation methodologies for particular products should be used as far as possible.
- Where the model is developed by the institution itself, it should be based on appropriate assumptions, which have been assessed and challenged by suitably qualified parties independent of the development process. The model should be developed or approved independently of the front office. It should be independently tested. This includes validating the mathematics, the assumptions and the software implementation.
- There should be formal change control procedures in place and a secure copy of the model should be held and periodically used to check valuations.
- Risk management should be aware of the weaknesses of the models used and how best to reflect these in the valuation output.
- The model should be subject to periodic review to determine the accuracy of its performance (e.g. assessing continued appropriateness of the assumptions, analysis of the P&L versus risk factors, and comparison of actual close out values to model outputs).
- Valuation adjustments should be made as appropriate, for example, to cover the uncertainty of the model valuation (see also *Valuation Adjustments*, below).

### *Independent price verification*

Independent price verification is distinct from daily mark-to-market. It is the process by which market prices or model inputs are regularly verified for accuracy. While daily marking-to-

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market may be performed by dealers, verification of market prices or model inputs should be performed by a unit independent of the dealing room, at least monthly (or, depending on the nature of the market/trading activity, more frequently). It need not be performed as frequently as daily mark-to-market, since the objective, i.e. independent, marking of positions, should reveal any error or bias in pricing, which should result in the elimination of inaccurate daily marks.

Independent price verification entails a higher standard of accuracy in that the market prices or model inputs are used to determine profit and loss figures, whereas daily marks are used primarily for management reporting in between reporting dates. For independent price verification, where pricing sources are more subjective, e.g. only one available broker quote, prudent measures such as valuation adjustments may be appropriate.

### 8.8.3. *Valuation adjustments*

As part of their procedures for marking to market, institutions must establish and maintain procedures for considering valuation adjustments. OSFI expects institutions using third-party valuations to consider whether valuation adjustments are necessary. Such considerations are also necessary when marking to model.

OSFI expects the following valuation adjustments/reserves to be formally considered at a minimum: unearned credit spreads (i.e., credit valuation adjustments), close-out costs, operational risks, early termination, investing and funding costs, and future administrative costs and, where appropriate, model risk.

### 8.8.4. *Adjustment to the current valuation of less liquid positions for regulatory capital purposes*

Institutions must establish and maintain procedures for judging the necessity of and calculating an adjustment to the current valuation of less liquid positions for regulatory capital purposes. This adjustment may be in addition to any changes to the value of the position required for financial reporting purposes and should be designed to reflect the illiquidity of the position. OSFI expects institutions to consider the need for an adjustment to a position's valuation to reflect current illiquidity whether the position is marked to market using market prices or observable inputs, third-party valuations or marked to model.

Bearing in mind that the assumptions made about liquidity in the market risk capital charge may not be consistent with the institution's ability to sell or hedge out less liquid positions where appropriate, institutions must take an adjustment to the current valuation of these positions, and review their continued appropriateness on an on-going basis. Reduced liquidity may have arisen from market events. Additionally, close-out prices for concentrated positions and/or stale positions should be considered in establishing the adjustment. Institutions must consider all relevant factors when determining the appropriateness of the adjustment for less liquid positions. These factors may include, but are not limited to, the amount of time it would take to hedge out the position/risks within the position, the average volatility of bid/offer spreads, the availability of independent market quotes (number and identity of market makers), the average and volatility of trading volumes (including trading volumes during periods of market stress), market

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concentrations, the aging of positions, the extent to which valuation relies on marking-to-model, and the impact of other model risks not included in the prior paragraph.

For complex products including, but not limited to, securitisation exposures and n-th-to-default credit derivatives, institutions must explicitly assess the need for valuation adjustments to reflect two forms of model risk: the model risk associated with using a possibly incorrect valuation methodology; and the risk associated with using unobservable (and possibly incorrect) calibration parameters in the valuation model.

The adjustments to the current valuation of less liquid positions made under the previous two paragraphs must impact Tier 1 regulatory capital and may exceed those valuation adjustments made under financial reporting standards and those considered in Section 8.8.3.

## **8.9. Capital requirement**

Each institution will be expected to monitor and report the level of risk against which a capital requirement is to be applied. The institution's total capital requirement for market risk will be:

- a) the sum of the capital charges for market risks as determined using the standardized approach or
- b) the measure of market risk derived from the models approach or
- c) a mixture of (a) and (b) summed arithmetically.

All transactions, including forward sales and purchases, shall be included in the calculation of capital requirements on a trade date basis. Although regular reporting will take place only quarterly, institutions are expected to manage risks in such a way that the capital requirements are being met on a continuous basis, i.e., at the close of each business day. Institutions are also expected to maintain strict risk management systems to ensure that intra-day exposures are not excessive.

## Appendix 8-I - Summary of Capital Charges by Instrument

The following tables have been provided for illustrative purposes and are intended to give a broad indication of the capital charges that apply to selected instruments. Specific instruments may be subject to additional charges: For example, a debt instrument denominated in a foreign currency and held in the trading book would be subject to both the general market risk charge for interest rate position risk and foreign exchange risk. The same debt instrument held outside the trading book would be subject to a general market risk charge for foreign exchange and a credit default risk charge.

Instruments	Specific Risk Charge	General Market Risk Charge	Options Risk Charge	Credit Default Risk Charge <sup>145</sup>
<b>Interest rate position risk</b>				
Debt instruments <sup>146</sup>	X	X		
Debt forward contracts	X	X		X
Debt index forward contracts		X		X
<b>Equity position risk</b>				
Equity instruments	X	X		
Equity forward contracts	X	X		X
Equity index forward contracts	X <sup>147</sup>	X		X
<b>Foreign exchange position risk</b>				
Foreign exchange spot		X		X
Foreign exchange forward		X		X
<b>Commodities risk</b>				
Gold spot		X		X
Gold forward contracts		X		X
Commodity spot		X		X
Commodity forward contracts		X		X

<sup>145</sup> Exchange traded contracts subject to daily margining requirements may be excluded from the capital calculation.

<sup>146</sup> This refers only to trading book instruments.

<sup>147</sup> Diversified equity indices require a low specific risk charge of 2% to cover execution and tracking risks.

Instruments	Specific Risk Charge	General Market Risk Charge	Options Risk Charge	Credit Default Risk Charge
<b>Options Portfolios</b>				
<i>Simplified Method</i>				
Debt options purchased			X	X
Debt index options purchased			X	X
Equity options purchased			X	X
Equity index options purchased			X	X
Foreign exchange options purchased			X	X
Gold options purchased			X	X
Commodity options purchased			X	X
<i>Scenario Method</i>				
Debt options	X		X	X
Debt index options			X	X
Equity options	X		X	X
Equity index options	X <sup>148</sup>		X	X
Foreign exchange options			X	X
Gold options			X	X
Commodity options			X	X

<sup>148</sup> Diversified equity indices require a low specific risk charge of 2% (multiplied by the notional value of the underlying and the option's delta as set out on section 8.10.5) to cover execution and tracking risks.

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## 8.10. Standardized approach

### 8.10.1. *Interest rate position risk*

This section describes the way in which an institution will calculate its capital requirement for interest rate positions held in the trading book where that institution does not use an internal model that meets the criteria set out in section 8.11. The interest rate exposure captured includes exposures arising from interest-bearing and discounted financial instruments, derivatives based on the movement of interest rates and interest rate exposures embedded in derivatives based on non-interest related derivatives including foreign exchange forward contracts. The market risk capital charge for interest rate options in an institution's trading book is calculated separately in accordance with section 8.10.5.

Convertible bonds, i.e., debt instruments or preference shares that are convertible, at a stated price, into common shares of the issuer, will be treated as debt securities if they trade like debt securities and as equities if they trade like equities. Convertible bonds must be treated as equities where:

- a) the first date at which conversion may take place is less than three months ahead, or the next such date (where the first has passed) is less than a year ahead; and
- b) the convertible is trading at a premium of less than 10%, where the premium is defined as the current mark to market value of the convertible less the mark to market value of the underlying equity, expressed as a percentage of the mark to market value of the underlying equity.

An institution's interest rate position risk requirement under the standardized approach is the sum of the capital required for *specific risk* and *general market risk* for each currency in which the institution has a trading book exposure. The specific risk capital charge depends on the type of product.

#### 8.10.1.1. *Specific risk*

##### *Non-tranched products*

The treatment for products that are not covered under the securitisation framework (as defined in paragraphs 538 to 542 of Chapter 6), and that are not n-th-to-default products, is as follows:

The specific risk capital charge is calculated by multiplying the absolute market values of the net positions in the trading book by their respective risk factors. The risk factors, as set out below in Table I, correspond to the category of the obligor and the residual maturity of the instrument.

Net positions are arrived at by applying permitted offsets of long and short positions in identical issues (including certain derivative contracts – see sub-section in 8.10.1.1. ). Even if the issuer is the same, no offsetting is permitted between different issues to arrive at a net holding since differences in currencies, coupon rates, liquidity, call features, etc., mean that prices may diverge in the short run.

<b>TABLE I</b>			
<b>Specific Risk Categories and Weights</b>			
<b>Category</b>	<b>External Credit Assessment</b>	<b>Residual Term to Final Maturity</b>	<b>Specific Risk Capital Charge</b>
Government	AAA to AA-	All	0%
	A+ to BBB-	6 months or less	0.25%
		Greater than 6 months but not exceeding 24 months	1.00%
		Greater than 24 months	1.60%
	BB+ to B-	All	8.00%
	Below B-	All	12.00%
	Unrated	All	8.00%
Qualifying	All	6 months or less	0.25%
		Greater than 6 months but not exceeding 24 months	1.00%
		Greater than 24 months	1.60%
Other	Similar to credit risk charges under the standardised approach for non-investment grade debt securities, e.g.:		
	BB+ to BB-	All	8.00%
	Below BB-	All	12.00%
	Unrated	All	8.00%

### OSFI Notes

The treatment of a sovereign asset under the standardized approach to specific risk is based on its rating. Obligations of Canadian provinces are treated as obligations of the government of Canada for the purpose of specific risk factors in the framework.

A specific risk charge will apply to derivative contracts in the trading book only when they are based on an underlying instrument. For example, where an interest rate swap is based on an index of Bankers Acceptance rates, there will not be a specific risk charge. However an option based on a corporate bond will generate a specific risk charge. Appendix 8-V includes examples of derivatives in the trading book that require a specific risk charge and derivatives in the trading book that do not.

The specific risk charge for net positions in derivative contracts is calculated by multiplying:



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- The market value of the effective notional amount of the debt instrument that underlies an interest rate swap, future or forward

by

- the specific risk factors in Table I that correspond to the category and residual term of the underlying debt instrument.

### *Effective notional amount*

The effective notional amount of a derivative net position is the (absolute) market value of a net position in a stated underlying debt instrument adjusted to reflect any multiplier applicable to the contract's reference rate(s) or, where there is no multiplier component, simply, the market value of the stated underlying debt instrument.

All over-the-counter derivative contracts are subject to the counterparty credit risk charges determined in accordance with chapter 4, even where a specific risk charge is required. A specific risk requirement would arise if the derivative position was based on an underlying instrument or security. For example, if the underlying security was a AAA rated corporate bond, the derivative will attract a specific risk requirement based on the underlying bond. However, where the derivative was based on an underlying exposure that was an index (e.g., interbank rates), no specific risk would arise.

### *Government*

The *government* category includes all forms of debt instruments, including but not limited to bonds, treasury bills and other short-term instruments, that have been issued by, fully guaranteed by, or fully collateralized by securities issued by:

- the Government of Canada, or the government of a Canadian province or territory; or
- an agent of the federal government, or a provincial or territorial government in Canada whose debts are, by virtue of their enabling legislation, direct obligations of the parent government.

The government category also includes all forms of debt instruments that are issued by, fully guaranteed by, or fully collateralized by securities issued by central governments that:

- have been rated, and whose rating is reflective of the issuing country's creditworthiness; or
- are denominated in the local currency of the issuing government, and funded by liabilities booked in that currency.

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## Qualifying

The *qualifying* category includes debt securities that are rated investment-grade and issued by or fully guaranteed by:

- a public sector entity,
- a multilateral development bank<sup>149</sup>,
- a bank where the instrument does not qualify as capital of the issuing institution<sup>150</sup>, or
- a regulated securities firm in a BCBS-member country or country that has implemented BCBS-equivalent standards.

### OSFI Notes

OSFI expects the institution to conduct its own internal self-assessment as to whether a non-BCBS member country has implemented BCBS equivalent standards.

In addition, the *qualifying* category also includes any other debt securities issued by a non-government obligor that have been rated investment-grade<sup>151</sup> by at least two nationally recognized credit rating services, or rated investment-grade by one nationally recognized credit rating agency and not less than investment-grade by any other credit rating agency.

Furthermore, institutions using the IRB approach for a portfolio may include an unrated security in the qualifying category if the security meets both of the following conditions:

- the security is rated equivalent to investment grade under the institution's internal rating system<sup>152</sup>, which OSFI has confirmed complies with the requirements for the IRB approach, and
- the issuer has securities listed on a recognized stock exchange.

Nationally recognized credit rating agencies include but are not restricted to:

- DBRS,
- Moody's Investors Service (Moody's),
- Standard & Poors (S&P),
- Fitch Rating Services (Fitch),

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<sup>149</sup> Multilateral banks are defined in Chapter 3.

<sup>150</sup> Government-sponsored agencies, multilateral development banks, and banks are defined in Chapter 3.

<sup>151</sup> See Table II below - e.g., rated Baa or higher by Moody's and BBB or higher by Standard and Poor's..

<sup>152</sup> Equivalent means that the debt security has a one-year PD less than or equal to the one year PD implied by the long-run average one-year PD of a security rated investment grade or better by a nationally recognized rating agency.

- Japan Credit Rating Agency, LTD (JCR), and
- Japan Rating and Investment Information (R&I).

Table II provides the minimum ratings constituting investment grade for the agencies listed above.

**TABLE II**  
**Example Minimum Ratings Comprising Investment Grade**

Rating Agency	Minimum Ratings	
	Securities	Money market
DBRS	BBB low	A-3
Moody's	Baa3	P-3
S&P	BBB-	A-3
Fitch	BBB-	A-3
JCR	BBB-	J-2
R&I	BBB-	a-3

*Other*

The *other* category is comprised of securities that do not meet the criteria for inclusion in the government or qualifying categories. Instruments in this category receive the same specific risk charge as do non-investment grade securities under the standardised approach to credit risk in this guideline. However, since this may in certain cases considerably underestimate the specific risk for debt instruments that have a high yield to redemption relative to government debt securities, OSFI will have the discretion:

- To apply a higher specific risk charge to such instruments; and/or
- To disallow offsetting for the purposes of defining the extent of general market risk between such instruments and any other debt instruments.

*Credit derivatives*

This section describes the minimum capital required to cover specific risk for positions in credit derivatives in the trading book. Such positions are also subject to the capital requirements for counterparty credit risk.

For the purpose of calculating the capital requirement, credit derivatives transactions are broken down into constituent components as follows.

*Total rate of return swaps* are represented as two legs of a single transaction. The first leg is an effective notional position in the reference asset to which the corresponding general and specific

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risk charges apply. The second leg, representing interest payments under the swap, is recorded as a notional position in a government bond in the reference currency with the appropriate fixed or floating rate.

*Credit default swaps/products* for the guarantor are represented as an effective notional position in the reference asset but are subject only to a specific risk charge. For such products, there is no general market risk position created in the reference asset. If periodic premium or interest payments are required of the beneficiary under the swap, these cash flows are represented as a notional position in a government bond in the reference currency with the appropriate fixed or floating rate.

*Credit-linked notes* are treated as a position in the note itself, with an embedded credit default product. The credit-linked note has specific risk of the issuer and general market risk according to the coupon or interest rate of the note. The embedded credit default product creates an effective notional position in the specific risk of the reference asset.

In almost all credit derivatives (including total rate of return swaps, credit default products and credit-linked notes), specific risk is created in the reference asset. When the credit derivative is for a single reference asset, the beneficiary creates a short position in the reference asset, while the guarantor creates a long position in the reference asset. For some credit-linked note products, or other products in which the guarantor funds the beneficiary (posts cash or collateral), a long specific risk position in the note issuer, in the amount of the collateral, is also created.

## Appendix 8-II - Summary of Capital Charges for Credit Derivatives

The following table summarizes the application of capital charge components to the three forms of credit derivative contracts.

		<b>Guarantor (variable payer)</b>	<b>Beneficiary (fixed payer)</b>
<b>Total Return Swap</b>	General Market Risk	Long position in the reference asset and a short position in the notional bond (interest rate leg of contract)	Short position in the reference asset and a long position in the notional bond (interest rate leg of contract)
	Specific Risk	Long position(s) in the reference asset(s)	Short position(s) in the reference asset(s)
	Counterparty Credit Risk	Add-on factor	Add-on factor
<b>Credit Default Swap</b>	General Market Risk	Normally no risk from market movements	Normally no risk from market movements
	Specific Risk	Long position(s) in the reference asset(s)	Short position(s) in the reference asset(s)
	Counterparty Credit Risk	Counterparty risk depends on whether future payments are due from fixed payer. If so and add-on factor is required but is capped by unpaid premiums as described in section 8.7.1.	Add-on factor
<b>Credit-Linked Note</b>	General Market Risk	Long position in the note	No risk from market movements
	Specific Risk	Long position(s) in the reference asset(s) plus long position on the note issuer	Short position(s) in the reference asset(s)
	Counterparty Credit Risk	No counterparty risk	No counterparty risk

The specific risk capital charge is calculated by multiplying the absolute values of the derivative positions (mark-to-market) in the trading book by their respective risk factors, as outlined elsewhere in this guideline. Institutions will generally use the factors in the non-tranched products sub-section of 8.10.1.1.– Table I (Specific Risk Categories and Weights), taking into account the category (government, qualifying, or non-qualifying) and the residual maturity (six months to two years).

