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 x 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%.

Annex 1a

Definition of Capital Included in the Capital Base

A. Capital elements

Tier 1 (a) Paid-up share capital/common stock

(b) Disclosed reserves

Tier 2 (a) Undisclosed reserves

(b) Asset revaluation reserves

(c) General provisions/general loan-loss reserves (subject to provisions of paragraphs 42 and 43)

(d) Hybrid (debt/equity) capital instruments

(e) Subordinated debt

Tier 3 At the discretion of their national authority, banks may also use a third tier of capital (Tier 3), consisting of short-term subordinated debt as defined in paragraphs 49(xxi) and 49(xxii) of this Framework, for the sole purpose of meeting a proportion of the capital requirements for market risks.

The sum of Tier 1, Tier 2, and Tier 3 elements will be eligible for inclusion in the capital base, subject to the following limits.

B. Limits and restrictions

(i) The total of Tier 2 (supplementary) elements will be limited to a maximum of 100% of the total of Tier 1 elements;

(ii) Subordinated term debt will be limited to a maximum of 50% of Tier 1 elements;

(iii) Tier 3 capital will be limited to 250% of a bank's Tier 1 capital that is required to support market risks.

(iv) Where general provisions/general loan-loss reserves include amounts reflecting lower valuations of asset or latent but unidentified losses present in the balance sheet, the amount of such provisions or reserves will be limited to a maximum of 1.25 percentage points;

(v) Asset revaluation reserves which take the form of latent gains on unrealised securities (see below) will be subject to a discount of 55%.

C. Deductions from the capital base

From Tier 1: Goodwill and increase in equity capital resulting from a securitisation exposure, pursuant to paragraph 562 of this Framework

50% from Tier 1 and 50% from Tier 2 capital:

(i) Investments in unconsolidated banking and financial subsidiary companies.

N.B. The presumption is that this Framework would be applied on a consolidated basis to banking groups.

(ii) Investments in the capital of other banks and financial institutions (at the discretion of national authorities).

(iii) Significant minority investments in other financial entities.

D. Definition of capital elements

(i) **Tier 1**: includes only **permanent shareholders' equity** (issued and fully paid ordinary shares/common stock and perpetual non-cumulative preference shares) and **disclosed reserves** (created or increased by appropriations of retained earnings or other surplus, e.g. share premiums, retained profit, general reserves and legal reserves). Disclosed reserves also include general funds (such as fund for general banking risk in certain EC countries) of the same quality that meet the following criteria:

- Allocations to the funds must be made out of post-tax retained earnings or out of pre-tax earnings adjusted for all potential tax liabilities;
- The funds and movements into or out of them must be disclosed separately in the bank's published accounts;
- The funds must be available to a bank to meet losses for unrestricted and immediate use as soon as they occur;
- Losses cannot be charged directly to the funds but must be taken through the profit and loss account.

In the case of consolidated accounts, this also includes minority interests in the equity of subsidiaries which are less than wholly owned. This basic definition of capital excludes revaluation reserves and cumulative preference shares.

(ii) **Tier 2**

(a) Undisclosed reserves are eligible for inclusion within supplementary elements provided these reserves are accepted by the supervisor. Such reserves consist of that part of the accumulated after-tax surplus of retained profits which banks in some countries may be permitted to maintain as an undisclosed reserve. Apart from the fact that the reserve is not identified in the published balance sheet, it should have the same high quality and character as a disclosed capital reserve; as such, it should not be encumbered by any provision or other known liability but should be freely and immediately available to meet unforeseen future losses. This definition of undisclosed reserves excludes hidden values arising from holdings of securities in the balance sheet at below current market prices (see below).

(b) Revaluation reserves arise in two ways. Firstly, in some countries, banks (and other commercial companies) are permitted to revalue fixed assets, normally their own premises, from time to time in line with the change in market values. In some of these countries the amount of such revaluations is determined by law. Revaluations of this kind are reflected on the face of the balance sheet as a revaluation reserve.

Secondly, hidden values of "latent" revaluation reserves may be present as a result of long-term holdings of equity securities valued in the balance sheet at the historic cost of acquisition.

Both types of revaluation reserve may be included in Tier 2 provided that the assets are prudently valued, fully reflecting the possibility of price fluctuation and forced sale. In the case of "latent" revaluation reserves a discount of 55% will be applied to the difference between historic cost book value and market value to reflect the potential volatility of this form of unrealised capital and the notional tax charge on it.

(c) General provisions/general loan-loss reserves (for banks using the Standardised Approach for credit risk): provisions or loan-loss reserves held against future, presently unidentified losses are freely available to meet losses which subsequently materialise and therefore qualify for inclusion within supplementary elements. Provisions ascribed to identified deterioration of particular assets or known liabilities, whether individual or grouped, should be excluded. Furthermore, general provisions/general loan-loss reserves eligible for inclusion in Tier 2 will be limited to a maximum of 1.25 percentage points of weighted risk assets

(d) Hybrid (debt/equity) capital instruments. This heading includes a range of instruments which combine characteristics of equity capital and of debt. Their precise specifications differ from country to country, but they should meet the following requirements:

- they are *unsecured, subordinated* and *fully paid-up*;
- they are *not redeemable* at the initiative of the holder or without the prior consent of the supervisory authority;
- they are *available to participate in losses* without the bank being obliged to cease trading (unlike conventional subordinated debt);
- although the capital instrument may carry an obligation to pay interest that cannot permanently be reduced or waived (unlike dividends on ordinary shareholders' equity), *it should allow service obligations to be deferred* (as with cumulative preference shares) where the profitability of the bank would not support payment.

Cumulative preference shares, having these characteristics, would be eligible for inclusion in this category. In addition, the following are examples of instruments that may be eligible for inclusion: long-term preferred shares in Canada, titres participatifs and titres subordonnés à durée indéterminée in France, Genusscheine in Germany, perpetual subordinated debt and preference shares in the United Kingdom and mandatory convertible debt instruments in the United States. Debt capital instruments which do not meet these criteria may be eligible for inclusion in item (e).

(e) Subordinated term debt: includes conventional unsecured subordinated debt capital instruments with a minimum original fixed term to maturity of over five years and limited life redeemable preference shares. During the last five years to maturity, a cumulative discount (or amortisation) factor of 20% per year will be applied to reflect the diminishing value of these instruments as a continuing source of strength. Unlike instruments included in

item (d), these instruments are not normally available to participate in the losses of a bank which continues trading. For this reason these instruments will be limited to a maximum of 50% of Tier 1.

Annex 2

Standardised Approach – Implementing the Mapping Process

1. Because supervisors will be responsible for assigning an eligible ECAI's credit risk assessments to the risk weights available under the standardised approach, they will need to consider a variety of qualitative and quantitative factors to differentiate between the relative degrees of risk expressed by each assessment. Such qualitative factors could include the pool of issuers that each agency covers, the range of ratings that an agency assigns, each rating's meaning, and each agency's definition of default, among others.

2. Quantifiable parameters may help to promote a more consistent mapping of credit risk assessments into the available risk weights under the standardised approach. This Annex summarises the Committee's proposals to help supervisors with mapping exercises. The parameters presented below are intended to provide guidance to supervisors and are not intended to establish new or complement existing eligibility requirements for ECAIs.

Evaluating CDRs: two proposed measures

3. To help ensure that a particular risk weight is appropriate for a particular credit risk assessment, the Committee recommends that supervisors evaluate the cumulative default rate (CDR) associated with all issues assigned the same credit risk rating. Supervisors would evaluate two separate measures of CDRs associated with each risk rating contained in the standardised approach, using in both cases the CDR measured over a three-year period.

- To ensure that supervisors have a sense of the long-run default experience over time, supervisors should evaluate the ten-year average of the three-year CDR when this depth of data is available.[231] For new rating agencies or for those that have compiled less than ten years of default data, supervisors may wish to ask rating agencies what they believe the 10-year average of the three-year CDR would be for each risk rating and hold them accountable for such an evaluation thereafter for the purpose of risk weighting the claims they rate.
- The other measure that supervisors should consider is the most recent three-year CDR associated with each credit risk assessment of an ECAI.

4. Both measurements would be compared to aggregate, historical default rates of credit risk assessments that were compiled by the Committee and that are believed to represent an equivalent level of credit risk.

5. As three-year CDR data is expected to be available from ECAIs, supervisors should be able to compare the default experience of a particular ECAI's assessments with those issued by other rating agencies, in particular major agencies rating a similar population.

[231] In 2002, for example, a supervisor would calculate the average of the three-year CDRs for issuers assigned to each rating grade (the "cohort") for each of the ten years 1990 to1999.

Mapping risk ratings to risk weights using CDRs

6. To help supervisors determine the appropriate risk weights to which an ECAI's risk ratings should be mapped, each of the CDR measures mentioned above could be compared to the following reference and benchmark values of CDRs:

- For each step in an ECAI's rating scale, a ten-year average of the three-year CDR would be compared to a long run "reference" three-year CDR that would represent a sense of the long-run international default experience of risk assessments.
- Likewise, for each step in the ECAI's rating scale, the two most recent three-year CDR would be compared to "benchmarks" for CDRs. This comparison would be intended to determine whether the ECAI's most recent record of assessing credit risk remains within the CDR supervisory benchmarks.

7. Table 1 below illustrates the overall framework for such comparisons.

Table 1

Comparisons of CDR Measures[232]

International Experience (derived from the combined experience of major rating agencies)	Compare to	External Credit Assessment Institution
Set by the Committee as guidance		*Calculated by national supervisors based on the ECAI's own default data*
Long-run "reference" CDR	⟺	Ten-year average of the three-year CDR
CDR Benchmarks	⟺	Two most recent three-year CDR

1. Comparing an ECAI's long-run average three-year CDR to a long-run "reference" CDR

8. For each credit risk category used in the standardised approach of this Framework, the corresponding long-run reference CDR would provide information to supervisors on what its default experience has been internationally. The ten-year average of an eligible ECAI's particular assessment would not be expected to match exactly the long-run reference CDR. The long run CDRs are meant as guidance for supervisors, and not as "targets" that ECAIs would have to meet. The recommended long-run "reference" three-year CDRs for each of the Committee's credit risk categories are presented in Table 2 below, based on the Committee's observations of the default experience reported by major rating agencies internationally.

[232] It should be noted that each major rating agency would be subject to these comparisons as well, in which its individual experience would be compared to the aggregate international experience.

Table 2

Proposed long-run "reference" three-year CDRs

S&P Assessment *(Moody's)*	**AAA-AA** *(Aaa-Aa)*	**A** *(A)*	**BBB** *(Baa)*	**BB** *(Ba)*	**B** *(B)*
20-year average of three-year CDR	0.10%	0.25%	1.00%	7.50%	20.00%

2. Comparing an ECAI's most recent three-year CDR to CDR Benchmarks

9. Since an ECAI's own CDRs are not intended to match the reference CDRs exactly, it is important to provide a better sense of what upper bounds of CDRs are acceptable for each assessment, and hence each risk weight, contained in the standardised approach.