*Limitation of the specific risk capital charge to the maximum possible loss*

Institutions may limit the capital charge for an individual position in a credit derivative (or securitisation instruments as described below in the tranched products sub-section of 8.10.1.1.) to

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the maximum possible loss. For a short risk position (beneficiary) this limit could be calculated as a change in value due to the underlying names immediately becoming default risk-free. For a long risk position (guarantor), the maximum possible loss could be calculated as the change in value in the event that all the underlying names were to default with zero recoveries. The maximum possible loss must be calculated for each individual position.

### *Netting*

Netting of positions within the specific risk category is permitted under the conditions described below. Where a credit default product or credit-linked note is of shorter maturity than the reference asset, a specific risk offset is allowed between the long and short specific risk positions, but a forward position in the specific risk of the reference asset is recorded. The net result is a single specific risk charge for the longer maturity position in the reference asset.

No capital is required for specific risk for either side of a position in cases where the values of the two legs (i.e., long and short) always move in the opposite direction and broadly to the same extent. This occurs where:

- a) the two legs consist of completely identical instruments<sup>153</sup>, or
- b) a long cash position is hedged by a total rate of return swap (or vice versa) and there is an exact match between the reference obligation and the underlying exposure (i.e., the cash position).

A partial reduction in the specific risk charge is permitted when the values of two legs (i.e., long and short) always move in the opposite direction but not broadly to the same extent. This occurs where:

- c) a long cash position is hedged by a credit default swap or a credit linked note (or vice versa) and there is an exact match in terms of the reference obligation, the maturity of both the reference obligation and the credit derivative, and the currency to the underlying exposure. In addition, the key features of the credit derivative contract (e.g., credit event definitions, settlement mechanisms) do not cause the price movement of the credit derivative to materially deviate from the price movements of the cash position.

To the extent that a transaction meeting the requirements of c) transfers risk (i.e., taking account of restrictive payout provisions such as fixed payouts and materiality thresholds), the specific risk charge for the side of the transaction with the higher charge is reduced by 80%, while the specific risk charge for the other side of the transaction is zero.

A partial reduction in the specific risk charge is also permitted when the values of two legs (i.e., long and short) usually move in the opposite direction. This occurs where:

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<sup>153</sup> The maturity of the swap itself may be different from that of the underlying exposure.

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- The position is captured under b) above, with the exception that there is an asset mismatch between the reference obligation and the underlying exposure. However, the reference obligation ranks pari passu with or is junior to the underlying obligation, the underlying and reference obligations share the same obligor (i.e., the same legal entity), and there are legally enforceable cross-default or cross-acceleration clauses in place.
  - The position is captured under a) or c) above, with the exception that there is a currency or maturity mismatch<sup>154</sup> between the credit protection and the underlying asset.
  - The position is captured under c) above, with the exception that there is an asset mismatch between the cash position and the credit derivative. However, the underlying asset is included in the (deliverable) obligations in the credit derivative documentation.

In each of the above cases, the specific risk charge for the side of the transaction with the higher charge remains the same, but the specific risk charge for the other side of the transaction is zero.

For all other cases not specifically mentioned above, the full specific risk capital charge applies to both sides of the position.

### ***Tranched products***

Tranched products include those covered under the securitisation framework (as defined in paragraphs 538 to 542 of Chapter 6: Structured Credit Products) and n-th to default products (henceforth ‘tranching products’). The specific risk charge for a tranching product depends on whether it is eligible for inclusion in a correlation trading portfolio. Notwithstanding this eligibility, the rules for permissible offsets as applied to non-tranching products (e.g., offsetting of long and short positions is permitted for tranching positions only in identical issues) apply here as well. The specific risk capital charge a net position in a tranching product is calculated as the lesser of:

- i) the product of the market value of the tranching product position and its respective charge (outlined in Tables III and IV below);

and

- ii) the maximum possible loss that could arise under that net position.

Similar concepts apply if an institution is applying alternative (instead of the Ratings Based Approach) treatments to unrated securitizations as described in the non-correlation trading portfolio products sub-section of 8.10.1.1.

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<sup>154</sup> Currency mismatches should feed into the normal reporting of foreign exchange risk.



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### *Correlation trading portfolio products*

For the purposes of this framework, the correlation trading portfolio incorporates securitisation exposures and n-th-to-default credit derivatives that meet the following criteria:

- The positions are neither resecuritisation positions, nor derivatives of securitisation exposures that do not provide a pro-rata share in the proceeds of a securitisation tranche (this therefore excludes options on a securitisation tranche, or a synthetically leveraged super-senior tranche);

and

- All reference entities are single-name products, including single-name credit derivatives, for which a liquid two-way market exists. This will include commonly traded indices based on these reference entities. A two-way market is deemed to exist where there are independent bona fide offers to buy and sell so that a price reasonably related to the last sales price or current bona fide competitive bid and offer quotations can be determined within one day and settled at such price within a relatively short time conforming to trade custom. Positions which reference an underlying that would be treated as a retail exposure, a residential mortgage exposure or a commercial mortgage exposure under the standardised approach to credit risk are not included in the correlation trading portfolio. Positions which reference a claim on a special purpose entity are not included either. An institution may also include in the correlation trading portfolio positions that hedge the positions described above and which are neither securitisation exposures nor n-th-to-default credit derivatives and where a liquid two-way market as described above exists for the instrument or its underlyings.

The specific risk capital charge for the correlation trading portfolio is equal to the greater of:

- (i) the total specific risk capital charges that would apply only to the net long positions from the net long correlation trading exposures combined,

or

- (ii) the total specific risk capital charges that would apply only to the net short positions from the net short correlation trading exposures combined. The larger of these total amounts is then the specific risk capital charge for the correlation trading portfolio.<sup>155</sup>

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<sup>155</sup> Note that the application of the maximum operator to net long positions and net short positions can be done after considering all permissible netting options (including those considered in section 8.10.1.1).

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### *Non-correlation trading portfolio products*

The specific risk capital charge for tranching products that are not eligible for inclusion in a correlation trading portfolio is calculated by multiplying the absolute values of the tranching positions in the trading book by their respective charges.

For this calculation, offsetting of long and short positions is permitted for tranching positions in identical issues with identical attachment and detachment points, and underlying reference names, etc..

During a transitional period ending 31 December 2013, the institution may exclude positions in securitisation instruments (and n-th-to-default credit derivatives) which are not included in the correlation trading portfolio from the above calculation, according to an equivalent treatment, and determine the specific risk capital charge as follows: The institution computes (i) the total specific risk capital charge that would apply just to the net long positions in securitisation instruments in the trading book, and (ii) the total specific risk capital charge that would apply just to the net short positions in securitisation instruments in the trading book. The larger of these total amounts is then the specific risk capital charge for securitisation instruments in the trading book. This calculation must be undertaken separately from the calculation for the correlation trading portfolio.

Institutions using the standardised approach for credit risk must utilize Table III.<sup>156</sup> For positions with long-term ratings of B+ and below and short-term ratings other than A-1/P-1, A-2/P-2, A-3/P-3, deduction from capital as defined in paragraph 561 is required. Deduction is also required for unrated positions with the exception of the circumstances described in paragraphs 571 to 575. The operational requirements for the recognition of external credit assessments outlined in paragraph 565 apply.

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<sup>156</sup> Note that the subsequent paragraph offers alternatives for determining the specific risk capital charge for unrated exposures for institutions that do not have approval to apply advanced modelling approaches to measure credit risk in the banking book,

<b>TABLE III</b>					
<b>Specific risk capital charges based on external credit ratings for institutions using the standardised approach to credit risk</b>					
<b>External Credit Assessment</b>	<b>AAA to AA-A-1/P-1</b>	<b>A+ to A-A-2/P-2</b>	<b>BBB+ to BBB-A-3/P-3</b>	<b>BB+ to BB-</b>	<b>Below BB- and below A-3/P-3 or unrated</b>
<b>Securitisation exposures</b>	1.6%	4%	8%	28%	Deduction
<b>Re-securitisation exposures</b>	3.2%	8%	18%	52%	Deduction

The specific risk capital charges for rated positions covered under the internal ratings-based approach for securitisation exposures are defined in Table IV below. For positions with long-term ratings of B+ and below and short-term ratings other than A-1/P-1, A-2/P-2, A-3/P-3, deduction from capital as defined in paragraph 561 is required. The operational requirements for the recognition of external credit assessments outlined in paragraph 565 apply.

a) For securitisation exposures, institutions may apply the capital charges defined in the table below for senior granular positions if the effective number of underlying exposures (N, as defined in paragraph 633) is 6 or more and the position is senior as defined in paragraph 613. When N is less than 6, the capital charges for non-granular securitisation exposures of the table below apply. In all other cases, the capital charges for non-senior granular securitisation exposures of the table below apply.

b) Resecuritisation exposures as defined in paragraph 541(i) are subject to specific risk capital charges depending on whether or not the exposure is senior as defined in paragraph 613.

<b>TABLE IV</b>					
<b>Specific risk capital charges based on external credit ratings for institutions using internal ratings based approaches to credit risk</b>					
<b>External rating (illustrative)</b>	<b>Securitisation exposures</b>			<b>Re-securitisation exposures</b>	
	<b>Senior, granular</b>	<b>Non-senior, granular</b>	<b>Non- granular</b>	<b>Senior</b>	<b>Non-senior</b>
AAA/A-1/P-1	0.56%	0.96%	1.60%	1.60%	2.40%
AA	0.64%	1.20%	2.00%	2.00%	3.20%
A+	0.80%	1.44%	2.80%	2.80%	4.00%
A/A-2/P-2	0.96%	1.60%		3.20%	5.20%
A-	1.60%	2.80%		4.80%	8.00%
BBB+	2.80%	4.00%		8.00%	12.00%
BBB/A-3/P-3	4.80%	6.00%		12.00%	18.00%
BBB-	8.00%			16.00%	28.00%
BB+	20.00%			24.00%	40.00%
BB	34.00%			40.00%	52.00%
BB-	52.00%			60.00%	68.00%
Below BB-/ A-3/P-3	Deduction				

The specific risk capital charges for unrated positions covered under the securitisation framework as defined in paragraphs 538 to 542 will be calculated as set out below, subject to OSFI approval (on approaches (a) through (c)).

- a) If an institution has approval for the internal ratings-based approach for the asset classes which include the underlying exposures, the institution may apply the supervisory formula approach (paragraphs 623 to 636). When estimating PDs and LGDs for calculating KIRB, the institution must meet the minimum requirements for the IRB approach.
- b) To the extent that an institution has approval to apply the internally developed approach, referred to in section 8.11.5 for interest rate specific risk, to the underlying exposures and the institution derives estimates for PDs and LGDs from the internally developed approach specified under the IRC framework (as described in Appendix 8-IX) that are in line with the quantitative standards for the internal ratings-based approach, the institution may use these estimates for calculating KIRB and, consequently, for applying the supervisory formula approach (paragraphs 623 to 636).
- c) In all other cases the capital charge can be calculated as 8% of the weighted average risk weight that would be applied to the securitised exposures under the standardised approach, multiplied by a concentration ratio. If the concentration ratio is 12.5 or higher

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the position has to be deducted from capital as defined in paragraph 561. This concentration ratio is equal to the sum of the nominal amounts of all the tranches divided by the sum of the nominal amounts of the tranches junior to or pari passu with the tranche in which the position is held including that tranche itself.

The resulting specific risk capital charge must not be lower than any specific risk capital charge applicable to a rated more senior tranche. If an institution is unable to determine the specific risk capital charge as described above or prefers not to apply the treatment described above to a position, it must deduct that position from capital.

A position subject to deduction according to the standardized approaches to interest rate specific risk for trached products may be excluded from the calculation of the capital charge for general market risk whether the institution applies the standardised measurement method or the internal models method for the calculation of its general market risk capital charge.

### *N-th to default products*

An n-th-to-default credit derivative is a contract where the payoff is based on the n-th asset to default in a basket of underlying reference instruments. Once the n-th default occurs the transaction terminates and is settled.

- (a) The capital charge for specific risk for a first-to-default credit derivative is the lesser of (1) the sum of the specific risk capital charges for the individual reference credit instruments in the basket, and (2) the maximum possible credit event payment under the contract. Where an institution has a risk position in one of the reference credit instruments underlying a first-to-default credit derivative and this credit derivative hedges the institution's risk position, the institution is allowed to reduce with respect to the hedged amount both the capital charge for specific risk for the reference credit instrument and that part of the capital charge for specific risk for the credit derivative that relates to this particular reference credit instrument. Where an institution has multiple risk positions in reference credit instruments underlying a first-to-default credit derivative this offset is allowed only for that underlying reference credit instrument having the lowest specific risk capital charge.
- (b) The capital charge for specific risk for an n-th-to-default credit derivative with n greater than one is the lesser of (1) the sum of the specific risk capital charges for the individual reference credit instruments in the basket but disregarding the (n-1) obligations with the lowest specific risk capital charges; and (2) the maximum possible credit event payment under the contract. For n-th-to-default credit derivatives with n greater than 1 no offset of the capital charge for specific risk with any underlying reference credit instrument is allowed.
- (c) If a first or other n-th-to-default credit derivative is externally rated, then the protection seller must calculate the specific risk capital charge using the rating of the derivative and apply the respective securitisation risk weights as specified above for trached products, as applicable.

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- (d) The capital charge against each net n-th-to-default credit derivative position applies irrespective of whether the institution has a long or short position, i.e. obtains or provides protection.

#### 8.10.1.2. General market risk

##### Overview

An institution may measure its exposure to general market risk using the *maturity method*, which uses standardized risk weights that approximate the price sensitivity of various instruments.

The maturity method uses a maturity-ladder that incorporates a series of "time-bands" that are divided into maturity "zones" for grouping together securities of similar maturities. These time bands and zones are designed to take into account differences in price sensitivities and interest rate volatilities across different maturities.

A separate maturity ladder must be constructed for each currency in which an institution has significant positions, and capital requirements must be calculated for each currency separately. No offsetting of positions is permitted between different currencies in which positions are significant.

Positions in currencies that are not significant may be combined into a common maturity ladder, with the net long or short position of each currency entered in the applicable time band. The net positions are to be summed within each time band, irrespective of whether they are positive or negative, to arrive at the gross position.

Opposite positions of the same amount in the same issues (but not different issues by the same issuer), whether actual or notional, may be excluded from the interest rate maturity framework, as well as closely matched swaps, forwards, futures, and forward rate agreements (FRAs) that meet the conditions set out in the sub-section on interest rate derivatives in Appendix 8-III.

The capital requirement for general market risk, excluding options, is the sum of:

○ Basis risk charge	
Matched weighted positions in all time bands	x 10%
○ Yield curve risk charge	
Matched weighted positions in zone 1	x 40%
Matched weighted positions in zone 2	x 30%
Matched weighted positions in zone 3	x 30%
Matched weighted positions between zones 1 and 2	x 40%

Matched weighted positions between zones 2 and 3	x 40%
Matched weighted positions between zones 1 and 3	x 100%
o Net position charge	
Residual unmatched weighted positions	x 100%

An example of the calculation of general market risk under the maturity method can be found in Appendix 8-III.

#### *General market risk calculation*

To calculate the *general market risk* charge, the institution distributes the long or short position (at current market value) of each debt instrument and other source of interest rate exposure, including derivatives, into the time-bands and three zones of the maturity ladder outlined in Table V. Once all long and short positions are placed into the appropriate time-bands, the long positions in each time-band are summed and the short positions in each time-band are summed.

The summed positions are multiplied by the appropriate risk-weight factor (reflecting the price sensitivity of the positions to changes in interest rates) to determine the risk-weighted long and short market risk positions for each time-band.

The risk weights for each time-band are:

**TABLE V**  
**Maturity Method: Zones, Time-bands and Weights**

<b>Zone</b>	<b>Time-bands</b>	<b>Time-bands</b>	<b>Risk Weights</b>
	<b>For Coupon 3% or more</b>	<b>For Coupon less than 3% and zero coupon bonds</b>	<b>[%]</b>
1	up to 1 month	up to 1 month	0.00
	1 up to 3 months	1 up to 3 months	0.20
	3 up to 6 months	3 up to 6 months	0.40
	6 up to 12 months	6 up to 12 months	0.70
2	1 up to 2 years	1 up to 1.9 years	1.25
	2 up to 3 years	1.9 up to 2.8 years	1.75
	3 up to 4 years	2.8 up to 3.6 years	2.25
3	4 up to 5 years	3.6 up to 4.3 years	2.75
	5 up to 7 years	4.3 up to 5.7 years	3.25



	7 up to 10 years	5.7 up to 7.3 years	3.75
	10 up to 15 years	7.3 up to 9.3 years	4.50
	15 up to 20 years	9.3 up to 10.6 years	5.25
	over 20 years	10.6 up to 12 years	6.00
		12 up to 20 years	8.00
		over 20 years	12.50

A capital requirement is calculated for the matched weighted position in each time band to address basis risk. The capital requirement is 10% of the matched weighted position in each time band, that is, 10% of the smaller of the risk-weighted long or risk-weighted short position, or if the positions are equal, 10% of either position.<sup>157</sup> If there is only a gross long or only a gross short position in the time band, a basis risk charge is not calculated. The remainder (i.e., the excess of the weighted long positions over the weighted short positions, or vice versa, within a time band) is called the unmatched weighted position for that time band.

The basis risk charges for each time-band are absolute values, that is, neither long nor short. The charges for all time-bands in the maturity ladder are summed and included as an element of the general market risk capital requirement.

Capital requirements, referred to as the yield curve risk charge, are assessed to allow for the imperfect correlation of interest rates along the yield curve. There are two elements to the yield curve risk charge. The first element is a charge on the matched weighted positions in zones 1, 2 and 3. The second is a capital charge on the matched weighted positions between zones.

The matched weighted position in each zone is multiplied by the percentage risk factor corresponding to the relevant zone. The risk factors for zones 1, 2 and 3 are provided in Table VI. The matched and unmatched weighted positions for each zone are calculated as follows. Where a zone has both unmatched weighted long and short positions for various time bands within a zone, the extent to which the one offsets the other is called the matched weighted position for that zone. The remainder (i.e., the excess of the weighted long positions over the weighted short positions, or vice versa, within a zone) is called the unmatched weighted position for that zone.

The matched weighted positions between zones are multiplied by the percentage risk factor corresponding to the relevant adjacent zones. The risk factors for adjacent offsetting zones are provided in Table VI. To arrive at the matched weighted positions between zones, the unmatched weighted positions of a zone may be offset against positions in other zones as follows.

<sup>157</sup> For example, if the sum of the weighted longs in a time-band is \$100 million and the sum of the weighted shorts is \$90 million, the basis risk charge for the time-band is 10% of \$90 million, or \$9 million.

- (a) The unmatched weighted long (short) position in zone 1 may offset the unmatched weighted short (long) position in zone 2. The extent to which unmatched weighted positions in zones 1 and 2 are offset is described as the matched weighted position between zones 1 and 2.
- (b) Then, any residual unmatched weighted long (short) positions in zone 2 may then be matched by offsetting unmatched weighted short (long) positions between zone 2 and zone 3<sup>158</sup>.
- (c) Then, any residual unmatched weighted long (short) positions in zone 1 may then be matched by offsetting unmatched weighted long (short) positions in zone 3. The extent to which the unmatched positions in zones 1 and 3 are offsetting is described as the matched weighted positions between zones 1 and 3.

The yield curve risk charges, like the basis risk charges, are absolute values that are summed and included as an element of the general market risk capital requirement.

**TABLE VI**

**Zonal Disallowances**

<b>Zone</b>	<b>Time-Band</b>	<b>Within the zone</b>	<b>Between adjacent zones</b>	<b>Between zones 1-3</b>
1	0-1 month	40%	40%	100%
	1-3 months			
	3-6 months			
	6-12 months			
2	1-2 years	30%	40%	
	2-3 years			
	3-4 years			
3	4-5 years	30%	40%	
	5-7 years			
	7-10 years			
	10-15 years			
	15-20 years			
	over 20 years			

<sup>158</sup> For example, if the unmatched weighted position for zone 1 was long \$100 and for zone 2 was short (\$200), the capital charge for the matched weighted position between zone 1 and 2 would be 40% of \$100, or \$40. The residual unmatched weighted position in zone 2 (\$100) also could have been carried over to offset a long position in zone 3 and would have attracted a 40% charge.

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The net position charge for interest rate position risk in a currency is the absolute value of the sum of the weighted net open positions in each time band.



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## Appendix 8-III - Position Reporting for General Market Risk Calculations

### *Debt instruments*

Fixed-rate instruments are allocated according to the remaining term to maturity and floating-rate instruments according to the next repricing date. A callable bond that has a market price above par is slotted according to its first call date, while a callable bond with a market price below par is slotted according to remaining maturity. Mortgage-backed securities are slotted according to their final maturity dates.

### *Interest rate derivatives*

Debt derivatives and other off-balance sheet positions whose values are affected by changes in interest rates are included in the measurement system described above, except for options and the associated underlying instrument (the measurement system for options is described later). A summary of the treatment for debt derivatives is set out in the following table.

Derivatives are converted into positions in the relevant underlying instrument and are included in the calculation of specific and general market risk capital charges as described above. The amount to be included is the market value of the principal amount of the underlying instrument or of the notional underlying. For instruments where the apparent notional amount differs from the effective notional amount, an institution must use the effective notional amount.

Futures and forward contracts (including FRAs) are broken down into a combination of a long position and short position in the notional security. The maturity of a future or a FRA is the period until delivery or exercise of the contract, plus the life of the underlying instrument.<sup>159</sup> Where a range of instruments may be delivered to fulfil the contract, the institution may choose which deliverable instrument goes into the maturity ladder as the notional underlying instrument. In the case of a future on a corporate bond index, positions are included at the market value of the notional underlying portfolio of securities.

Although an FRA is closely analogous to an interest rate future, the words "buyer" and "seller" when used in reference to FRAs have the opposite meaning to that used in the financial futures market. The "buyer" of an FRA is fixing the interest rate on a deposit that it will receive in the future. Hence, if interest rates rise, the buyer of an FRA receives the difference between the contracted rate and the new (higher) rate from the seller; that is the buyer makes a gain. Thus, an institution wishing to hedge against a rise in interest rates may buy an FRA or sell an interest rate future.

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<sup>159</sup> For example, assuming an April 30 reporting date, a long position in a June three-month bankers acceptance future (BAX) is recorded as a long position maturing in five months and a short position maturing in two months.

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<b>Position Reporting for the Maturity Method</b>				
<b>Instrument Type</b>	<b>First Reporting Leg</b>		<b>Second Reporting Leg</b>	
	<b>Amount</b>	<b>Report According to:</b>	<b>Amount</b>	<b>Report According to:</b>
<b>Interest Rate Swaps:</b>				
Pay Fixed	- NP	Maturity Date	+ NP	Next Settlement Date: Pay
Receive Fixed	+ NP	Maturity Date	- NP	Next Settlement Date: Receive
<b>Forward Rate Agreements:</b>				
Buy (i.e., short)	- NP	Maturity Date	+ NP	Value Date
Sell (i.e., long)	+ NP	Maturity Date	- NP	Value Date
<b>3-month BAX Futures:</b>				
Buy	+ NP	Maturity Date + 3 months	- NP	Maturity Date
Sell	- NP	Maturity Date + 3 months	+ NP	Maturity Date
<b>Gov't Bonds and Notes</b>	+ NP	Maturity Date		
<b>Cross Currency Swaps:</b>				
Received Floating	+ NP	Value Date + Frequency**		
Pay Floating	- NP	Value Date + Frequency**		
Receive Fixed	+ NP	Maturity Date		
Pay Fixed	- NP	Maturity Date		
<b>FX Forwards</b>	+ NP (Buy)	Value Date	- NP (Sell)	Value Date

NP = Notional principal in relevant currency

\*\* Starting with the value date, move forward in intervals according to the frequency of payments (e.g., 3M, 6M, or 1YR)

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Swaps are treated as two notional positions in the relevant instruments with appropriate maturities. The receiving side is treated as the long position and the paying side is treated as the short position.<sup>160</sup> The separate sides of cross-currency swaps or forward foreign exchange transactions are slotted in the relevant maturity ladders for the currencies concerned. For swaps that pay or receive a fixed or floating interest rate against some other reference price, for example, an equity index, the interest rate component is slotted into the appropriate repricing maturity category, with the long or short position attributable to the equity component being included in the equity framework set out above.<sup>161</sup>

An institution may offset long and short positions (both actual and notional) in identical derivative instruments with exactly the same issuer, coupon, currency, and maturity before slotting these positions into time-bands. A matched position in a future and its corresponding underlying may also be fully offset and, thus, excluded from the calculation, except when the future comprises a range of deliverable instruments. However, in cases where, among the range of deliverable instruments, there is a readily identifiable underlying instrument that is most profitable for the trader with a short position to deliver, positions in the futures contract and the instrument may be offset. No offsetting is allowed between positions in different currencies.

Offsetting positions in the same category of instruments can, in certain circumstances, be regarded as matched and treated by the institution as a single net position that should be entered into the appropriate time-band. To qualify for this treatment, the positions must be based on the same underlying instrument, be of the same nominal value, and be denominated in the same currency. The separate sides of different swaps may also be "matched" subject to the same conditions. In addition:

- For futures, offsetting positions in the notional or underlying instruments to which the futures contract relates must be for identical instruments and the instruments must mature within seven days of each other;
- For swaps and FRAs, the reference rate (for floating rate positions) must be identical and the coupon closely matched (i.e., within 15 basis points); and
- For swaps, FRAs and forwards, the next interest reset date, or for fixed coupon positions or forwards, the remaining maturity must correspond within the following limits: If the reset (remaining maturity) dates occur within one month,

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<sup>160</sup> For example, an interest rate swap under which an institution is receiving floating-rate interest and paying fixed is treated as a long position in a floating rate instrument with a maturity equivalent to the period until the next interest reset date and a short position in a fixed-rate instrument with a maturity equivalent to the remaining life of the swap.

<sup>161</sup> An institution with a large swap book may, subject to review by OSFI, use alternative formulae to calculate the positions to be included in the maturity ladder. For example, an institution could first convert the payments required by the swap into present values. For that purpose, each payment would be discounted using zero coupon yields, and the payment's present value entered into the appropriate time-band using procedures that apply to zero (or low) coupon bonds. The net amounts would then be treated as bonds, and slotted into the general market risk framework. Such alternative treatments will, however, only be allowed if: (i) OSFI is fully satisfied with the accuracy of the system being used, (ii) the positions calculated fully reflect the sensitivity of the cash flows to interest rate changes; and (iii) the positions are denominated in the same currency.

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then the reset dates must be on the same day; if the reset dates occur between one month and one year later, then the reset dates must occur within seven days of each other, or if the reset dates occur over one year later, then the reset dates must occur within thirty days of each other.

Interest rate and currency swaps, FRAs, forward foreign exchange contracts and interest rate futures are not subject to a specific risk charge. This exemption also applies to futures on a short-term (e.g., 3-month Bankers Acceptance rate) interest rate index. However, in the case of futures contracts where the underlying is a debt security, or an index representing a basket of debt securities, a specific risk charge will apply according to the category of the issuer.



## Appendix 8-IV - Sample Steps in the Calculation of General Market Risk for Debt Instruments using the Maturity Method

A hypothetical institution has the following given positions designated as trading:

(a) Qualifying bond, \$13.33 million market value, remaining maturity 8 years, coupon 8%.

(b) Government bond, \$75 million market value, remaining maturity 2 months, coupon 7%.

(c) Interest rate swap, \$150 million, institution receives floating rate interest and pays fixed, next interest reset after 12 months, remaining life of swap is 8 years (assumes the current interest rate is identical to the one the swap is based on).

(d) Long position in interest rate future, \$50 million, delivery date after 6 months, life of underlying government security is 3.5 years (assumes the current interest rate is identical to the one on which the swap is based).

The institution would record these instruments as positions in a maturity ladder as shown below:

Zone	Time-band	Position for Instruments: in \$ millions				Risk Weights [%]	Risk Weighted Long Positions \$ millions	Risk Weighted (Short) positions \$ millions
		A	B	C	D			
1	0-1 mth					0.00	0.15	(0.20)
	1-3 mth	\$75				0.20		
	3-6 mth					0.40		
	6-12 mth					0.70		
2	1-2 years					1.25	1.125	
	2-3 years					1.75		
	3-4 years	\$50				2.25		
3	4-5 years					2.75	0.50	(5.625)
	5-7 years					3.25		
	7-10 years	\$13.33	(\$150)			3.75		
	10-15 years					4.50		
	15-20 years					5.25		
	>20 years					6.00		

Each position would be multiplied by the risk weight corresponding to the time band in which it is recorded. The risk-weighted long and risk weighted short positions in each maturity band are the basis of calculating the general market risk capital charges.

The first step in the process of calculating general market risk is to calculate a 10% basis risk charge on the matched weighted position in each time band. In this example, there are partially offsetting long and short positions in the 7-10 year time-band, the matched portion of which is equal to \$500,000 (i.e., 0.50 million). Ten percent of this matched portion is equal to \$50,000 [ $.10 \times 0.50 = 0.05$  (\$50,000)].

In \$ millions					
Zone	Time-band	Risk Weighted Long Positions	Risk Weighted (Short) Positions	Unmatched Weighted Position	Step 1 10% Basis risk charge
1	0-1 mth	0.15	(0.20)	0.15	n/a
	1-3 mth			(0.20)	n/a
	3-6 mth	1.05		1.05	n/a
	6-12 mth				
2	1-2 years	1.125		1.125	n/a
	2-3 years				
	3-4 years				
3	4-5 years	0.50	(5.625)	(5.125)	0.050
	5-7 years				
	7-10 years				
	10-15 years				
	15-20 years				
	>20 years				
<b>TOTAL</b>					<b>0.05</b>

Step 2 requires the calculation of the yield curve risk charge. The yield curve risk charge is calculated on the matched weighted position in each zone using the percentage risk factors in the table below. In this example, a charge would be calculated for zone 1 (step 2(a)). It would be 40% of the total offsetting in the zone --  $40\% \times 0.20 = 0.08$  (\$80,000). No charge is required if offsetting does not occur within a zone.

Zone	Time-band	Unmatched Weighted Positions	Step 2(a) 30% to 40% of Matched weighted Zone position	Step 2(b) 40% to 100% Matched between Zones
1	0-1 mth	0.15 (0.20) 1.05		
	1-3 mth			
	3-6 mth			
	6-12 mth			
Zone 1 totals		long 1.20 short (0.20) unmatched 1.00	<b>0.08</b> =.20 x 40%	n/a [Zone 1 & 2 net totals are both long]
2	1-2 years	1.125		
	2-3 years			
	3-4 years			
Zone 2 totals		long 1.125	n/a	<b>0.45</b> = 40% x the lesser of 1.125 and 5.125 Charge on the offsetting between Zone 2 (long) and Zone 3 (short)]
3	4-5 years	(5.125)		
	5-7 years			
	7-10 years			
	10-15 years			
	15-20 years			
	>20 years			
Zone 3 total		short (5.125)	n/a	<b>1.0</b> = 100% x 1.00 [Charge on the offsetting between Zone 1 and Zone 3]

In step 2(b), the yield curve risk charges on matching between residual unmatched weighted positions in the three zones are calculated. Zone 1 and zone 2 are offset, if possible, reducing or eliminating the unmatched weighted positions in zone 1 and zone 2, as appropriate. Zone 2 and zone 3 are then offset, if possible, reducing or eliminating the unmatched weighted position in zone 2 or zone 3, as appropriate. Zone 3 and zone 1 are then offset, if possible, reducing or eliminating the unmatched weighted position in zone 3 and zone 1, as appropriate. A capital requirement is calculated as a percentage of the position eliminated by the inter-zone offsetting.

In the example, a charge would be calculated for adjacent zones 2 and 3 (step 3). It would be 40 % of the matched weighted positions between the zones --  $40\% \times 1.125 = 0.45$  (\$450,000). A charge would be calculated between zones 1 and 3 (step 3). It would be 100 % of the matched positions between the zones --  $100\% \times 1.00 = 1.00$  (\$1,000,000).

Step 3 calculates a net position charge equal to the residual unmatched weighted position. In this example this amounts to \$3 million [being the absolute value of the sum of  $0.15 - .20 + 1.05 + 1.125 - 5.125 = -3.00$ ] and would be included as the net position charge for general market risk.

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The total capital requirement for general market risk for this portfolio would be:

1. Basis risk charge

$\Sigma$	Matched weighted positions in all time bands	50,000
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2. Yield curve risk charge

$\Sigma$	Matched weighted positions in zone 1	80,000
$\Sigma$	Matched weighted positions in zone 2	n/a
$\Sigma$	Matched weighted positions in zone 3	n/a
$\Sigma$	Matched weighted positions between zones 1 and 2	n/a
$\Sigma$	Matched weighted positions between zones 2 and 3	450,000
$\Sigma$	Matched weighted positions between zones 1 and 3	1,000,000

3. Net position charge

$\Sigma$	Residual unmatched weighted positions	<u>3,000,000</u>
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TOTAL GENERAL MARKET RISK	<u>\$4,580,000</u>
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## Appendix 8-V - Summary of Specific and General Market Risk Charges for Interest Rate Derivatives

INSTRUMENT	SPECIFIC RISK CHARGE  (Relating to the issuer of the instrument. There remains a separate capital requirement for counterparty credit risk.)	GENERAL MARKET RISK CHARGE
<b>EXCHANGE-TRADED FUTURE</b>		
Government security	No	Yes, as two positions
Corporate debt security	Yes	Yes, as two positions
Index on short-term interest rates (e.g., Bankers Acceptances)	No	Yes, as two positions
<b>OTC FORWARD</b>		
Government security	No	Yes, as two positions
Corporate debt security	Yes	Yes, as two positions
Index on short-term interest rates	No	Yes, as two positions
FRAs, Swaps	No	Yes, as two positions
Forward foreign exchange	No	Yes, as one position in each currency
<i>Options</i>		For each type of transaction, either:
Government security	No	Carve out together with the associated hedging positions
		- simplified approach
		- scenario analysis
- internal models		
Corporate debt security	Yes	Same as above
Index on short-term interest rates	No	Same as above

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### *General market risk – credit derivatives*

General market risk for credit derivatives is calculated using the same methodology as that used for cash market debt instruments as described in this guideline. As a result, the combinations for general market risk charges are more limited than those combinations relating to specific risk.

Most credit default products do not create a general market risk position for either the guarantor or the beneficiary, since they are written against one counterparty's potential default. There is no risk exposure to market movements.

Total rate of return products create a long or short position in the reference asset as well as a short or long position in the notional bond representing the interest rate related leg of the contract. These positions should be incorporated into a maturity ladder using standardized risk weights that approximate the price sensitivity of the instruments. Long or short positions in reference assets that are created on account of total rate of return products are eligible for netting using the same treatment as for other asset positions in the maturity ladder calculation.