10. It is the Committee's general sense that the upper bounds for CDRs should serve as guidance for supervisors and not necessarily as mandatory requirements. Exceeding the upper bound for a CDR would therefore not necessarily require the supervisor to increase the risk weight associated with a particular assessment in all cases if the supervisor is convinced that the higher CDR results from some temporary cause other than weaker credit risk assessment standards.

11. To assist supervisors in interpreting whether a CDR falls within an acceptable range for a risk rating to qualify for a particular risk weight, two benchmarks would be set for each assessment, namely a "monitoring" level benchmark and a "trigger" level benchmark.

(a) "Monitoring" level benchmark

12. Exceeding the "monitoring" level CDR benchmark implies that a rating agency's current default experience for a particular credit risk-assessment grade is markedly higher than international default experience. Although such assessments would generally still be considered eligible for the associated risk weights, supervisors would be expected to consult with the relevant ECAI to understand why the default experience appears to be significantly worse. If supervisors determine that the higher default experience is attributable to weaker standards in assessing credit risk, they would be expected to assign a higher risk category to the ECAI's credit risk assessment.

(b) "Trigger" level

13. Exceeding the "trigger" level benchmark implies that a rating agency's default experience is considerably above the international historical default experience for a particular assessment grade. Thus there is a presumption that the ECAI's standards for assessing credit risk are either too weak or are not applied appropriately. If the observed three-year CDR exceeds the trigger level in two consecutive years, supervisors would be expected to move the risk assessment into a less favourable risk category. However, if supervisors determine that the higher observed CDR is not attributable to weaker

assessment standards, then they may exercise judgement and retain the original risk weight.[233]

14. In all cases where the supervisor decides to leave the risk category unchanged, it may wish to rely on Pillar 2 of this Framework and encourage banks to hold more capital temporarily or to establish higher reserves.

15. When the supervisor has increased the associated risk category, there would be the opportunity for the assessment to again map to the original risk category if the ECAI is able to demonstrate that its three-year CDR falls and remains below the monitoring level for two consecutive years.

(c) Calibrating the benchmark CDRs

16. After reviewing a variety of methodologies, the Committee decided to use Monte Carlo simulations to calibrate both the monitoring and trigger levels for each credit risk assessment category. In particular, the proposed monitoring levels were derived from the 99th percentile confidence interval and the trigger level benchmark from the 99.9th percentile confidence interval. The simulations relied on publicly available historical default data from major international rating agencies. The levels derived for each risk assessment category are presented in Table 3 below, rounded to the first decimal:

Table 3

Proposed three-year CDR benchmarks

S&P Assessment *(Moody's)*	**AAA-AA** *(Aaa-Aa)*	**A** *(A)*	**BBB** *(Baa)*	**BB** *(Ba)*	**B** *(B)*
Monitoring Level	0.8%	1.0%	2.4%	11.0%	28.6%
Trigger Level	1.2%	1.3%	3.0%	12.4%	35.0%

[233] For example, if supervisors determine that the higher default experience is a temporary phenomenon, perhaps because it reflects a temporary or exogenous shock such as a natural disaster, then the risk weighting proposed in the standardised approach could still apply. Likewise, a breach of the trigger level by several ECAIs simultaneously may indicate a temporary market change or exogenous shock as opposed to a loosening of credit standards. In either scenario, supervisors would be expected to monitor the ECAI's assessments to ensure that the higher default experience is not the result of a loosening of credit risk assessment standards.

Annex 3

Capital Treatment for Failed Trades and Non-DvP Transactions

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, pursuant to paragraph 88 and 89 of this Framework.

2. Transactions settled through a delivery-versus-payment system (DvP)[234], 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[235].

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 Framework.

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

[235] 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 Framework.

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

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

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[236]. This means that a bank under the IRB approach will apply the appropriate IRB formula set out in this Framework, 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 Framework. 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.

[236] 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.

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 Framework.[237] 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

[237] 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.

collateral. Generally, in margin lending transactions, the loan amount is collateralised by securities whose value is greater than the amount of the loan.

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 the provisions of paragraphs 96 (i) to 96 (v) of this Annex, this Framework text on credit risk mitigation techniques, 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.
- **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.
- **General Wrong-Way Risk** arises when the probability of default of counterparties is positively correlated with general market risk factors.
- **Specific Wrong-Way Risk** arises when the exposure to a particular counterpart is positively correlated with the probability of default of the counterparty due to the nature of the transactions with the counterparty.

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[238].

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.

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

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 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 all of the three 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 all three 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[239]

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 recognising a Cross-Product Netting Arrangement.

[239] 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 the 1988 Accord, as amended, or in this Framework. The rules in the 1988 Accord and this Framework continue to apply for purposes of regulatory capital recognition of netting within product categories under IMM or other relevant methodology.

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.

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 paragraphs 96(i) to 96(v) of this Annex, or (ii) credit risk mitigation techniques in Part 2, Section II.D of this Framework.

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

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 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 standardised method or 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 either the standardised method or the current exposure method. Combined use of the current exposure method and the standardised method is permitted on a permanent basis within a group. Combined use of the current exposure method and the standardised method within a legal entity is only permissible for the cases indicated in paragraph 90 of this Annex.

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

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 either the current exposure or standardised methods 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 703 of this Framework 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 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:

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

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…[240] Specifically, "Effective EE" is computed recursively as

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

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:

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

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

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[240] 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.

32. Alpha (α) is set equal to 1.4.

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 of this Framework is replaced with the following:

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

where df_k is the risk-free discount factor for future time period t_k and the remaining symbols are defined above. Similar to the treatment under corporate exposures, M has a cap of five years.[241]

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 of this Framework is unchanged and a floor of one year applies, with the exception of short-term exposures as described in paragraphs 321 to 323 of this Framework.

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 unmargined 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.[242] A supervisory floor of five business days for netting sets consisting only of repo-style transactions subject to daily remargining 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 in paragraph 718 (LXXIV) 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

[241] 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.

[242] 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.

validated over a long time horizon. In contrast, VaR for market risk is measured over a short time horizon (typically, one to ten days).

- 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 threshold of unmargined exposure the bank is willing to accept, and the minimum transfer amount. Such a model must either model the mark-to-market change in the value of collateral posted or apply this Framework's rules for collateral.

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 in paragraph 718(Lxxiv) (b) and 718(xcviii), 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 of this Framework) 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 include meeting the requirements related to the qualifying standards on

CCR Management, a use test, stress testing, identification of wrong-way risk, and internal controls.

Qualifying standards on CCR Management

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, including those specified in paragraphs 777 (i) to 777 (xiv) of this Framework.

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.[243] This Framework must include the measurement of usage of credit lines (aggregating counterparty exposures with other credit exposures) and economic capital allocation. In addition to EPE (a measure of future exposure), a bank must measure and manage current exposures. Where appropriate, the bank must measure current exposure gross and net of collateral held. The use test is satisfied if a bank uses other counterparty risk measures, such as peak exposure or potential future exposure (PFE), based on the distribution of exposures generated by the same model to compute EPE.

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[243] 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.

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.

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.

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.

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 this 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.[244]

[244] See Part 2, Section VI D 1 (paragraphs 718 (LXX) to 718 (LXXIII).

65. Pillar 2 of this Framework provides general background and specific guidance to cover counterparty credit risks that may not be fully covered by the Pillar 1 process.

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 paragraphs 96(I) to 96(v) of this Annex, this Framework text on credit risk mitigation techniques, 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 Part 2, Section II.D of this Framework.

VI. Standardised Method

69. Banks that do not have approval to apply the internal models method for the relevant OTC transactions may use the standardised method. The standardised method can be used only for OTC derivatives; SFTs are subject to the treatments set out under the Internal Model Method of this Annex or under the Part 2, Section II.D, of this Framework. The exposure amount (under the standardised approach for credit risk) or EAD is to be calculated separately for each netting set. It is determined as follows:

$$\text{exposure amount or EAD} = \beta \cdot \max\left(CMV - CMC; \sum_j \left| \sum_i RPT_{ij} - \sum_l RPC_{lj} \right| \times CCF_j \right)$$

where:

CMV = current market value of the portfolio of transactions within the netting set with a counterparty gross of collateral, i.e. $CMV = \sum_i CMV_i$, where CMV_i is the current market value of transaction i.

CMC = current market value of the collateral assigned to the netting set, i.e. $CMC = \sum_l CMC_l$, where CMC_l is the current market value of collateral l.

i = index designating transaction.

l = index designating collateral.

j = index designating supervisory hedging sets. These hedging sets correspond to risk factors for which risk positions of opposite sign

can be offset to yield a net risk position on which the exposure measure is then based.

RPT_{ij} = Risk position from *transaction* i with respect to hedging set j [245].

RPC_{lj} = Risk position from collateral l with respect to hedging set j.

CCF_j = Supervisory credit conversion factor with respect to the hedging set j[246].

β = Supervisory scaling parameter.

Collateral received from a counterparty has a positive sign; collateral posted to a counterparty has a negative sign.

Collateral that is recognised for the standardised approach is confined to the collateral that is eligible under paragraphs 146 and 703 of this Framework for credit risk mitigation.

70. When an OTC derivative transaction with linear risk profile (e.g. a forward, a future or a swap agreement) stipulates the exchange of a financial instrument (e.g. a bond, an equity, or a commodity) for a payment, the payment part is referred to as the payment leg. Transactions that stipulate the exchange of payment against payment (e.g. an interest rate swap or a foreign exchange forward) consist of two payment legs. The payment legs consist of the contractually agreed gross payments, including the notional amount of the transaction. Banks may disregard the interest rate risk from payment legs with a remaining maturity of less than one year from the following calculations. Banks may treat transactions that consist of two payment legs that are denominated in the same currency (e.g. interest rate swaps) as a single aggregate transaction. The treatment for payment legs applies to the aggregate transaction.

71. Transactions with linear risk profiles that have equity (including equity indices), gold, other precious metals or other commodities as the underlying financial instruments are mapped to a risk position in the respective equity (or equity index) or commodity (including gold and the other precious metals) hedging set. The payment leg of these transactions is mapped to an interest rate risk position within the appropriate interest rate hedging set. If the payment leg is denominated in a foreign currency, the transaction is also mapped to a foreign exchange risk position in the respective currency.

72. Transactions with linear risk profiles that have a debt instrument (e.g. a bond or a loan) as the underlying instrument are mapped to an interest rate risk positions with one risk position for the debt instrument and another risk position for the payment leg. Transactions with linear risk profiles that stipulate the exchange of payment against payment (including foreign exchange forwards) are mapped to an interest rate risk position for each of the payment legs. If the underlying debt instrument is denominated in a foreign currency, the debt instrument is mapped to a foreign exchange risk position in the respective currency. If a

[245] E.g. a short-term FX forward with one leg denominated in the firm's domestic currency will be mapped into three risk positions: 1. an FX risk position, 2. a foreign currency interest rate risk position, 3. a domestic currency risk position.

[246] Calibration has been made assuming at the money forwards or swaps and given a forecasting horizon of one year.

payment leg is denominated in a foreign currency, the payment leg is also mapped to a foreign exchange risk position in this currency.[247] The exposure amount or EAD assigned to a foreign exchange basis swap transactions is zero.