Credit-linked note products create a long position in the note itself but the position is only applied to the note purchaser (i.e., the guarantor).

#### **8.10.2. Equities risk**

This section sets out the minimum capital associated with an institution's risk of holding or taking positions in equities within the trading book. An institution which holds equity positions (whether long or short) in the trading book is exposed to the risk that the value of individual equity positions relative to the market may move against the institution - specific risk- and that the equity market as a whole may move against it - general risk. The specific risk requirements recognize that individual equities are subject to issuer risk and liquidity risk, and that these risks may be reduced by portfolio diversification. The general risk requirements set out in this section recognize offsetting positions within national markets. A separate subsection for equity derivatives positions outlines the method for including them in the capital calculation.

Equity risk capital requirements will apply to positions and exposures in the trading book on the following instruments:

- common shares,
- convertible preference shares or securities,
- convertible debt securities which convert into equity instruments and are trading as equities<sup>162</sup>,
- depository receipts,

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<sup>162</sup> See section 8.10.1. for the definition of when a convertible security is trading like an equity.

- 
- any other instruments exhibiting equity characteristics, and
  - equity derivatives or derivatives based on above securities.

Non-convertible preference shares are to be excluded from these calculations, as they are covered by the interest rate risk requirements described in section 8.10.1.

Equity positions should be allocated to the country in which each equity is listed and the calculations outlined below applied to each country. Equity securities listed in more than one country must be allocated to either (i) the country where the issuer is incorporated and listed or, (ii) the country where the security was purchased or sold, but not both. Switching between countries is not permitted and any foreign exchange position resulting from a long or short position in an equity listed in a country other than Canada must be included in the calculation of the foreign exchange risk capital requirement. Conversion into the institution's reporting currency should be done at current spot foreign exchange rates.

Matched positions in each identical equity or stock index in each country may be fully offset, resulting in a single net short or long position to which the specific and general market risk charges will apply.

#### *8.10.2.1. Specific risk*

The measurement of specific risk capital requirements is calculated on the basis of the institution's gross equity positions. The gross position is the sum of the absolute value of all short equity positions and all long equity positions, including positions arising from derivatives, calculated at the current market value. Long and short positions in the same share issue may be reported on a net basis. The specific risk capital requirement for equity positions is 8% of this sum.

#### *8.10.2.2. General market risk*

To calculate general market risk, long and short positions in equity instruments are offset to arrive at a net position. Instruments are valued at current market and a net position must be separately calculated for each country in which the institution holds equity instruments. The capital requirement for general market risk is 8% of the net position for each country.

#### *8.10.2.3. Equity derivatives*

Equity derivatives and other off-balance sheet positions that are affected by changes in equity prices are included in the measurement system (except for equity options, equity index options, and the associated underlying).<sup>163</sup> This includes futures and swaps on both individual equities and on equity indices. Equity derivatives should be converted into notional equity positions in

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<sup>163</sup> Where equities are part of a forward contract (both equities to be received or to be delivered), any interest rate or foreign currency exposure from the other side of the contract should be included in the measurement systems in sections 8.10.1 or 8.10.2, as appropriate.



the relevant underlying instrument. A summary of the rules for equity derivatives is set out in Appendix 8-VI.

### *Calculation of positions*

In order to calculate the specific and general market risk, positions in derivatives should be converted into notional equity positions as follows:

- futures and forward contracts relating to individual equities should be reported at current market price of the underlying;
- futures relating to stock indices should be reported as the marked-to-market value of the notional underlying equity portfolio;
- equity swaps are to be treated as two notional positions; and
- equity options should be carved out together with the associated underlyings and treated under section 8.10.5.

### *Risk in relation to an index*

A specific risk capital charge of 2% applies to the net long or short position in a contract on an index listed in Table I below. This capital charge is intended to cover factors such as divergence from the general market level and execution risk. The 2% risk weight is to apply only to well diversified indices and not, for example, to sectoral indices. Positions in indices not listed in Table I must either be decomposed into their component shares, or be treated as a single position based on the sum of current market values of the underlying instruments; if treated as a single position, the specific risk requirement is the highest specific risk charge that would apply to any of the index's constituent shares. An institution's position in an index contract is also subject to an 8% general market risk charge.

<b>TABLE I</b>			
<b>MARKET INDICES</b>			
Australia	S&P/ASX 200	Netherlands	EOE 25
Austria	ATX	Spain	IBEX 35
Belgium	BEL 20	Sweden	OMX
Canada	S&P/TSX 60	Switzerland	SMI
France	CAC 40	United Kingdom	FTSE 100
Germany	DAX	United Kingdom	FTSE mid-250
Japan	Nikkei 25	United States	S&P 500

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### *Futures arbitrage*

In the case of futures-related arbitrage strategies, the 2% specific risk charge described above may be applied to only one index with the opposite position exempt from a capital charge (both the specific and general market risk capital charges). The strategies qualifying for this treatment are:

- when the institution takes an opposite position in exactly the same index future at different dates; and
- when the institution has an opposite position in different but similar indices at the same date, subject to supervisory oversight.

If an institution engages in a deliberate arbitrage strategy, in which a futures contract on a well-diversified<sup>164</sup> equity index matches a basket of securities, it may exclude both positions from their respective specific and general risk charges on condition that the trade has been deliberately entered into and separately controlled and the composition of the basket of stocks represents at least 90% of the market value of the index.

In such a case, there will be a minimum capital requirement of 4% (that is, 2% of the gross value of the positions on each side) to reflect risk associated with executing the transaction. This applies even if all of the securities comprising the index are held in identical proportions. Any excess value of the securities comprising the basket over the value of the futures contract or excess value of the futures contract over the value of the basket is treated as an open long or short position.

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<sup>164</sup> A portfolio that is well-diversified is characterized by a limited sensitivity to price changes of any single equity issue or closely related group of equity issues held in the portfolio. The volatility of the portfolio's value should not be dominated by the volatility of any individual equity issue or by equity issues from any single industry or economic sector.

## Appendix 8-VI - Summary of Treatment for Equity Derivatives

<b>INSTRUMENT</b>	<b>SPECIFIC RISK</b> (relating to the issuer of the instrument. There remains a separate capital requirement for counterparty credit risk)	<b>GENERAL MARKET RISK</b>
<b>FUTURES, SWAPS, &amp; SIMILAR OTC CONTRACTS</b>		
Individual equity Index	Yes 2.0%	Yes, as underlying Yes, as underlying
<b>OPTIONS</b>		
Individual equity Index	Yes 2.0%	Carve out from equity position risk framework together with the associated hedging positions and apply: <ul style="list-style-type: none"> <li>• simplified approach; or</li> <li>• scenario approach; or</li> <li>• internal models.</li> </ul>

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### 8.10.3. *Foreign exchange position risk*

This section sets out a shorthand method for calculating the minimum capital required to cover the risk of holding or taking a position in foreign currencies including gold. Institutions with significant foreign exchange positions are encouraged to use internal models.

The capital requirement for foreign exchange risk is applied to the entire business, both the trading and non-trading books. Two steps are required to calculate the capital requirement for foreign exchange risk. The first is to measure the exposure in a single currency position. The second is to calculate the capital requirement for the portfolio of positions in different currencies. In summary, the capital charge is 8% of the greater of the sum of (i) the net open long positions or (ii) the net open short positions in each currency, plus the net open position in gold, whatever the sign.<sup>165</sup>

#### 8.10.3.1. *Measuring the exposure in a single currency*

The net open position for each individual currency (and gold) is calculated by summing:

- the net spot position (i.e., all asset items less all liability items, including accrued interest and accrued expenses, denominated in the currency in question),
- the net forward position (i.e., all net amounts under forward foreign exchange transactions, including currency futures and the principal on currency swaps),
- guarantees (and similar instruments) that are certain to be called and are likely to be irrecoverable,
- net future income/expenses not yet accrued but already fully hedged (at the discretion of the reporting institution), and
- any other item representing a profit or loss in foreign currencies.

Options on foreign exchange are treated separately; see section 8.10.5. of this chapter.

#### *Treatment of immaterial operations*

Foreign exchange risk is assessed on a consolidated basis. It may be technically impractical in the case of immaterial operations to include some currency positions. In such cases, the internal limit in each currency may be used as a proxy for the positions, provided there is adequate ex post monitoring of actual positions complying with such limits. In these circumstances, the limits should be added, regardless of sign, to the net open position in each currency.

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<sup>165</sup> Gold is treated as a foreign exchange position rather than a commodity because its volatility is more in line with foreign currencies and institutions manage it in a manner similar to foreign currencies.

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### *Measurement of forward currency positions*

Forward currency positions should be valued at current spot market exchange rates. It would be inappropriate to use forward exchange rates since, to some extent they reflect current interest rate differentials. Institutions that base their normal management accounting on net present values are expected to use the net present values of each position, discounted using current interest rates and translated at current spot rates, for measuring their forward currency and gold positions.

### *Accrued and unearned interest, income and expenses*

Accrued interest, accrued income and accrued expenses should be treated as a position if they are subject to exchange rate fluctuations. Unearned but expected future interest, income or expenses may be included, provided the amounts are certain and have been fully hedged by forward foreign exchange contracts. Institutions must be consistent in their treatment of unearned interest, income and expenses and must have written policies covering the treatment. The selection of positions that are only beneficial to reducing the overall position will not be permitted.

### *Structural positions*

Structural positions and related hedges will be exempt from the calculation of net open currency positions. Structural positions may include any of the following:

- any position arising from an instrument that qualifies to be included in an institution's capital base
- any position entered into in relation to the net investment of a capital nature in foreign operation, the accounting consequence of which is to reduce or eliminate what would otherwise be a movement in the foreign currency translation reserve
- investments in foreign operations that are fully deducted from an institution's capital for capital adequacy purposes

#### *8.10.3.2. Calculating the capital requirement for the portfolio*

The nominal amount (or net present value) of the net open position in each foreign currency (and gold) is converted at spot rates into Canadian dollars. The capital charge is 8% of the overall net open position calculated as the sum of:

- the greater of the sum of the net open short positions or the sum of the net open long positions (absolute values), and
- the net open position in gold, either long or short, regardless of sign

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#### 8.10.3.3. *Foreign exchange de minimus criteria*

An institution doing negligible business in foreign currency, and that does not take foreign exchange positions for its own account, may be exempted from the capital requirement for foreign exchange risk provided that:

- Its foreign currency business, defined as the greater of the sum of its gross long positions and the sum of its gross short positions in all foreign currencies, does not exceed 100% of eligible capital, and
- Its overall net open foreign exchange position does not exceed 2% of its eligible capital.

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## Appendix 8-VII - Example of the Shorthand Measure of Foreign Exchange Risk

Institution A has the following net currency positions. These open positions have been converted at spot rates to the reporting currency, in this case Canadian dollars, (+) signifies a long position and (-) signifies a short position.

**Table I**

<b>YEN</b>	<b>Euro</b>	<b>GB£</b>	<b>CHF</b>	<b>US\$</b>	<b>GOLD</b>
+50	+100	+150	-20	-180	-35
+300			-200		-35

In this example, the institution has three currencies in which it has long positions, these being the Japanese Yen, the Euro and the British Pound, and two currencies in which it has a short position, the Swiss Franc and the U.S. Dollar. The middle line of the above chart shows the net open positions in each of the currencies. The sum of the long positions is +300. The sum of the short positions is -200.

The foreign exchange market risk is calculated using the higher of the summed absolute values of either the net long or short positions, and the absolute value for the position in gold. The capital charge is 8%. In this example, the total long position (300) would be added to the gold position (35) to give an aggregate position of 335. The aggregated amount multiplied by 8% would result in a capital charge of \$26.80.



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#### 8.10.4. *Commodities risk*

This section provides a minimum capital requirement to cover the market risk of holding or taking positions in commodities, including precious metals but excluding gold (gold is treated as a foreign currency). Institutions conducting a limited amount of commodities business may use the simplified measurement method that is comprised of a capital charge on the net and gross position in each category of commodity. This method is set out below. All other institutions must adopt an internal model system that conforms to criteria set out in section 8.11.

##### 8.10.4.1. *Net position requirement*

Under the simplified method, each long and short commodity position (spot and forward) is expressed in terms of the standard unit of measurement (such as barrels, kilos, or grams). The open positions in each category<sup>166</sup> of commodities are then converted at current spot rates into Canadian dollars, with long and short positions offset to arrive at the net open position in each commodity. Positions in different categories of commodities may not be offset. The base capital requirement is 15% of the net open position, long or short, in each commodity.<sup>167</sup>

##### *Gross position requirement*

To protect an institution against basis risk, interest rate risk, and forward gap risk, each category of commodity is also subject to a 3% capital requirement on the institution's gross positions, long plus short, in the particular commodity.

##### *Calculation of positions*

Commodity derivatives and other off-balance-sheet positions that are affected by changes in commodity prices are included in the measurement system (except for options and the associated underlying instrument - refer to Appendix 8-VIII for a description of their treatment). Commodity derivatives are converted into notional commodity positions using the current spot price.

#### 8.10.5. *Options*

Options contracts and related hedging positions in the associated underlying instrument, commodity or index, cash or forward, are subject to capital requirements as calculated in this section. The capital requirements calculated under this section should then be added to the

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<sup>166</sup> Commodities that are deliverable against each other or that are close substitutes with a minimum correlation of ninety percent between price movements are considered to be part of the same category.

<sup>167</sup> When the funding of a commodity position opens an institution to interest rate or foreign exchange exposure, the relevant positions should be included in the measures of interest rate and foreign exchange risk described in sections 8.10.1. and 8.10.2. When a commodity is part of a forward contract, any interest or foreign currency exposure from the other side of the contract should be appropriately included in the measurement systems in sections 8.10.1. and 8.10.2.

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capital requirements for debt securities, equities, foreign exchange, and commodities risk as appropriate. Two alternatives to measuring the market risk for options activities are available under the standardized approach:

- institutions which solely use purchased options may use the *simplified method*
- institutions which also write options must use the *scenario method*<sup>168</sup>

The more significant an institution's trading in options, the more sophisticated the approach an institution will be expected to use. Institutions doing business in certain classes of exotic options (e.g., barriers and digitals) may be required to use the internal models alternative as set out in section 8.11.

Regardless of the method used, specific risk related to the issuer of an instrument still applies to options positions for equities, equity indices and corporate debt securities.

In addition to these market risk charges, purchased options remain subject to the credit risk capital requirements specified in chapter 3.

#### 8.10.5.1. *Simplified method*

An institution that has only a limited amount and range of purchased options may use the simplified method set out in Table I for individual options positions. These options positions are subject to the separate capital charges specified in Table I and are not included in the standardized calculation of specific and general market risk specified in the preceding sections. A charge must be calculated for each individual option in which the institution has a position.

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<sup>168</sup> Unless all their written option positions are hedged by perfectly matched long positions in exactly the same options, in which case there is no capital requirement for market risk.

**Table I**

<b>Simplified Method: Capital Charges</b>	
<b>Position</b>	<b>Treatment</b>
Long the underlying and Long the put  or Short the underlying and Long the call	The capital charge will be the market value of the underlying instrument <sup>169</sup> multiplied by the sum of specific and general market risk charges <sup>170</sup> specified in the preceding sections for the underlying less the amount the option is in the money (if any) bounded at zero <sup>171</sup>
Long call  or Long put	The capital charge will be the lesser of:  (i) the market value of the underlying instrument multiplied by the sum of specific and general market risk charges (refer to footnote 28) for the underlying  (ii) the market value of the option <sup>172</sup>

As an example of how the calculation in Table I would work, if a holder of 100 shares currently valued at \$10 each has an equivalent put option with a strike price of \$11, the capital charge would be:  $\$1,000 \times 16.0\%$  (e.g., 8.0% specific plus 8.0% general market risk) = \$160, less the amount the option is in the money  $(\$11 - \$10) \times 100 = \$100$ , i.e., the capital charge would be \$60. A similar methodology applies for options whose underlying is a foreign currency, a debt security or a commodity. However, in the case of options on foreign exchange and options on commodities, only the risk factor for general market risk will be applied to the relevant options position.

<sup>169</sup> In some cases such as foreign exchange, it may be unclear which side is the "underlying instrument"; this should be taken to be the asset that would be received if the option were exercised. In addition the nominal value should be used for items where the market value of the underlying instrument could be zero, e.g., caps and floors and swaptions, etc.

<sup>170</sup> To determine the appropriate specific risk and general market risk factors, refer to the preceding sections on interest rate positions risk, equity risk, foreign exchange risk and commodity risk. Some options (e.g., where the underlying is an interest rate, a currency or a commodity) bear no specific risk but specific risk will be present in the case of options on certain interest rate related instruments (e.g., options on a corporate debt security or corporate bond index) and for options on equities and stock indices (see the section on equity position risk). Accordingly, the combined charge under this measure for currency options will be 8% and for options on commodities, 15% (the additional 3% charge is not added because options are not netted).

<sup>171</sup> For options with a residual maturity of more than six months, the strike price should be compared with the forward, not current, price. An institution unable to do this must take the in the money amount to be zero.

<sup>172</sup> Where the position does not fall within the trading book (i.e., options on certain foreign exchange or commodities positions not belonging to the trading book), it may be acceptable to use the book value instead.

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#### 8.10.5.2. Scenario method

Under the scenario method, an institution is required to make separate calculations of the specific risk and general market risk of options and their related hedging positions. Specific risk charges must be calculated on each issue in which the institution has a net option position that is subject to interest rate risk or to equity risk. General risk charges are calculated on portfolios of options (groupings are set out below).