73. For all but debt instruments, the size of a risk position from a transaction with linear risk profile is the effective notional value (market price multiplied by quantity) of the underlying financial instruments (including commodities) converted to the firm's domestic currency.

74. For debt instruments and the payment legs of all transactions, the size of the risk position is the effective notional value of the outstanding gross payments (including the notional amount) converted to the firm's domestic currency, multiplied by the modified duration of the debt instrument or payment leg, respectively.

75. The size of a risk position from a credit default swap is the notional value of the reference debt instrument multiplied by the remaining maturity of the credit default swap.

76. The size of a risk position from an OTC derivative with non-linear risk profile (including options and swaptions) is equal to the delta equivalent effective notional value of the financial instrument that underlies the transaction, except in the case of an underlying debt instrument.

77. For OTC derivative with non-linear risk profiles (including options and swaptions), for which the underlying is a debt instrument or a payment leg, the size of the risk position is equal to the delta equivalent effective notional value of the financial instrument or payment leg multiplied by the modified duration of the debt instrument or payment leg.

78. Banks may use the following formulas to determine the size and sign of a risk position:

a. for all but debt instruments:

effective notional value, or delta equivalent notional value =

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

where

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

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

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

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

[247] E.g. a short-term FX forward with one leg denominated in the firm's domestic currency will be mapped into three risk positions: 1. an FX risk position, 2. a foreign currency interest rate risk position, 3. a domestic currency risk position.

effective notional value multiplied by the modified duration, or

delta equivalent in notional value multiplied by the modified duration

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

where

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

r interest level

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

79. The risk positions are to be grouped into hedging sets. For each hedging set, the absolute value amount of the sum of the resulting risk positions is computed. This sum is termed the “net risk position” and is represented as

$$\left| \sum_i RPT_{ij} - \sum_l RPC_{lj} \right|$$

in the formulas in paragraph 70 of this Annex.

80. Interest rate positions arising from debt instruments of low specific risk are to be mapped into one of six hedging sets for each represented currency. A debt instrument is classified as being of low specific risk when it is subject to a 1.6 percent or lower capital charge according to paragraphs 710 to 711(ii). Interest rate positions arising from the payment legs are to be assigned to the same hedging sets as interest rate risk positions from debt instruments of low specific risk. Interest rate positions arising from money deposits received from the counterparty as collateral are also to be assigned to the same hedging sets as interest rate risk positions from debt instruments of low specific risk. The six hedging sets per currency are defined by a combination of two criteria:

(i) The nature of the referenced interest rate — either a sovereign (government) rate or some other rate.

(ii) The remaining maturity or rate-adjustment frequency — less than one year, between one and five years, or longer than five years.

Table 1

Hedging Sets for Interest Rate Risk Positions Per Currency

Remaining maturity or rate-adjustment frequency	Sovereign-referenced interest rates	Non-sovereign-referenced interest rates
One year or less	X	X
Over one year to five years	X	X
Over five years	X	X

81. For underlying debt instruments (e.g. floating rate notes) or payment legs (e.g. floating rate legs of interest swaps) for which the interest rate is linked to a reference interest rate that represents a general market interest level (e.g. government bond yield, money market rate, swap rate), the rate-adjustment frequency is the length of the time interval up to the next re-adjustment of the reference interest rate. Otherwise, the remaining maturity is the remaining life of the underlying debt instrument, or, in the case of a payment leg, the remaining life of the transaction.

82. There is one hedging set for each issuer of a reference debt instrument that underlies a credit default swap.

83. There is one hedging set for each issuer of a debt instrument of high specific risk, i.e. debt instruments to which a capital charge of more than 1.60 percent applies under the standardised measurement method for interest rate risk in paragraph 710. The same applies to money deposits that are posted with a counterparty as collateral when that counterparty does not have debt obligations of low specific risk outstanding. When a payment leg emulates a debt instrument of high specific risk (e.g. in the case of a total return swap with one leg that emulates a bond), there is also one hedging set for each issuer of the reference debt instrument. Banks may assign risk positions that arise from debt instruments of a certain issuer or from reference debt instruments of the same issuer that are emulated by payment legs or that underlie a credit default swap to the same hedging set.

84. Underlying financial instruments other than debt instruments (equities, precious metals, commodities, other instruments), are assigned to the same respective hedging sets only if they are identical or similar instruments. The similarity of instruments is established as follows:

- For equities, similar instruments are those of the same issuer. An equity index is treated as a separate issuer.
- For precious metals, similar instruments are those of the same metal. A precious metal index is treated as a separate precious metal.
- For commodities, similar instruments are those of the same commodity. A commodity index is treated as a separate commodity.
- For electric power, delivery rights and obligations that refer to the same peak or off-peak load time interval within any 24 hour interval are similar instruments.

85. The credit conversion factor that is applied to a net risk position from a hedging set depends on the supervisory hedging set category as given in paragraphs 86 to 88 of this Annex.

86. The credit conversion factors for underlying financial instruments other than debt instruments and for foreign exchange rates are given in Table 2.

Table 2

Exchange Rates	Gold	Equity	Precious Metals (except gold)	Electric Power	Other Commodities (excluding precious metals)
2.5%	5.0%	7.0%	8.5%	4%	10.0%

87. The credit conversion factor for risk positions from debt instruments are as follows:

- 0.6 percent for risk positions from a debt instrument or reference debt instrument of high specific risk.
- 0.3 percent for risk position from a reference debt instrument that underlies a credit default swap and that is of low specific risk.
- 0.2 percent otherwise.

88. Underlying instruments of OTC derivatives that are not in any of the categories above are assigned to separate individual hedging sets for each category of underlying instrument. A credit conversion factor of 10 percent is applied to the notional equivalent amount.

89. There may be transactions with a non-linear risk profile for which the bank cannot determine the delta with a model that the supervisor has approved for the purposes for determining the minimum capital requirements for market risk (instrument models approved for the purposes of the standardised approach for market risk, or instrument models approved as part of the firm's admission to the internal modelling approach for market risk). In the case of payment legs and transactions with debt instruments as underlying, there may be transactions for which the bank cannot determine the modified duration with such a model. For these transactions, the supervisor will determine the size of the risk positions and the applicable credit conversion factors conservatively. Alternatively, supervisors may require the use of the current exposure method. Netting will not be recognised: in other words, the exposure amount or EAD is to be determined as if there were a netting set that comprises just the individual transaction.

90. The supervisory scaling parameter β (beta) is set at 1.4.

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 of this Framework. 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 under the Part 2, Section II.D, of this Framework.

92. (Deleted)

92(i) Under the Current Exposure Method, banks must calculate the current replacement cost by marking contracts to market, thus capturing the current exposure without any need for estimation, and then adding a factor (the "add-on") to reflect the potential future exposure over the remaining life of the contract. It has been agreed that, in order to calculate the credit equivalent amount of these instruments under this current exposure method, a bank would sum:

- The total replacement cost (obtained by "marking to market") of all its contracts with positive value; and

- An amount for potential future credit exposure calculated on the basis of the total notional principal amount of its book, split by residual maturity as follows:

	Interest Rates	**FX and Gold**	**Equities**	**Precious Metals Except Gold**	**Other Commodities**
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%

Notes:

1. For contracts with multiple exchanges of principal, the factors are to be multiplied by the number of remaining payments in the contract.

2. 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 that meet the above criteria, the add-on factor is subject to a floor of 0.5%.

3. Forwards, swaps, purchased options and similar derivative contracts not covered by any of the columns of this matrix are to be treated as "other commodities".

4. No potential future credit exposure would be calculated for single currency floating/floating interest rate swaps; the credit exposure on these contracts would be evaluated solely on the basis of their mark-to-market value.

92(ii). Supervisors will take care to ensure that the add-ons are based on effective rather than apparent notional amounts. In the event that the stated notional amount is leveraged or enhanced by the structure of the transaction, banks must use the effective notional amount when determining potential future exposure.

93. Banks can obtain capital relief for collateral as defined in paragraphs 146 and 703 of this Framework. The methodology for the recognition of eligible collateral follows that of the applicable approach for credit risk.

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 paragraph 707 of this Framework.

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

96. Where a credit derivative is an n^{th}-to-default transaction (such as a first-to-default transaction), the treatment specified in paragraph 708 of this Framework applies.

Bilateral netting

96(i). Careful consideration has been given to the issue of **bilateral netting**, i.e. weighting the net rather than the gross claims with the same counterparties arising out of the full range of forwards, swaps, options and similar derivative contracts.[248] The Committee is concerned that if a liquidator of a failed counterparty has (or may have) the right to unbundle netted contracts, demanding performance on those contracts favourable to the failed counterparty and defaulting on unfavourable contracts, there is no reduction in counterparty risk.

96(ii). Accordingly, it has been agreed for capital adequacy purposes that:

(a) Banks may net transactions subject to novation under which any obligation between a bank and its counterparty to deliver a given currency on a given value date is automatically amalgamated with all other obligations for the same currency and value date, legally substituting one single amount for the previous gross obligations.

(b) Banks may also net transactions subject to any legally valid form of bilateral netting not covered in (a), including other forms of novation.

(c) In both cases (a) and (b), a bank will need to satisfy its national supervisor that it has:[249]

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

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

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[248] Payments netting, which is designed to reduce the operational costs of daily settlements, will not be recognised in the capital framework since the counterparty's gross obligations are not in any way affected.

[249] In cases where an agreement as described in 96(ii) (a) has been recognised prior to July 1994, the supervisor will determine whether any additional steps are necessary to satisfy itself that the agreement meets the requirements set out below.

- The law of the jurisdiction in which the counterparty is chartered and, if the foreign branch of a counterparty is involved, then also under the law of the jurisdiction in which the branch is located;

- The law that governs the individual transactions; and

- The law that governs any contract or agreement necessary to effect the netting.

The national supervisor, after consultation when necessary with other relevant supervisors, must be satisfied that the netting is enforceable under the laws of each of the relevant jurisdictions;[250]

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

96(iii). Contracts containing walkaway clauses will not be eligible for netting for the purpose of calculating capital requirements pursuant to this Framework. 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 a defaulter, even if the defaulter is a net creditor.

96(iv). Credit exposure on bilaterally netted forward transactions will be calculated as the sum of the net mark-to-market replacement cost, if positive, plus an add-on based on the notional underlying principal. The add-on for netted transactions (A_{Net}) will equal the weighted average of the gross add-on (A_{Gross})[251] and the gross add-on adjusted by the ratio of net current replacement cost to gross current replacement cost (NGR). This is expressed through the following formula:

$$A_{Net}=0.4*A_{Gross}+0.6*NGR*A_{Gross}$$

where :

NGR=level of net replacement cost/level of gross replaceent cost for transactions subject to legally enforceable netting agreements[252]

96(v). The scale of the gross add-ons to apply in this formula will be the same as those for non-netted transactions as set out in paragraphs 91 to 96 of this Annex. The Committee will

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

[251] A_{Gross} equals the sum of individual add-on amounts (calculated by multiplying the notional principal amount by the appropriate add-on factors set out in paragraph 92(i) of this Annex) of all transactions subject to legally enforceable netting agreements with one counterparty.