The scenario method uses simulation techniques to calculate changes in the value of an options portfolio for changes in the level and volatility of the prices of its associated underlying instruments. Under this approach, the general market risk charge is determined by the scenario "matrix" (i.e., the specified combination of underlying and volatility changes) that produces the largest loss. The total general market risk capital requirement for all option portfolios is the sum of the largest losses of individual option portfolios.

In addition to the general market risk of its interest rate and equity options portfolios, institutions using the scenario method are required to calculate the specific risk of these options using the same basic methodology in the preceding sections on interest rate position risk and equity risk.

##### *Calculating the general market risk*

An institution constructs a two-dimensional matrix for each of its options portfolios. Options portfolios include options and any related hedging positions grouped together as follows:

- for interest rates, options on underlying instruments whose residual maturity is bounded by one of at least six groups of time bands from Table II of this section where no more than three contiguous time bands are grouped together,
- for equities and equity indices, each national market,
- for foreign currencies and gold, each currency pair and gold, and
- for commodities, each individual commodity.

The first dimension of each matrix requires the institution to evaluate the portfolio over a specified range above and below the current value of the underlying instrument, commodity, or index. For interest rates the range is consistent with the assumed changes in yield for the time bands in Table II. Institutions should use the highest of the assumed changes in yield applicable to the time bands that it groups together. The time bands and assumed changes in yield are:

**Table II**

<b>Time band</b>	<b>Assumed changes in yield</b>	<b>Time band</b>	<b>Assumed changes in yield</b>
up to 1 month	1.00	3 up to 4 years	0.75
1 up to 3 months	1.00	4 up to 5 years	0.75
3 up to 6 months	1.00	5 up to 7 years	0.70
6 up to 12 months	1.00	7 up to 10 years	0.65
1 up to 2 years	0.90	10 up to 15 years	0.60
2 up to 3 years	0.80	15 up to 20 years	0.60
		over 20 years	0.60

The other ranges are  $\pm 8\%$  for equities,  $\pm 8\%$  for foreign exchange and gold, and  $\pm 15\%$  for commodities.

For all option portfolios, at least seven observations (including the current observation) should be used to divide the range into equally spaced intervals.

The second dimension of the matrix entails a change in the volatility of the underlying rate or price equal to  $\pm 25\%$  of the current volatility.<sup>173</sup>

The application of the scenario method, particularly regarding the precise way the analysis is constructed, will be subject to review by OSFI. An institution using the scenario method should meet the appropriate qualitative standards set forth in the section on the internal models approach.

*Calculating the specific risk of options on debt and equity securities*

The specific risk charge for options on debt securities is calculated by multiplying the market value of the effective notional amount of the debt instrument that underlies an option by:

- the option's delta; and
- by the specific risk factors in Table I of section 8.10.1.I that correspond to the category and residual term of the underlying debt instrument.

<sup>173</sup> For example, if the underlying of an equity instrument has a current market value of \$100 and a volatility of 20%, the first dimension of the grid would range from \$92 to \$108, divided into eight intervals of \$2.00 and the second dimension would assume volatility stays at 20%, increases to 25% ( $20\% + (.20 \times .25)$ ) and decreases to 15% ( $20\% - (.20 \times .25)$ ).

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The specific risk charge for options on equity securities and options on an equity index is calculated by multiplying the market value of the effective notional amount of the equity instrument or equity index that underlies an option by:

- the option's delta; and

then by:

- 8%, **or**
- 2% if the option is based on an index of equities.

The effective notional amount of an option is the market value of the stated underlying debt or equity instrument or equity index adjusted to reflect any multiplier applicable to the contract's reference rate(s) or, where there is no multiplier component, simply, the market value of the stated underlying debt or equity instrument or the notional amount underlying an option on an equity index.

## Appendix 8-VIII - Example of Options Scenario Matrices

A hypothetical institution has purchased and sold options on Canadian interest rates, and options to purchase and sell U.S. dollars with Canadian funds. The institution might use the scenario approach to calculate the general market risk of these options portfolios by calculating the following matrices.

### 1) Options on instruments maturing up to 3 months

<b>Yield</b>	- 100 basis points	- 66 basis points	- 33 basis points	Current Yield	+ 33 basis points	+ 66 basis points	+ 100 basis points
<b>Volatility</b>							
+ 25%	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss
Current % Volatility	gain/loss	gain/loss	gain/loss	market value	gain/loss	gain/loss	gain/loss
- 25%	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss

Repeat the interest rate matrix above for each of the following:

Group of maturity bands	Assumed yield changes in basis points
2) 3 up to 6 months	100
3) 6 up to 12 months	100
4) 1 up to 4 years	90
5) 4 up to 10 years	75
6) 10 years and over	60

### 7) Options on Canada/U.S. dollar exchange rate

<b>Exchange Rate</b>	-8 %	-5.33%	-2.67%	Current Exchange Rate	+2.67%	+5.33%	+8%
<b>Volatility</b>							
+ 25%	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss
Current % Volatility	gain/loss	gain/loss	gain/loss	market value	gain/loss	gain/loss	gain/loss
- 25%	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss	gain/loss



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## 8.11. Models

### 8.11.1. *General criteria*

The use of an internal model will be conditional upon the explicit approval of OSFI. OSFI will only give its approval if at a minimum:

- It is satisfied that the institution's risk management system is conceptually sound and is implemented with integrity,
- The institution has sufficient numbers of staff skilled in the use of sophisticated models not only in the trading area but also in the risk control, audit, and if necessary, back office areas,
- The institution's models have in OSFI's judgement a proven track record of reasonable accuracy in measuring risk, and
- The institution regularly conducts stress tests along the lines indicated in section 8.11.6.

The institution must be able to satisfy OSFI that the period of initial monitoring and live testing of its internal model is satisfactory before the model can be used for capital purposes. Institutions using internal models for capital purposes will be subject to the requirements detailed in sections 8.11.2. to 8.11.8.

### 8.11.2. *Qualitative standards*

Institutions must ensure that the models they are using are supported by market risk management systems that are conceptually sound and implemented with integrity. Set out below are qualitative criteria that institutions would have to meet before they are permitted to use a models-based approach. Only those institutions whose models are in full compliance with the qualitative criteria will be eligible for application of the minimum multiplication factor (see section 8.11.4.)

The qualitative criteria include:

- The institution should have an independent risk control unit that is responsible for the design and implementation of the institution's risk management system. The unit should produce and analyze daily reports on the output of the institution's risk measurement model, including an evaluation of the relationship between measures of risk exposure and trading limits. This unit must be independent from business trading units and should report directly to senior management of the institution.
- The unit must conduct a regular back-testing program, i.e., an ex post comparison of the risk measure generated by the model against daily changes in portfolio value of static positions over longer periods of time. Where backtesting is based on comparisons against static positions, institutions should still track daily portfolio profits and losses to assure a strong understanding of the link between calculated measures of risk and trading outcomes. The back-testing program should be applied

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as appropriate to the aggregate risks measured by the models as well as on an individual book level that corresponds to the structure of VaR limits and disaggregated profit and loss information.

- The unit should also conduct the initial and on-going validation of the internal model, as described in section 8.11.7.
- Board of directors and senior management should be actively involved in the risk control process and must regard risk control as an essential aspect of its business to which significant resources need to be devoted. In this regard, the daily reports prepared by the independent risk control unit must be reviewed by a level of management with sufficient seniority and authority to enforce both reductions of positions taken by individual traders and reductions in the institution's overall risk exposure.
- The institution's internal risk measurement model must be closely integrated into the day-to-day risk management process of the institution. Its output should accordingly be an integral part of the process of planning, monitoring and controlling the institution's market risk profile.
- The risk measurement system should be used in conjunction with internal trading and exposure limits. While trading limits for individual dealers do not need to be explicitly stated in terms of value-at-risk, trading limits should be related to the institution's risk measurement model in a manner that is consistent over time and that is well understood by both traders and senior management.
- A routine and rigorous program of stress testing should be in place as a supplement to the risk analysis based on the day-to-day output of the institution's risk measurement model. The results of stress testing should be reviewed periodically by senior management, used in the internal assessment of capital adequacy, and reflected in the policies and limits set by management and the board of directors. Where stress tests reveal particular vulnerability to a given set of circumstances, prompt steps should be taken to manage those risks appropriately (e.g. by hedging against that outcome, reducing the size of the institution's exposures, or increasing capital).
- Institutions should have a routine in place for ensuring compliance with a documented set of internal policies, controls and procedures concerning the risk measurement system. The institution's risk measurement system must be well documented, for example, through a risk management manual that describes the basic principles of the risk management system and that provides an explanation of the empirical techniques used to measure market risk.
- An independent review of the risk measurement system should be carried out regularly in the institution's own internal auditing process. This review should include both the activities of the business trading units and of the independent risk control unit. A review of the overall risk management process should take place at regular intervals (ideally not less than once a year) and should specifically address, at a minimum:

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- the adequacy of the documentation of the risk management system and process,
  - the organization of the risk control unit,
  - the integration of market risk measures into daily risk management,
  - the approval process for risk pricing models and valuation systems used by front and back-office personnel,
  - the validation of any significant change in the risk measurement process,
  - the scope of market 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 factor calculations, and
  - the verification of the model's accuracy through frequent back-testing as described above.

### 8.11.3. *Specification of market risk factors*

An important part of an institution's internal market risk measurement system is the specification of an appropriate set of market risk factors, i.e., the market rates and prices that affect the value of the institution's trading positions. The risk factors contained in a market risk measurement system should be sufficient to capture the risks inherent in the institution's portfolio of on- and off-balance sheet trading positions. In specifying the risk factors for their internal models, institutions should meet the guidelines set out below.

Factors that are deemed relevant for pricing should be included as risk factors in the value-at-risk model. Where a risk factor is incorporated in a pricing model but not in the value-at-risk model, an institution must justify this omission to the satisfaction of OSFI. In addition, the value-at-risk model must capture nonlinearities for options and other relevant products (e.g. mortgage backed securities, tranch exposures or n-th-to-default credit derivatives), as well as correlation risk and basis risk (e.g. between credit default swaps and bonds). Moreover, OSFI must be satisfied that proxies are used that show a good track record for the actual position held (i.e. an equity index for a position in an individual stock).

#### **OSFI Notes**

The institution is expected to develop an internal process that describes minimum conditions under which a proxy has a good track record; a methodology for assessing proxies against those conditions (including independent validation); and steps to address the use of proxies that fail to meet that standard.

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### *Interest rates*

- There must be a set of risk factors corresponding to interest rates in each currency in which the institution has interest-rate-sensitive on- or off-balance sheet positions.
- The risk measurement system should model the yield curve using one of a number of generally accepted approaches, for example, by estimating forward rates of zero coupon yields. The yield curve should be divided into various maturity segments in order to capture variation in the volatility of rates along the yield curve; there will typically be one risk factor corresponding to each maturity segment. For material exposures to interest rate movements in the major currencies and markets, institutions must model the yield curve using a minimum of six risk factors. However, the number of risk factors used should ultimately be driven by the nature of the institution's trading strategies. For instance, an institution with a portfolio of various types of securities across many points of the yield curve and that engages in complex arbitrage strategies would require a greater number of risk factors to capture interest rate risk accurately.
- The risk measurement system must incorporate separate risk factors to capture spread risk (e.g., between bonds and swaps). A variety of approaches may be used to capture the spread risk arising from less than perfectly correlated movements between government and other fixed-income interest rates, such as specifying a completely separate yield curve for non-government fixed-income instruments (for instance, swaps or municipal securities) or estimating the spread over government rates at various points along the yield curve.

### *Exchange rates*

- The risk measurement system should incorporate risk factors corresponding to the individual foreign currencies in which the institution's positions are denominated. Since the value-at-risk figure calculated by the risk measurement system will be expressed in the institution's domestic currency, any net position denominated in a foreign currency will introduce a foreign exchange risk. Thus, there must be risk factors corresponding to the exchange rate between the domestic currency and each foreign currency in which the institution has a significant exposure.

### *Equity prices*

- There should be risk factors corresponding to each of the equity markets in which the institution holds significant positions.
- At a minimum, there should be a risk factor that is designed to capture market-wide movements in equity prices (e.g., a market index). Positions in individual securities or in sector indices could be expressed in "beta-equivalents"<sup>174</sup> relative to this market-wide index.

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<sup>174</sup> A "beta-equivalent" position would be calculated from a market model of equity price returns (such as the CAPM model) by regressing the return on the individual stock or sector index on the risk-free rate of return and the return on the market index.

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- A somewhat more detailed approach would be to have risk factors corresponding to various sectors of the overall equity market (for instance, industry sectors or cyclical and non-cyclical sectors). As above, positions in individual stocks within each sector could be expressed in beta-equivalents relative to the sector index.
  - The most extensive approach would be to have risk factors corresponding to the volatility of individual equity issues.
  - The sophistication and nature of the modelling technique for a given market should correspond to the institution's exposure to the overall market as well as its concentration in individual equity issues in that market.

#### *Commodity prices*

- There should be risk factors corresponding to each of the commodity markets in which the institution holds significant positions.
- For institutions with relatively limited positions in commodity-based instruments, a straightforward specification of risk factors would be acceptable. Such a specification would likely entail one risk factor for each commodity price to which the institution is exposed. In cases where the aggregate positions are quite small, it might be acceptable to use a single risk factor for a relatively broad class of commodities (for instance, a single risk factor for all types of oil).
- For more active trading, the model should encompass:
  - directional risk, to capture the exposure from changes in spot prices arising from net open positions,
  - forward gap and interest rate risk, to capture the exposure to changes in forward prices arising from maturity mismatches,
  - basis risk, to capture the exposure to changes in the price relationships between two similar, but not identical, commodities, and
  - the model must also take account of variation in the "convenience yield"<sup>175</sup> between derivatives positions, such as forwards and swaps, and cash positions in the commodity.

#### **8.11.4. Quantitative standards**

Institutions will have flexibility in devising the precise nature of their models, but the following minimum standards will apply for the purpose of calculating their capital charge:

- "Value at risk" should be computed on a daily basis.
- In calculating the value-at-risk, a 99th percentile, one-tailed confidence interval is to be used.

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<sup>175</sup> The convenience yield reflects the benefits from direct ownership of the physical commodity (for example, the ability to profit from temporary market shortages), and is affected both by market conditions and by factors such as physical storage costs.

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- In calculating value-at-risk, the minimum holding period will be ten trading days. For positions that display linear price characteristics, institutions may use value-at-risk numbers calculated according to shorter holding periods scaled up to ten days by, for example, the square root of time. An institution using this approach must periodically justify the reasonableness of its approach to the satisfaction of OSFI. (Options are an example of instruments that do not display linear price characteristics; the treatment of these positions is covered in a separate bullet below).
  - The historical observation period (sample period) for calculating value-at-risk will be constrained to a minimum length of one year. For institutions that use a weighting scheme or other methods for the historical observation period, the "effective" observation period must be at least one year (that is, the weighted average duration of all daily time series data should be no less than 6 months). An institution may calculate the value-at-risk estimate using a different weighting scheme provided that the method results in a capital charge at least as conservative as that calculated using an "effective" observation period of at least one year.
  - Institutions must update their data sets no less frequently than once every month and should also reassess them whenever market prices are subject to material changes. This updating process must be flexible enough to allow for more frequent updates. OSFI may also require an institution to calculate its value-at-risk using a shorter observation period if, in OSFI's judgement, this is justified by a significant upsurge in price volatility.
  - No particular type of model is prescribed. So long as each model used captures all the material risks run by the institution as set out in section 8.11.3., institutions will be free to use models based on variance-covariance matrices, historical simulations, or Monte Carlo simulations.
  - Institutions will have discretion to recognize empirical correlations within broad risk categories (e.g., interest rates, exchange rates, equity prices and commodity prices, including related options volatilities in each risk factor category). OSFI may also recognize empirical correlations across broad risk factor categories, provided OSFI is satisfied that the institution's system for measuring correlations is sound and implemented with integrity.
  - Institutions' models must accurately capture the unique risks associated with options within each of the broad risk categories. The following criteria apply to the measurement of options risks:
    - Institutions' models must capture the non-linear price characteristics of options positions;
    - Institutions are expected to ultimately move towards the application of a full 10-day price shock to options positions or positions that display option-like characteristics. In the interim, OSFI will accept estimates of less than a 10 day price shock that are adjusted to an equivalent 10 day price shock using a square root of time adjustment; and

- Each institution's risk measurement system must have a set of risk factors that captures the volatilities of the rates and prices underlying option positions, i.e., vega risk. Institutions with relatively large and/or complex options portfolios should have detailed specifications of the relevant volatilities. This means that institutions should measure the volatilities of the options positions broken down by different maturities.
  - In addition, an institution must calculate a 'stressed value-at-risk' measure. This measure is intended to replicate a value-at-risk calculation that would be generated on the institution's current portfolio if the relevant market forces experienced a period of stress; and should therefore be based on the 10-day, 99<sup>th</sup> percentile, one-tailed confidence interval value-at-risk measure of the current portfolio, with model inputs calibrated to historical data from a continuous 12-month period of significant financial stress relevant to the institution's portfolio. The period used must be approved by the OSFI and regularly reviewed. As an example, for many portfolios, a 12-month period relating to significant losses in 2007/08 would adequately reflect a period of such stress; although other periods relevant to the current portfolio must be considered by the institution.
  - As no particular model is prescribed for measuring value-at-risk above, different techniques might need to be used to translate the current model used for value-at-risk into one that delivers a stressed value-at-risk. For example, institutions should consider applying anti-thetic<sup>176</sup> data, or applying absolute rather than relative volatilities to deliver an appropriate stressed value-at-risk. The stressed value-at-risk should be calculated at least weekly.
  - Each institution must meet, on a daily basis, a capital requirement expressed as the sum of:
    - The higher of (1) the previous day's value-at-risk number measured according to the parameters specified in this section ( $VaR_{t-1}$ ); and (2) an average of the daily value-at-risk measures on each of the preceding sixty business days ( $VaR_{avg}$ ), multiplied by a multiplication factor ( $m_c$ );

Plus

    - The higher of (1) its latest available stressed-value-at-risk number ( $sVaR_{t-1}$ ); and (2) an average of the stressed value-at-risk numbers over the preceding sixty business days ( $sVaR_{avg}$ ), multiplied by a multiplication factor ( $m_s$ ).

Therefore, the capital requirement (c) is calculated according to the following formula:

$$c = \max \{ VaR_{t-1}; m_c \cdot VaR_{avg} \} + \max \{ sVaR_{t-1}; m_s \cdot sVaR_{avg} \}$$

<sup>176</sup> Institutions should consider modelling valuation changes that are based on the magnitude of historic price movements, applied in both directions – irrespective of the direction of the historic movement.



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- The multiplication factors  $m_c$  and  $m_s$  will be set by OSFI on the basis of its assessment of the quality of the institution's risk management system, subject to an absolute minimum of 3. Institutions will be required to add to these factors a "plus" directly related to the ex-post performance of the model, thereby introducing a built-in positive incentive to maintain the predictive quality of the model. The plus factors can exceed 1 depending on the outcome of so-called "backtesting." The backtesting results applicable for calculating the plus factors are based on value-at-risk only and not stressed value-at-risk. If the backtesting results are satisfactory and the institution meets all of the qualitative standards set out below in section 8.11.5 the plus factors could be zero. Institutions must perform backtesting on hypothetical outcomes (i.e. using changes in the portfolio value that would occur were end-of-day positions to remain unchanged).
  - Institutions using models will also be subject to a separate capital charge to cover the specific risk of interest rate related instruments and equity securities<sup>177</sup>, as defined sections 8.10.1. and 8.10.2., to the extent that this risk is not incorporated into their models. The options for calculating the specific risk capital charge are set out in section 8.11.5.

#### 8.11.5. *Specific risk calculation*

Institutions using an internal VaR model may calculate their specific risk capital charge for equity risk positions using modelled estimates if they meet all of the qualitative and quantitative requirements for general risk models as well as the additional criteria and requirements set out in sections 8.11.5.1 (criteria) and 8.11.6 (backtesting) below. Such institutions are not required to subject their equity positions to the capital charge according to the standardized measurement method as specified section 8.10.2.

For interest rate risk positions other than securitization exposures and n-th-to-default credit derivatives, an institution will not be required to subject these positions to the standardised capital charge for specific risk, as specified in non-tranched sub-sections of 8.10.1.1, when all of the following conditions hold:

- The institution has a value-at-risk measure that incorporates specific risk and meets all the qualitative and quantitative requirements for general market risk models, as well as the additional criteria and requirements set out in sections 8.11.5.1 (criteria) and 8.11.6 (backtesting); and
- OSFI is satisfied that the institution's internally developed approach adequately captures incremental default and migration risks for positions subject to specific interest rate risk according to the standards laid out in Appendix 8-IX below.

In the criteria below, event risk is defined as the risk of loss in the value of claims against a borrower or security issuer when that issuer experiences an event other than default or rating migration which so greatly modifies net worth or future earnings prospects of the issuer that the

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<sup>177</sup> Including the additional requirements set out in section 8.10.2 for equity indices.

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market value of the securities is sharply affected. Default risk is narrowly defined as the risk of loss in the value of claims against a borrower or security issuer when that borrower has insufficient assets to meet its obligations or is otherwise prevented from meeting its obligations in a timely manner.

The institution is allowed to include its securitisation exposures and n-th-to-default credit derivatives in its value-at-risk measure. Notwithstanding, it is still required to hold additional capital for these products according to the standardised measurement methodology, with the exceptions noted section 8.11.5.2 under the comprehensive risk measure below.

#### 8.11.6. *Criteria*

Modelled estimates of specific risk must capture all material components of price risk<sup>178</sup> and be responsive to changes in market conditions and compositions of portfolios. In particular, the model must:

- explain the historical price variation in the portfolio<sup>179</sup>,
- demonstrably capture concentrations (magnitude and changes in composition)<sup>180</sup>,
- signal rising risk in an adverse environment<sup>181</sup>,
- capture name-related basis risk<sup>182</sup>,
- capture event risk<sup>183</sup>, and

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<sup>178</sup> Institutions need not capture default and migration risks for positions subject to the incremental risk capital charge referred to in Appendix 8-IX.

<sup>179</sup> The key ex ante measures of model quality are "goodness-of-fit" measures that address the question of how much of the historical variation in price value is explained by the risk factors included within the model. One measure of this type that can often be used is an R-squared measure from regression methodology. If this measure is to be used, the risk factors included in an institution's model would be expected to be able to explain a high percentage, such as 90%, of the historical price variation or the model should explicitly include estimates of the residual variability not captured in the factors included in this regression. For some types of models, it may not be feasible to calculate a goodness-of-fit measure. In such instances, an institution will be expected to work with OSFI to define an acceptable alternative measure that meets this regulatory objective.

<sup>180</sup> The institution would be expected to demonstrate that the model is sensitive to changes in portfolio construction and that higher capital charges are estimated for portfolios that have increasing concentrations in particular names or sectors.

<sup>181</sup> This could be achieved by incorporating in the historical estimation period of the model at least one full credit cycle and ensuring that the model would not have been inaccurate in the downward portion of the cycle. Another approach for demonstrating this is through simulation of historical or plausible worst-case environments.

<sup>182</sup> Institutions should be able to demonstrate that the model is sensitive to material idiosyncratic differences between similar but not identical positions, for example debt positions with different levels of subordination, maturity mismatches, or credit derivatives with different default events.

<sup>183</sup> For debt positions, this should include migration risk. For equity positions, events that are reflected in large changes or jumps in prices must be captured, e.g. merger break-ups/takeovers. In particular, firms must consider issues related to survivorship bias.

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- be validated through backtesting aimed at assessing whether specific risk, as well as general market risk, is being adequately captured.

As techniques and best practices evolve, institutions should incorporate these advances into their models.

The institution's model must conservatively assess the risk arising from less liquid positions and/or positions with limited price transparency under realistic market scenarios. In addition, the model must meet minimum data standards. Proxies may be used only where available data is insufficient or is not reflective of the true volatility of a position or portfolio, and only where they are appropriately conservative.

An institution must have an approach in place to capture in its regulatory capital default and migration risks in positions subject to a capital charge for specific interest rate risk, with the exception of securitisation exposures and n-th-to-default credit derivatives, that are incremental to the risks captured by the VaR-based modeled estimate for specific risk ("incremental risks"). No specific approach for capturing the incremental risks is prescribed Appendix 8-IX presents guidelines around positions and risks that are covered by this incremental risk capital charge.

The institution must demonstrate that the approach used to capture incremental risks meets a soundness standard comparable to that of the internal-ratings based approach for credit risk as set forth in this guideline, under the assumption of a constant level of risk, and adjusted where appropriate to reflect the impact of liquidity, concentrations, hedging and optionality. An institution that does not capture incremental risks through an internally developed approach must use the specific risk capital charges under the standardised measurement method as set out in section 8.10.1.1.

#### *8.11.6.1. Comprehensive risk measure*

Subject to OSFI approval, an institution may incorporate its correlation trading portfolio in an internally developed approach that adequately captures not only incremental default and migration risks, but all price risks ("comprehensive risk measure"). The value of such products is subject in particular to the following risks that must be adequately captured:

- the cumulative risk arising from multiple defaults, including the ordering of defaults, in tranching products;
- credit spread risk, including the gamma and cross-gamma effects;
- volatility of implied correlations, including the cross effect between spread and correlations;
- basis risk, including both
  - the basis between the spread of an index and those of its constituent single names; and
  - the basis between the implied correlation of an index and that of bespoke portfolios;
- recovery rate volatility, as it relates to the propensity for recovery rates to affect tranche prices; and

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- to the extent the comprehensive risk measure incorporates benefits from dynamic hedging, the risk of hedging slippage and the potential costs of rebalancing such hedges.

The approach must meet all of the requirements specified in section 8.11.5.1 and Appendix 8-IX. This exception only applies to institutions that are active in buying and selling these products. For the exposures that the institution does incorporate in its internally developed approach, the institution will be required to subject them to a capital charge equal to the higher of the capital charge according to this internally developed approach and 8% of the capital charge for specific risk according to the standardised measurement method. It will be required to subject these exposures to the treatment according section 8.11.5.1 (i.e., it must incorporate them in both the value-at-risk and stressed value-at-risk measures).<sup>184</sup>

For an institution applying this exception, it must

- Have sufficient market data to ensure that it fully captures the salient risks of these exposures in its comprehensive risk measure in accordance with the standards set forth above;
- Demonstrate (for example, through backtesting) that its risk measures can appropriately explain the historical price variation of these products; and
- Ensure that it can separate the positions for which it holds approval to incorporate them in its comprehensive risk measure from those positions for which it does not hold this approval.

In addition to these data and modelling criteria, for an institution to apply this exception it must regularly apply a set of specific, predetermined stress scenarios to the portfolio that receives internal model regulatory capital treatment (i.e., the ‘correlation trading portfolio’). These stress scenarios will examine the implications of stresses to (i) default rates, (ii) recovery rates, (iii) credit spreads, and (iv) correlations on the correlation trading desk’s profit and loss. The institution must apply these stress scenarios at least weekly and report the results, including comparisons with the capital charges implied by the institutions’ internal model for estimating comprehensive risks, at least quarterly. Any instances where the stress tests indicate a material shortfall of the comprehensive risk measure must be reported to OSFI in a timely manner. Based on these stress testing results, OSFI may impose a supplemental capital charge against the correlation trading portfolio, to be added to the institution’s internally modelled capital requirement. For further detail refer to Appendix 8-X: Stress testing guidance for the correlation trading portfolio.

An institution must calculate this incremental risk measure and comprehensive risk measure at least weekly, or more frequently if directed by OSFI. The capital charge for incremental risk is given by a scaling factor of 1.0 times the maximum of (i) the average of the incremental risk measures over 12 weeks; and (ii) the most recent incremental risk measure. Likewise, the capital charge for comprehensive risk is given by a scaling factor of 1.0 times the maximum of (i) the

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<sup>184</sup> Institutions must still include correlation trading portfolio products in VaR and stressed VaR models for general market risk and interest rate specific risk.

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average of the comprehensive risk measures over 12 weeks; and (ii) the most recent comprehensive risk measure. Both capital charges are added up. There will be no adjustment for double counting between the comprehensive risk measure and any other risk measures.

Institutions that have already received specific risk model recognition from OSFI for particular portfolios or lines of business according to a previous version of this guideline should agree to a timetable with OSFI to bring these models into line with the above criteria in as timely a manner as practicable, but by no later than December 31, 2011. Following this transition period, institutions that have been unable to develop an acceptable methodology will be required to calculate their specific risk capital charge using the standardised approach.

### *Backtesting*

Institutions that apply modelled estimates of specific risk are required to conduct backtesting aimed at assessing whether specific risk is being accurately captured. The methodology an institution should use for validating its specific risk estimates is to perform separate backtests on sub-portfolios using daily data on sub-portfolios subject to specific risk. The key sub-portfolios for this purpose are traded-debt and equity positions. However, if an institution breaks down its trading portfolio into finer categories (e.g. emerging markets, traded corporate debt, etc.), it is appropriate to keep these distinctions for sub-portfolio backtesting purposes. An institution is required to commit to a sub-portfolio structure and adhere to it unless it can demonstrate to OSFI that it would be appropriate to change the structure.

Institutions must have in place a process to analyze exceptions identified through the backtesting of sub-portfolios of specific risk. This process is intended to serve as the fundamental way in which institutions correct their models of specific risk in the event they become inaccurate. There will be a presumption that models that incorporate specific risk are "unacceptable" if the results at the sub-portfolio level produce a number of exceptions commensurate with the *Red Zone* as defined in the document, *Supervisory framework for the use of backtesting in conjunction with the internal models approach to market risk capital requirements*, issued by the Basel Committee on Banking Supervision in April 1996. Institutions with "unacceptable" specific risk models are expected to take immediate action to correct the problem in the model and to ensure that there is a sufficient capital buffer to absorb those risks that backtests identify as being inadequately captured.

#### *8.11.7. Stress testing*

Institutions that use the internal models approach for meeting market risk capital requirements must have in place a rigorous and comprehensive stress testing program. Stress testing to identify events or influences that could greatly impact institutions is a key component of an institution's assessment of its capital position.

Institutions' stress scenarios need to cover a range of factors that can create extraordinary losses or gains in trading books, or make the control of risk in those books very difficult. These factors include low-probability events in all major types of risks, including the various components of market, credit, and operational risks. Stress scenarios need to shed light on the impact of such

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events on positions that display both linear and non-linear price characteristics (i.e., options and instruments that have options-like characteristics).

Institutions' stress tests should be both of a quantitative and qualitative nature, incorporating both market risk and liquidity aspects of market disturbances. Quantitative criteria should identify plausible stress scenarios to which institutions could be exposed. Qualitative criteria should emphasize that two major goals of stress testing are to evaluate the capacity of the institution's capital to absorb potential large losses and to identify steps the institution can take to reduce its risk and conserve capital. This assessment is integral to setting and evaluating the institution's management strategy and the results of stress testing should be routinely communicated to senior management and, periodically, to the institution's board of directors.

Institutions should combine the use of supervisory stress scenarios with stress tests developed by institutions themselves to reflect their specific risk characteristics. OSFI may ask institutions to provide information on stress testing in three broad areas:

- a) Supervisory scenarios requiring no simulations by the institution

Institutions should have information on the largest losses experienced during the reporting period available for supervisory review. This loss information could be compared to the level of capital that results from an institution's internal measurement system. For example, it could provide OSFI with the coverage ratio of reported VaR capital to the maximum one day loss during the reporting period.

- b) Scenarios requiring a simulation by the institution

Institutions should subject their portfolios to a series of simulated stress scenarios and provide OSFI with the results quarterly. These scenarios could include testing the current portfolio against past periods of significant disturbance, for example the 1987 equity crash, the Exchange Rate Mechanism crises of 1992 and 1993, the fall in bond markets in the first quarter of 1994, the 1998 Russian financial crisis, the 2000 bursting of the technology stock bubble or the 2007/2008 sub-prime crisis, incorporating both the large price movements and the sharp reduction in liquidity associated with these events. A second type of scenario would evaluate the sensitivity of the institution's market risk exposure to changes in the assumptions about volatilities and correlations. Applying this test would require an evaluation of the historical range of variation for volatilities and correlations and evaluation of the institution's current positions against the extreme values of the historical range. Due consideration should be given to the sharp variation that at times has occurred in a matter of days in periods of significant market disturbance. For example, the above-mentioned situations involved correlations within risk factors approaching the extreme values of 1 or -1 for several days at the height of the disturbance.

- c) Scenarios developed by the institution itself to capture the specific characteristics of its portfolio

In addition to the scenarios prescribed by OSFI under (a) and (b) above, an institution should also develop its own stress tests which it identifies as most adverse based on the characteristics



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of its portfolio (e.g., problems in a key region of the world combined with a sharp move in oil prices). Institutions should provide OSFI with a description of the methodology used to identify and carry out the scenarios as well as with a description of the results derived from these scenarios.

The results should be reviewed periodically by senior management and should be reflected in the policies and limits set by management and the board of directors. Moreover, if the testing reveals particular vulnerability to a given set of circumstances, OSFI would expect the institution to take prompt steps to manage those risks appropriately (e.g., by hedging against that outcome or reducing the size of its exposures).

#### **8.11.8. Model validation**

It is important that institutions have processes in place to ensure that their internal models have been adequately validated by suitably qualified parties independent of the development process and to ensure that they are conceptually sound and adequately capture all material risks. This validation should be conducted when the model is initially developed and when any significant changes are made to the model. The validation should also be conducted on a periodic basis but especially when there have been any significant structural changes in the market or changes to the composition of the portfolio that might lead to the model being no longer adequate. More extensive model validation is particularly important when specific risk is modelled and the model is required to meet the additional criteria in section 8.11.5. As techniques and best practices evolve, institutions should avail themselves of these advances. Model validation should not be limited to backtesting, but should, at a minimum, also include the following:

- (a) Tests to demonstrate that any assumptions made within the internal model are appropriate and do not underestimate risk. These may include the assumption of the normal distribution, the use of the square root of time to scale from a one-day holding period to a 10-day holding period, the use of extrapolation or interpolation techniques, and the use of pricing models.
- (b) Further to regulatory backtesting programs, testing for model validation must use hypothetical changes in portfolio value that would occur were end-of-day positions to remain unchanged. Such tests would therefore exclude fees, commissions, bid-ask spreads, net interest income and intra-day trading. Moreover, additional tests are required which may include, for instance:
  - Testing carried out for periods that are longer than required for the regular backtesting program (e.g. 3 years). The longer time period would generally improve the power of the backtesting, but a longer time period may not be desirable if the VaR model or market conditions have changed to the extent that historical data is no longer relevant.
  - Testing carried out using confidence intervals other than the 99 percent interval required under the quantitative standards.
  - Testing of portfolios below the overall bank level.



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- (c) The use of hypothetical portfolios to ensure that the model is able to account for and adequately capture particular structural features that may arise, for example:
- When data histories for a particular instrument do not meet the quantitative standards in section 8.11.4 and the institution has to map these positions to proxies. In such a situation the institution must ensure that the proxies produce conservative results under relevant market scenarios.
  - When material basis risks are present, which may include mismatches between long and short positions either by maturity or by issuer.
  - When concentration risk (as would occur in an undiversified portfolio) is present.