[252] National authorities may permit a choice of calculating the NGR on a counterparty by counterparty or on an aggregate basis for all transactions subject to legally enforceable netting agreements. If supervisors permit a choice of methods, the method chosen by an institution is to be used consistently. Under the aggregate approach, net negative current exposures to individual counterparties cannot be used to offset net positive current exposures to others, i.e. for each counterparty the net current exposure used in calculating the NGR is the maximum of the net replacement cost or zero. Note that under the aggregate approach, the NGR is to be applied individually to each legally enforceable netting agreement so that the credit equivalent amount will be assigned to the appropriate counterparty risk weight category.

continue to review the scale of add-ons to make sure they are appropriate. For purposes of calculating potential future credit exposure to a netting counterparty for forward foreign exchange contracts and other similar contracts 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 for this 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.

Risk weighting

96(vi). Once the bank has calculated the credit equivalent amounts they are to be **weighted** according to the category of counterparty in the same way as in the main framework, including concessionary weighting in respect of exposures backed by eligible guarantees and collateral. The Committee will keep a close eye on the credit quality of participants in these markets and reserves the right to raise the weights if average credit quality deteriorates or if loss experience increases.

Annex 5

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 Part 2, Section III. 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.

Illustrative IRB Risk Weights for UL

Asset Class:	**Corporate Exposures**		**Residential Mortgages**		**Other Retail Exposures**		**Qualifying Revolving Retail Exposures**	
LGD:	45%	45%	45%	25%	45%	85%	45%	85%
Maturity: 2.5 years								
Turnover (millions of €)	50	5						
PD:								
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 6

Supervisory Slotting Criteria for Specialised Lending

Table 1 — Supervisory Rating Grades for Project Finance Exposures

	Strong	Good	Satisfactory	Weak
Financial strength				
Market conditions	Few competing suppliers or substantial and durable advantage in location, cost, or technology. Demand is strong and growing	Few competing suppliers or better than average location, cost, or technology but this situation may not last. Demand is strong and stable	Project has no advantage in location, cost, or technology. Demand is adequate and stable	Project has worse than average location, cost, or technology. Demand is weak and declining
Financial ratios (e.g. *debt service coverage ratio (DSCR), loan life coverage ratio (LLCR), project life coverage ratio (PLCR), and debt-to-equity ratio*)	Strong financial ratios considering the level of project risk; very robust economic assumptions	Strong to acceptable financial ratios considering the level of project risk; robust project economic assumptions	Standard financial ratios considering the level of project risk	Aggressive financial ratios considering the level of project risk
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

	Strong	Good	Satisfactory	Weak
Financial structure				
Duration of the credit compared to the duration of the project	Useful life of the project significantly exceeds tenor of the loan	Useful life of the project exceeds tenor of the loan	Useful life of the project exceeds tenor of the loan	Useful life of the project may not exceed tenor of the loan
Amortisation schedule	Amortising debt	Amortising debt	Amortising debt repayments with limited bullet payment	Bullet repayment or amortising debt repayments with high bullet repayment
Political and legal environment				
Political risk, including transfer risk, considering project type and mitigants	Very low exposure; strong mitigation instruments, if needed	Low exposure; satisfactory mitigation instruments, if needed	Moderate exposure; fair mitigation instruments	High exposure; no or weak mitigation instruments
Force majeure risk (war, civil unrest, etc),	Low exposure	Acceptable exposure	Standard protection	Significant risks, not fully mitigated
Government support and project's importance for the country over the long term	Project of strategic importance for the country (preferably export-oriented). Strong support from Government	Project considered important for the country. Good level of support from Government	Project may not be strategic but brings unquestionable benefits for the country. Support from Government may not be explicit	Project not key to the country. No or weak support from Government
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

	Strong	Good	Satisfactory	Weak
Enforceability of contracts, collateral and security	Contracts, collateral and security are enforceable	Contracts, collateral and security are enforceable	Contracts, collateral and security are considered enforceable even if certain non-key issues may exist	There are unresolved key issues in respect if actual enforcement of contracts, collateral and security
Transaction characteristics				
Design and technology risk	Fully proven technology and design	Fully proven technology and design	Proven technology and design — start-up issues are mitigated by a strong completion package	Unproven technology and design; technology issues exist and/or complex design
Construction risk				
Permitting and siting	All permits have been obtained	Some permits are still outstanding but their receipt is considered very likely	Some permits are still outstanding but the permitting process is well defined and they are considered routine	Key permits still need to be obtained and are not considered routine. Significant conditions may be attached
Type of construction contract	Fixed-price date-certain turnkey construction 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

	Strong	Good	Satisfactory	Weak
Track record and financial strength of contractor in constructing similar projects.	Strong	Good	Satisfactory	Weak
Operating risk				
Scope and nature of operations and maintenance (O & M) contracts	Strong long-term O&M contract, preferably with contractual performance incentives, and/or O&M reserve accounts	Long-term O&M contract, and/or O&M reserve accounts	Limited O&M contract or O&M reserve account	No O&M contract: risk of high operational cost overruns beyond mitigants
Operator's expertise, track record, and financial strength	Very strong, or committed technical assistance of the sponsors	Strong	Acceptable	Limited/weak, or local operator dependent on local authorities
Off-take risk				
(a) If there is a take-or-pay or fixed-price off-take contract:	Excellent creditworthiness of off-taker; strong termination clauses; tenor of contract comfortably exceeds the maturity of the debt	Good creditworthiness of off-taker; strong termination clauses; tenor of contract exceeds the maturity of the debt	Acceptable financial standing of off-taker; normal termination clauses; tenor of contract generally matches the maturity of the debt	Weak off-taker; weak termination clauses; tenor of contract does not exceed the maturity of the debt
(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