In addition, in reviewing an institution's internal model OSFI will require assurance that:

- The internal validation processes described in section 8.11.2. are operating in a satisfactory manner.
- The formulae used in the calculation process as well as for the pricing of options and other complex instruments are validated by a qualified unit, which in all cases should be independent from the trading area.
- The structure of internal models is adequate with respect to the institution's activities and geographical coverage.
- The results of the institutions' back-testing of its internal measurement system (i.e., comparing value-at-risk estimates with actual profits and losses) ensure that the model provides a reliable measure of potential losses over time. The results as well as the underlying inputs to their value-at-risk calculations should be available to OSFI and external auditors on request.
- Data flows and processes associated with the risk measurement system are transparent and accessible. In particular, it is necessary that auditors or OSFI are in a position to have easy access, whenever they judge it necessary and under appropriate procedures, to the models' specifications and parameters.

#### **8.11.9. *Combination of internal models and the standardized methodology***

Unless an institution's exposure to a particular risk factor, such as commodity prices, is insignificant, the internal measurement system will, in principle, require institutions to have an integrated risk measurement system that captures the broad risk factor categories (i.e., interest rates, exchange rates, equity prices and commodity prices, with related options volatilities being included in each risk factor category). Thus, institutions that start to use models for one or more risk factor categories will, over time, be expected to extend the models to all their market risks. An institution that has developed one or more models will no longer be able to revert to measuring the risk measured by those models according to the standardized methodology (unless OSFI withdraws approval for those models). However, pending further experience regarding the process of changing to a models-based approach, no specific time limit will be set for institutions which use a combination of internal models and the standardized methodology to move to a comprehensive model.

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The following conditions apply to institutions using such combinations:

- Subject to transitional arrangements, each broad risk factor category must be assessed using a single approach (either internal models or the standardized approach), i.e., no combination of the two methods will be permitted within a risk category or across the institutions' different entities for the same type of risk.<sup>185</sup>
- All criteria in chapter 8 will apply to the models being used.
- Institutions may not switch from a model to the standardized approach unless OSFI rescinds permission to use the model for capital adequacy purposes.
- No element of market risk may escape measurement, i.e., the exposure for all the various risk factors, whether calculated according to the standardized approach or internal models, would have to be captured.
- The capital charges assessed under the standardized approach and under the models approach are to be aggregated according to the simple sum method.

On a case-by-case basis, OSFI may permit short term transitional arrangements for using a combination of internal models and the standardized approach for any risk across all of an institution's operations. Approval of these temporary arrangements will be subject to:

- the institution providing adequate internal controls that prevent switching of business between legal entities to achieve the most advantageous capital charge,
- the Superintendent imposing an additional capital requirement which may be amended periodically depending on the circumstances of the transitional arrangements. The additional requirement will terminate once the risk category is fully assessed under the internal models approach, and
- the institution entering into a formal undertaking to comply with the conditions of the temporary arrangement and to expand the internal model on or before a specific date to those operations initially using the standardised approach.

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<sup>185</sup> However, institutions may incur risks in positions which are not captured by their models, for example, in remote locations, in minor currencies or in negligible business areas. Such risks should be measured according to the standardized methodology.

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## Appendix 8-IX      The Incremental Risk Charge.

The incremental risk charge (IRC) set forth below is intended to complement additional standards being applied to the value-at-risk modelling framework. As described in more detail below, the IRC represents an estimate of the default and migration risks of non-tranched products, with exposure to interest rate risk, over a one-year capital horizon at a 99.9 percent confidence level, taking into account the liquidity horizons of individual positions or sets of positions. This appendix provides guidelines on how an IRC model should be developed by institutions for calculating the IRC for these positions. It also contains guidance on how OSFI will evaluate institutions' IRC models.

An institution has to meet the guidelines for calculating the IRC that are laid out in this Appendix to the extent that it seeks to model incremental risks, as part of its interest rate specific risk VaR model, section 8.11.5.1 or comprehensive risks according to section 8.11.5.2.

### II. Principles for calculating the IRC

#### A. IRC-covered positions and risks

8. The IRC encompasses all positions subject to a capital charge for specific interest rate risk according to the internal models approach to specific market risk but not subject to the treatment outlined in sections 8.10.1.1 for tranched products, regardless of their perceived liquidity.
9. With OSFI approval, a bank can choose consistently to include all listed equity and derivatives positions based on listed equity of a desk in its incremental risk model.

#### OSFI Notes

Banks should not include equity positions and derivatives positions that reference equity positions in their IRC models.

At this time the OSFI is not confident in the ability of firms to model migration and default risk in equities. In time, as modelling standards evolve the OSFI will revisit this policy. In the context of convertible bonds, a bank could achieve partial hedge recognition by including the embedded warrant component of this hybrid instrument in its equity general market risk VaR and equity specific risk VaR models. If a bank elects to do this, at a minimum the remainder of the decomposed convertible bond is still subject to default and migration risk, which should either be captured in an IRC model or through the application of the standardized framework for convertible bonds (see Sections 8.10.1 and 8.10.2).

10. Additionally, an institution is not permitted to incorporate into its IRC model any securitisation positions, even when securitisation positions are viewed as hedging underlying credit instruments held in the trading account.

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11. For IRC-covered positions, the IRC captures
- Default risk. This means the potential for direct loss due to an obligor’s default as well as the potential for indirect losses that may arise from a default event;
  - Credit migration risk. This means the potential for direct loss due to an internal/external rating downgrade or upgrade as well as the potential for indirect losses that may arise from a credit migration event.

## **B. Key supervisory parameters for computing IRC**

### ***1. Soundness standard comparable to IRB***

12. One of the underlying objectives of IRC is to achieve broad consistency between capital charges for similar positions (adjusted for illiquidity) held in the banking and trading books. Since the Basel II Framework reflects a 99.9 percent soundness standard over a one-year capital horizon, the IRC is also described in these terms.

13. Specifically, for all IRC-covered positions, an institution’s IRC model must measure losses due to default and migration at the 99.9 percent confidence interval over a capital horizon of one year, taking into account the liquidity horizons applicable to individual trading positions or sets of positions. Losses caused by broader market-wide events affecting multiple issues/issuers are encompassed by this definition.

14. As described immediately below, for each IRC-covered position the model should also capture the impact of rebalancing positions at the end of their liquidity horizons so as to achieve a constant level of risk over a one-year capital horizon. The model may incorporate correlation effects among the modelled risk factors, subject to validation standards set forth in Section III. The trading portfolio’s IRC equals the IRC model’s estimate of losses at the 99.9 percent confidence level.

### ***2. Constant level of risk over one-year capital horizon***

15. An IRC model should be based on the assumption of a constant level of risk over the one-year capital horizon.<sup>186</sup>

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<sup>186</sup> This assumption is consistent with the capital computations in the Basel II Framework. In all cases (loans, derivatives and repos), the Basel II Framework defines EAD in a way that reflects a roll-over of existing exposures when they mature.

The combination of the constant level of risk assumption and the one-year capital horizon reflects supervisors’ assessment of the appropriate capital needed to support the risk in the trading portfolio. It also reflects the importance to the financial markets of banks having the capital capacity to continue providing liquidity to the financial markets in spite of trading losses. Consistent with a “going concern” view of a bank, this assumption is appropriate because a bank must continue to take risks to support its income-producing activities. For regulatory capital adequacy purposes, it is not appropriate to assume that a bank would reduce its VaR to zero at a short-term horizon in reaction to large trading losses. It also is not appropriate to rely on the prospect that a bank could raise additional Tier 1 capital during stressed market conditions.

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16. This constant level of risk assumption implies that an institution rebalances, or rolls over, its trading positions over the one-year capital horizon in a manner that maintains the initial risk level, as indicated by a metric such as VaR or the profile of exposure by credit rating and concentration. This means incorporating the effect of replacing positions whose credit characteristics have improved or deteriorated over the liquidity horizon with positions that have risk characteristics equivalent to those that the original position had at the start of the liquidity horizon. The frequency of the assumed rebalancing must be governed by the liquidity horizon for a given position.

17. Rebalancing positions does not imply, as the IRB approach for the banking book does, that the same positions will be maintained throughout the capital horizon. Particularly for more liquid and more highly rated positions, this provides a benefit relative to the treatment under the IRB framework. However, an institution may elect to use a one-year constant position assumption, as long as it does so consistently across all portfolios.

### **3. *Liquidity horizon***

18. Stressed credit market events have shown that institutions cannot assume that markets remain liquid under those conditions. Banks experienced significant illiquidity in a wide range of credit products held in the trading book, including leveraged loans. Under these circumstances, liquidity in many parts of the securitisation markets dried up, forcing banks to retain exposures in securitisation pipelines for prolonged periods of time. Institutions must pay particular attention to the appropriate liquidity horizon assumptions within their IRC models.

19. The liquidity horizon represents the time required to sell the position or to hedge all material risks covered by the IRC model in a stressed market. The liquidity horizon must be measured under conservative assumptions and should be sufficiently long that the act of selling or hedging, in itself, does not materially affect market prices. The determination of the appropriate liquidity horizon for a position or set of positions may take into account an institution's internal policies relating to, for example, prudent valuation (as per the prudent valuation guidance of the Basel II Framework), valuation adjustments<sup>187</sup> and the management of stale positions.

20. The liquidity horizon for a position or set of positions has a floor of three months.

21. In general, within a given product type a non-investment-grade position is expected to have a longer assumed liquidity horizon than an investment-grade position. Conservative assumptions regarding the liquidity horizon for non-investment-grade positions are warranted until further evidence is gained regarding the market's liquidity during systematic and idiosyncratic stress situations. Firms also need to apply conservative liquidity horizon assumptions for products, regardless of rating, where secondary market liquidity is not deep, particularly during periods of financial market volatility and investor risk aversion. The application of prudent liquidity assumptions is particularly important for rapidly growing product classes that have not been tested in a downturn.

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<sup>187</sup> For establishing prudent valuation adjustments, see sections 8.8.3 and 8.8.4.

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22. An institution can assess liquidity by position or on an aggregated basis (“buckets”). If an aggregated basis is used (e.g. investment-grade European corporate exposures not part of a core CDS index), the aggregation criteria would be defined in a way that meaningfully reflect differences in liquidity.

23. The liquidity horizon is expected to be greater for positions that are concentrated, reflecting the longer period needed to liquidate such positions. This longer liquidity horizon for concentrated positions is necessary to provide adequate capital against two types of concentration: issuer concentration and market concentration.

#### **4. Correlations and diversification**

##### *(a) Correlations between defaults and migrations*

24. Economic and financial dependence among obligors causes a clustering of default and migration events. Accordingly, the IRC charge includes the impact of correlations between default and migration events among obligors and an institution’s IRC model must include the impact of such clustering of default and migration events.

##### *(b) Correlations between default or migration risks and other market factors*

25. The impact of diversification between default or migration risks in the trading book and other risks in the trading book is not currently well understood. Therefore, for the time being, the impact of diversification between default or migration events and other market variables would not be reflected in the computation of capital for incremental risk. This is consistent with the Basel II Framework, which does not allow for the benefit of diversification when combining capital requirements for credit risk and market risk. Accordingly, the capital charge for incremental default and migration losses is added to the VaR-based capital charge for market risk.

#### **5. Concentration**

26. An institution’s IRC model must appropriately reflect issuer and market concentrations. Thus, other things being equal, a concentrated portfolio should attract a higher capital charge than a more granular portfolio (see also paragraph 23). Concentrations that can arise within and across product classes under stressed conditions must also be reflected.

#### **6. Risk mitigation and diversification effects**

27. Within the IRC model, exposure amounts may be netted only when long and short positions refer to the same financial instrument. Otherwise, exposure amounts must be captured on a gross (i.e. non-netted) basis. Thus, hedging or diversification effects associated with long and short positions involving different instruments or different securities of the same obligor (“intra-obligor hedges”), as well as long and short positions in different issuers (“interobligor hedges”), may not be recognised through netting of exposure amounts. Rather, such effects may only be recognised by capturing and modelling separately the gross long and short positions in the different instruments or securities.

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28. Significant basis risks by product, seniority in the capital structure, internal or external rating, maturity, vintage for offsetting positions as well as differences between offsetting instruments, such as different payout triggers and procedures, should be reflected in the IRC model.

29. If an instrument has a shorter maturity than the liquidity horizon or a maturity longer than the liquidity horizon is not contractually assured, the IRC must, where material, include the impact of potential risks that could occur during the interval between the maturity of the instrument and the liquidity horizon.

30. For trading book risk positions that are typically hedged via dynamic hedging strategies, a rebalancing of the hedge within the liquidity horizon of the hedged position may also be recognised. Such recognition is only admissible if the institution:

- (i) chooses to model rebalancing of the hedge consistently over the relevant set of trading book risk positions,
- (ii) demonstrates that the inclusion of rebalancing results in a better risk measurement, and
- (iii) demonstrates that the markets for the instruments serving as hedge are liquid enough to allow for this kind of rebalancing even during periods of stress.

Any residual risks resulting from dynamic hedging strategies must be reflected in the capital charge. An institution should validate its approach to capture such residual risks to the satisfaction of OSFI.

### **7. Optionality**

31. The IRC model must reflect the impact of optionality. Accordingly, institutions' models should include the nonlinear impact of options and other positions with material nonlinear behaviour with respect to price changes. The institution should also have due regard to the amount of model risk inherent in the valuation and estimation of price risks associated with such products.

## **III. Validation**

32. Institutions should apply the validation principles described in the Basel II Framework in designing, testing and maintaining their IRC models. This includes evaluating conceptual soundness, ongoing monitoring that includes process verification and benchmarking, and outcomes analysis. Some factors that should be considered in the validation process include:

- Liquidity horizons should reflect actual practice and experience during periods of both systematic and idiosyncratic stresses.
- The IRC model for measuring default and migration risks over the liquidity horizon should take into account objective data over the relevant horizon and include a comparison of risk estimates for a rebalanced portfolio with that of a portfolio with fixed positions.



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- Correlation assumptions must be supported by analysis of objective data in a conceptually sound framework. If an institution uses a multi-period model to compute incremental risk, it should evaluate the implied annual correlations to ensure they are reasonable and in line with observed annual correlations. An institution must validate that its modelling approach for correlations is appropriate for its portfolio, including the choice and weights of its systematic risk factors. An institution must document its modelling approach so that its correlation and other modelling assumptions are transparent to supervisors.
  - Owing to the high confidence standard and long capital horizon of the IRC, robust direct validation of the IRC model through standard backtesting methods at the 99.9%/one-year soundness standard will not be possible. Accordingly, validation of an IRC model necessarily must rely more heavily on indirect methods including but not limited to stress tests, sensitivity analyses and scenario analyses, to assess its qualitative and quantitative reasonableness, particularly with regard to the model's treatment of concentrations. Given the nature of the IRC soundness standard such tests must not be limited to the range of events experienced historically. The validation of an IRC model represents an ongoing process in which supervisors and firms jointly determine the exact set of validation procedures to be employed.
  - Firms should strive to develop relevant internal modelling benchmarks to assess the overall accuracy of their IRC models.

#### **IV. Use of internal risk measurement models to compute the IRC**

33. As noted above, these guidelines do not prescribe any specific modelling approach for capturing incremental risk. Because a consensus does not yet exist with respect to measuring risk for potentially illiquid trading positions, it is anticipated that institutions will develop different IRC modelling approaches.

34. The approach that an institution uses to measure the IRC is subject to the “use test”. Specifically, the approach must be consistent with the institution’s internal risk management methodologies for identifying, measuring, and managing trading risks.

35. Ideally, the supervisory principles set forth in this Appendix would be incorporated within an institution’s internal models for measuring trading book risks and assigning an internal capital charge to these risks. However, in practice an institution’s internal approach for measuring trading book risks may not map directly into the above supervisory principles in terms of capital horizon, constant level of risk, rollover assumptions or other factors. In this case, the institution must demonstrate that the resulting internal capital charge would deliver a charge at least as high as the charge produced by a model that directly applies the supervisory principles.

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## Appendix 8-X: Stress testing guidance for the correlation trading portfolio

### 1. Introduction

1. The *Revisions to the Basel II market risk framework* permit banks meeting certain conditions to calculate specific risk capital charges for the correlation trading portfolio (CTP) using a comprehensive risk modelling (CRM) approach. One of these conditions is that an institution using the CRM approach must conduct, at least weekly, a set of pre-determined stress tests for the CTP encompassing shocks to default rates, recovery rates, credit spreads, and correlations. This Appendix provides guidance on the stress testing that should be undertaken to satisfy this requirement.

### 2. Overview

2. The goal of the stress testing standards described below is to provide estimates of the mark-to-market (MTM) changes that would be experienced by the current CTP in the event of credit-related shocks. The standards encompass both prescribed regulatory stress scenarios and high-level principles governing an institution's internal stress testing. The prescribed scenarios are not intended to capture all potential sources of stress. Rather, their primary focus is on valuation changes involving large, broad-based movements in spreads for single name bonds and credit default swaps (CDS), such as could accompany major systemic financial or macroeconomic shocks, and associated spillovers to prices for index and bespoke tranches and other complex correlation positions. In addition to the prescribed scenarios, an institution is expected to implement a rigorous internal stress testing process to address other potential correlation trading risks, including institution-specific risks related to its underlying business model and hedging strategies.

### 3. Prescribed stress tests

3. The prescribed stress scenarios below are framed in terms of risk factor movements affecting credit spreads over specific historical reference periods. The term 'risk factor' encompasses any parameter or input within the pricing model that can vary over time. Examples include, but are not limited to:

- single-name risk-neutral default rates/intensities;
- recovery rates;
- market-implied correlations for index tranches;
- parameters used to infer market-implied correlations for bespoke tranches from those for index tranches;
- index-single name basis risks; and index-tranche basis risks.

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### 3.1 Historical reference periods

4. The prescribed stress tests refer to specific historical reference periods. These periods correspond to historical intervals of three-months or less over which spreads for single-name and tranching credit products have exhibited very large, broad-based increases or decreases. As described more fully in subsequent sections of this Appendix, for each stress test the historical reference period is used to calibrate the sizes of the assumed shocks to credit-related risk factors. This approach to calibrating the sizes of shocks is intended to accommodate the wide range of pricing models observed in practice.

5. The specific historical reference periods are as follows:

- Periods of sharply rising credit spreads
  - 4 June 2007 through 30 July 2007;
  - 10 December 2007 through 10 March 2008;
  - 8 September 2008 through 5 December 2008.
- Periods of sharply falling credit spreads
  - 14 March 2008 through 13 June 2008;
  - 12 March 2009 through 11 June 2009.

6. In the future, OSFI may modify the above historical reference periods in coordination with supervisors on the BCBS, or specify additional reference periods, as it deems appropriate in light of developments in correlation trading markets. In addition, at their discretion, OSFI may require institutions to perform stress tests based on additional reference periods, or may require additional stress tests based on methodologies different from those described herein.

### 3.2 Historical stress tests

7. For each historical reference period, several stress tests are to be undertaken. Each stress scenario involves replicating historical movements in all credit-related risk factors over the reference period. In these exercises, only credit-related risk factors are shocked; for example, non-credit-related risk factors driving default-free term structures of interest rates and foreign exchange rates should be fixed at current levels.

8. This description presumes that the institution's pricing model can be used to decompose historical movements in credit spreads into changes in risk factors. If the pricing model does not take this form explicitly, the institution will need to translate the stress scenarios into equivalent risk factor representations that are compatible with the structure of its pricing model. As with all aspects of the standards set forth in this Appendix, such translations should be made in consultation with supervisors and are subject to supervisory approval.

### 3.3 Jumps to default

9. The preceding stress scenarios encompass changes in credit spreads, but abstract from defaults of individual firms. The final set of stress tests incorporates assumptions of actual defaults into

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the sector shock scenarios. For each historical scenario in (7), four jump-to-default (JTD) stress tests should be performed. In the first, the institution should assume an instantaneous JTD with zero recovery of that corporate name in the current CTP having the largest JTD01 measure. In the second stress test the institution should assume JTDs with zero recovery of the two corporate names having the largest JTD01 measures. Similarly, in the third (fourth) stress test, the institution should assume JTDs with zero recovery of the three (four) corporate names having the largest JTD01 measures. (JTD01 is defined as the estimated decline in the MTM value of the CTP portfolio associated with a JTD of that entity, assuming a zero recovery rate for the entity's liabilities.)

### 3.4 Additional technical guidance

10. Below, a given historical reference period is identified by its start date ( $t$ ) and end date ( $t+M$ ).

11. When calculating movements in risk factors over the historical reference period, the values of risk factors on dates  $t$  and  $t+M$  should be calibrated to be consistent with the institution's current pricing model and with actual market prices on those days.

12. In carrying out the stress tests, the institution's methodology should reflect the current credit quality of specific names, rather than the name's credit quality during the historical reference period. For example, if the current credit quality of a particular firm is worse than during the historical reference period, the shocks to risk factors for that firm should be consistent with those for similar quality firms over the reference period. Subject to OSFI approval, proxies for credit quality may be based on external ratings, implied ratings from credit spreads, or possibly other methods.

13. The current CTP's stressed MTM loss should be calculated as the difference between its current MTM value and its stressed MTM value.

14. MTM values should be based on full portfolio revaluation (e.g., no delta approximations).

15. Stress tests should be performed under the following assumptions:

(a) Portfolio positions are held static at their current levels (e.g., no recognition of dynamic hedging within the period).

(b) All credit-related risk factors are instantaneously shocked.

(c) Risk factors not directly related to credit risk (e.g., foreign exchange rates, commodity prices, risk-free term structures of interest rates, etc.) are fixed at current levels.

(d) In general, within the prescribed stress tests, the difference between the shocked value and the current value of each risk factor should be set equal to its absolute (as opposed to relative) change between dates  $t$  and  $t+M$ . Exceptions are to be approved by the supervisor.

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This treatment presumes that each stress scenario generates price effects that are internally consistent (e.g., positive spreads, no arbitrage opportunities). If this is not the case, a simple rescaling of certain risk factors may address the issue (e.g., a re-parameterisation to ensure that implied correlations and risk-neutral default rates and recoveries remain bounded between zero and one).

16. In cases where the historical value of a risk factor at date  $t$  or  $t+M$  is not known (perhaps because the current pricing model differs from that used over the interval  $t$  to  $t+M$ ), the risk factor value will need to be ‘backfilled’. Subject to OSFI approval, the backfilling method used by the institution should be consistent with the current pricing model and observed historical prices at  $t$  and  $t+M$ .

#### **4. Internal stress testing**

17. In addition to the prescribed stress tests set forth above, institutions applying the CRM approach are expected to implement a rigorous internal stress testing process for the CTP. Subject to supervisory review, an institution’s internal stress testing for the CTP should identify stress scenarios and then assess the effects of the scenarios on the MTM value of the CTP.

The framework is intended to be flexible. Scenarios may be historical, hypothetical, or model-based, and may be deterministic or stochastic. Key variables specified in a scenario may include, for example, default rates, recovery rates, credit spreads, and correlations, or they might focus directly on price changes for CTP positions. An institution may choose to have scenarios apply to the entire CTP, or it may identify scenarios specific to sub-portfolios of the CTP.

18. The internal stress tests should be economically meaningful, taking into account the current composition of the CTP, the institution’s business model for this desk, and the nature of its hedging activities. The form and severity of the stress scenarios should be developed with an eye toward their applicability to the unique characteristics (and vulnerabilities) of the current CTP including, but not limited to, concentration risks associated with particular geographic regions, economic sectors, and individual corporate names.

19. Taking into account the specific nature of the institution’s CTP, the internal stress tests should not be limited to the historical reference periods used for the prescribed stress tests described in Section 3. The institution should consider relevant historical experience over other time intervals, as well, including periods within, around, or subsequent to the historical reference periods specified above.

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## **Glossary**

<b>Basis risk</b>	The risk that the relationship between the prices of two similar, but not identical, instruments will change. Thus, even if maturities are perfectly matched, basis risk could remain.
<b>Basket</b>	A set of related instruments whose prices or rates are used to create a synthetic (composite) instrument.
<b>Beneficiary, Protection buyer, Fixed payer</b>	Terms that are used interchangeably when describing the counterparty that owns the asset and benefits from the protection provided by the credit derivative by paying a fixed amount to the protection provider.
<b>Building-block approach</b>	A method for measuring price risk which disaggregates risk specific to a security/issuer and general market risk
<b>Convertible bond</b>	A bond which gives either the investor or issuer the option to switch into equity at a fixed conversion price.
<b>Credit Event</b>	Credit default products are structured so that a payout occurs only when a pre-defined credit event (or one of several such events) occurs. Credit events will normally include bankruptcy, liquidation and any payment default on the reference asset, but may also include lesser events such as rescheduling or rating downgrades. In some contracts a pre-determined materiality (or loss) threshold may also trigger payment.
<b>Delta</b>	The expected change of an option's price as a proportion of a small change in the price of the underlying instrument. An option whose price changes by \$1 for every \$2 change in the price of the underlying has a delta of 0.5. The delta approaches 1.0 or -1.0 for options that are deep in-the-money and approaches 0 for options that are deep out-of-the-money.
<b>Duration</b>	A measure of the price sensitivity of debt securities to small parallel changes in interest rates. It is the weighted average maturity of all payments of a security, coupons plus principal, where the weights are the discounted present values of the payments. Modified duration is duration divided by a factor of

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one plus the interest rate.

**Exercise price also Strike price**

The fixed price at which an option holder has the right to buy, in the case of a call option, or to sell, in the case of a put option, the financial instrument covered by the option.

**Financial instrument**

Any contract that gives rise to both a financial asset of one entity and a financial liability or equity instrument of another entity. Financial instruments include both primary financial instruments (or cash instruments) and derivative financial instruments. A financial asset is any asset that is cash, the right to receive cash or another financial asset; or the contractual right to exchange financial assets on potentially favourable terms, or an equity instrument. A financial liability is the contractual obligation to deliver cash or another financial asset or to exchange financial liabilities under conditions that are potentially unfavourable.

**Forward rate agreement (FRA)**

A contract in which two counterparties agree on the interest rate to be paid on a notional deposit of specified maturity at a specific future time. Normally, no principal exchanges are involved, and the differences between the contracted rate and the prevailing rate is settled in cash.

**Guarantor, Protection seller/provider, Variable payer<sup>188</sup>**

Terms that are used interchangeably when describing the counterparty who is providing the protection against a potential default or taking on the risk of an asset they do not own by agreeing to make payment upon a credit event.

**Holding period**

The length of time that a financial institution is assumed to hold a given financial instrument for the purpose of calculating price volatility.

**Interest rate risk**

The risk that changes in market interest rates might adversely affect an institution's financial condition.

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<sup>188</sup> The word "guarantor" is used in connection with derivatives and similar instruments to describe the economic result that the protection provider/variable payer, in accordance with the term of such instrument, takes on a portion of the risk arising from the underlying reference asset (and conversely, that the protection beneficiary/fixed payer has mitigated such risk) and is not intended to imply that such a protection provider/variable payer is for legal or other purposes acting as a guarantor.



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<b>Interest rate swap</b>	A transaction in which two counterparties exchange interest payment streams of differing character based on an underlying notional principal amount. The three main types are coupon swaps (fixed rate to floating rate in the same currency), basis swaps (one floating rate index to another floating rate index in the same currency) and cross-currency interest rate swaps (fixed rate in one currency to floating rate in another).
<b>Investment grade</b>	Securities which are rated at or above Baa by Moody's Investors Services or BBB by Standard & Poor's Corporation.
<b>Long option position</b>	The position of a trader who has purchased an option regardless of whether it is a put or a call.
<b>Long position</b>	The position of the holder or buyer of a security or other instrument, or a position that appreciates in value when market prices increase.
<b>Marking-to-market</b>	The process of revaluing a portfolio on the basis of prevailing market prices.
<b>Matched weighted position</b>	The smaller of the sum of the risk weighted long positions or the sum of the risk weighted short positions within a time band or a zone or between zones.
<b>Observation period</b>	The period over which it is judged appropriate to review historical data in setting a capital requirement. For example, the requirement might be set according to observed price changes over the past five years.
<b>Recovery value</b>	The reference asset will normally retain some value after a credit event has triggered the settlement of a contract. Where payment under the contract is based on the recovery value.
<b>Reference asset</b>	The asset or assets whose credit risk is transferred. This may be a loan, security or other obligation, or a basket containing obligations of a single borrower or several borrowers that are named in the credit derivative contract.

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<b>Settlement</b>	The completion of a transaction, wherein the seller transfers securities or financial instruments to the buyer and the buyer transfers money to the seller.
<b>Short option position</b>	The position of a trader who has sold or written an option. The writer's maximum potential profit is the premium received.
<b>Short position</b>	A position whereby an investor incurs rights and obligations that mirror the characteristics of another counterparty's asset position, or a position that appreciates in value when the underlying market price decreases.
<b>Simulation</b>	A mathematical technique for measuring the likely performance of a given portfolio for changes in certain parameters such as market interest rates or foreign exchange rates.
<b>Swap</b>	A financial transaction in which two counterparties agree to exchange streams of payments over time according to a predetermined rule.
<b>Underlying asset</b>	The credit derivative may be used to hedge another position in an asset that is the same or similar to the reference asset. The position that the institution is attempting to hedge is referred to as the underlying asset.
<b>Volatility</b>	A measure of the variability of the price of an asset, usually defined as the standard deviation of observed changes in the natural logarithm of the asset price.
<b>Writer</b>	The party that sells an option. The writer is required to carry out the terms of the option at the choice of the holder.
<b>Zero coupon bonds</b>	Securities which do not make periodic interest payments and are redeemed at face value at a specified maturity date. These securities are sold at a deep discount, and the return accrues to the buyer as the security gradually appreciates.

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## Chapter 9      Stress Testing and Capital Requirements

As well as satisfying minimum capital requirements, institutions should assess the adequacy of the capital held by looking at risks that are not covered by minimum capital requirements. Stress testing is a tool for this assessment.

The purpose of this section is to clarify the difference between stress testing that is required as part of the minimum regulatory capital requirement and stress testing as part of an institution's internal capital assessment process.

### 9.1. Definition

Stress testing can be defined as "*the examination of the potential effects on a firm's financial condition of a set of specified changes in risk factors, corresponding to exceptional but plausible events.*"<sup>189</sup> Financial institutions often examine these effects through mathematical models; for example banks may develop a model of credit losses as a function of general credit conditions. Such a model is implicit in the IRB capital formula. Although these models can be used in a stress testing program, stress testing is much broader. Stress testing looks at what might happen when the assumptions underlying established models break down.

### 9.2. Minimum capital requirements

The minimum requirements of this guideline require institutions to consider stress testing in the development of inputs to the minimum regulatory capital formula. However, this does not necessarily imply that the minimum capital requirement is directly dependent on the results of stress testing. For example, under paragraph 468, banks must determine a stress LGD for each obligor if LGD is generally found to be correlated with PD, but an obligor's estimated LGD would not be determined from the result of a stress test.

Stress testing is required for institutions planning to use the IRB approach to credit risk in the banking book or the Advanced Measurement Approach to operational risk. Institutions that use or plan to use an internal model for the trading book are also required to stress test.

The following are examples of stress testing requirements in Pillar 1. See chapters 4, 5, 7 and 8 of this guideline for specific guidance on stress testing requirements.

#### *Credit risk*

- Paragraph 158 requires institutions using the comprehensive approach to credit risk mitigation to evaluate the performance of collateral in stress conditions;

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<sup>189</sup> Stress Testing by Large Financial Institutions: Current Practice and Aggregation Issues, Basel Committee

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- Paragraph 434 requires institutions to have sound stress testing processes in place for use in the assessment of the adequacy of capital for the risk it holds that addresses changes in market conditions and liquidity;
  - Paragraph 435 requires banks to perform stress tests to assess the effects of certain specific conditions on IRB capital;
  - Paragraph 436 requires institutions to look at both internal and external data given that minimum capital will be affected by migration of borrowers and ratings from high quality ratings to low;
  - Paragraph 527 states that as a minimum quantitative standard, institutions should have a stress testing program in place when using the internal model approach for banking book equities.

#### *Operational risk*

- Paragraph 669 (d) states that institutions may use internally determined correlations in operational risk losses across individual operational risk estimates provided that periods of stress are taken into consideration in correlation estimates.

#### *Market risk*

- Paragraph 56 in Annex 4 requires that institutions stress test counterparty exposures in addition to stressing market and credit risk factors;
- Paragraph 435 (i) states that institutions using the double default framework should consider as part of their stress testing framework the impact of a deterioration in the credit quality of protection providers;

### **9.3. Internal capital assessment**

In addition to satisfying minimum capital requirements, institutions are expected to conduct internal assessments of the adequacy of the capital they hold. Institutions should have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels.

As part of the internal capital assessment and management process, stress testing can help institutions to assess potential risks and help them understand how these risks may be managed. Institutions are expected to consider all material risks and may use stress tests to assess them.

Institutions should recognize that minimum capital requirements already demand capital to absorb certain risks. For example, the IRB minimum requirement for credit risk is calibrated to ensure that a well-diversified international institution could handle the losses it would incur over a year at a particular confidence level. Further, the requirements to use a downturn LGD may adequately handle diversified recovery risks. Institutions should take into account the stress capacity of minimum capital requirements in their internal capital assessment and management process.

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The extent and sophistication of institutions' efforts to assess capital adequacy should be commensurate with the importance and sophistication of various activities. Extensive and sophisticated stress testing may be necessary for certain activities that are complex and important at one institution; rather less may be sufficient for the same general type of activities at an institution where they are less complex or important.

Risk measurement and management are rapidly evolving, so it is not desirable or even possible to prescribe in detail the precise contents and structure of a sound stress testing regime for large complex institutions. Sound practice will evolve, and will depend on individual circumstances of institutions. Stress testing should be rigorous and comprehensive. Stress scenarios should be plausible and relevant to the composition of a bank's portfolio. They should identify vulnerabilities, and the potential for large losses from relationships between risk factors in a stressed environment.

Scenario analysis typically refers to a range of individual stresses or variation in parameters occurring at the same time. Scenario analyses often examine the impact of catastrophic events on a firm's financial position, for example simultaneous movements in a number of risk categories affecting all of an institution's business operations - such as volumes, investment values and interest rate movements. Scenarios can be derived in a variety of ways including stochastic models, analysis of historic experience or a repetition of a historical event. Scenarios can be developed with varying degrees of precision and depth.

To improve the value of the stress testing exercises, institutions should consider the following:

- Identifying a range of scenarios that could produce losses for portfolios or businesses;
- Ranking the scenarios by level of potential adverse impact; and
- Assessing relative probabilities for the scenarios

Stress tests should be integrated with internal controls, both those that manage risk in an institution's activities, as well as those that govern the assessment and management of its capital. They should also be integrated with the institution's reporting process, so that Senior Management and the Board can compare potential loss estimates resulting from stress tests, with approved risk tolerance limits. Stress tests complement statistical capital models, and mitigate institutions' reliance on one measure of risk. They may work better than some capital models in reflecting changed relations among risk factors.

Accordingly, stress test results should

- inform management about potential risks and their impact; and
- management should consider these risks in their capital planning and risk management practices.