	Strong	Good	Satisfactory	Weak
Supply risk				
Price, volume and transportation risk of feed-stocks; supplier's track record and financial strength	Long-term supply contract with supplier of excellent financial standing	Long-term supply contract with supplier of good financial standing	Long-term supply contract with supplier of good financial standing — a degree of price risk may remain	Short-term supply contract or long-term supply contract with financially weak supplier — a degree of price risk definitely remains
Reserve risks (e.g. natural resource development)	Independently audited, proven and developed reserves well in excess of requirements over lifetime of the project	Independently audited, proven and developed reserves in excess of requirements over lifetime of the project	Proven reserves can supply the project adequately through the maturity of the debt	Project relies to some extent on potential and undeveloped reserves
Strength of Sponsor				
Sponsor's track record, financial strength, and country/sector experience	Strong sponsor with excellent track record and high financial standing	Good sponsor with satisfactory track record and good financial standing	Adequate sponsor with adequate track record and good financial standing	Weak sponsor with no or questionable track record and/or financial weaknesses
Sponsor support, as evidenced by equity, ownership clause and incentive to inject additional cash if necessary	Strong. Project is highly strategic for the sponsor (core business — long-term strategy)	Good. Project is strategic for the sponsor (core business — long-term strategy)	Acceptable. Project is considered important for the sponsor (core business)	Limited. Project is not key to sponsor's long-term strategy or core business
Security Package				
Assignment of contracts and accounts	Fully comprehensive	Comprehensive	Acceptable	Weak

	Strong	Good	Satisfactory	Weak
Pledge of assets, taking into account quality, value and liquidity of assets	First perfected security interest in all project assets, contracts, permits and accounts necessary to run the project	Perfected security interest in all project assets, contracts, permits and accounts necessary to run the project	Acceptable security interest in all project assets, contracts, permits and accounts necessary to run the project	Little security or collateral for lenders; weak negative pledge clause
Lender's control over cash flow (e.g. cash sweeps, independent escrow accounts)	Strong	Satisfactory	Fair	Weak
Strength of the covenant package (mandatory prepayments, payment deferrals, payment cascade, dividend restrictions…)	Covenant package is strong for this type of project Project may issue no additional debt	Covenant package is satisfactory for this type of project Project may issue extremely limited additional debt	Covenant package is fair for this type of project Project may issue limited additional debt	Covenant package is Insufficient for this type of project Project may issue unlimited additional debt
Reserve funds (debt service, O&M, renewal and replacement, unforeseen events, etc)	Longer than average coverage period, all reserve funds fully funded in cash or letters of credit from highly rated bank	Average coverage period, all reserve funds fully funded	Average coverage period, all reserve funds fully funded	Shorter than average coverage period, reserve funds funded from operating cash flows

Table 2 — Supervisory Rating Grades for Income-Producing Real Estate Exposures and High-Volatility Commercial Real Estate Exposures

	Strong	Good	Satisfactory	Weak
Financial strength				
Market conditions	The supply and demand for the project's type and location are currently in equilibrium. The number of competitive properties coming to market is equal or lower than forecasted demand	The supply and demand for the project's type and location are currently in equilibrium. The number of competitive properties coming to market is roughly equal to forecasted demand	Market conditions are roughly in equilibrium. Competitive properties are coming on the market and others are in the planning stages. The project's design and capabilities may not be state of the art compared to new projects	Market conditions are weak. It is uncertain when conditions will improve and return to equilibrium. The project is losing tenants at lease expiration. New lease terms are less favourable compared to those expiring
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

	Strong	Good	Satisfactory	Weak
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) 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

	Strong	Good	Satisfactory	Weak
(c) For construction phase	The property is entirely pre-leased through the tenor of the loan or pre-sold to an investment grade tenant or buyer, or the bank has a binding commitment for take-out financing from an investment grade lender	The property is entirely pre-leased or pre-sold to a creditworthy tenant or buyer, or the bank has a binding commitment for permanent financing from a creditworthy lender	Leasing activity is within projections but the building may not be pre-leased and there may not exist a take-out financing. The bank may be the permanent lender	The property is deteriorating due to cost overruns, market deterioration, tenant cancellations or other factors. There may be a dispute with the party providing the permanent financing
Asset characteristics				
Location	Property is located in highly desirable location that is convenient to services that tenants desire	Property is located in desirable location that is convenient to services that tenants desire	The property location lacks a competitive advantage	The property's location, configuration, design and maintenance have contributed to the property's difficulties
Design and condition	Property is favoured due to its design, configuration, and maintenance, and is highly competitive with new properties	Property is appropriate in terms of its design, configuration and maintenance. The property's design and capabilities are competitive with new properties	Property is adequate in terms of its configuration, design and maintenance	Weaknesses exist in the property's configuration, design or maintenance
Property is under construction	Construction budget is conservative and technical hazards are limited. Contractors are highly qualified	Construction budget is conservative and technical hazards are limited. Contractors are highly qualified	Construction budget is adequate and contractors are ordinarily qualified	Project is over budget or unrealistic given its technical hazards. Contractors may be under qualified

	Strong	Good	Satisfactory	Weak
Strength of Sponsor/Developer				
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

	Strong	Good	Satisfactory	Weak
Security Package				
Nature of lien	Perfected first lien[253]	Perfected first lien[253]	Perfected first lien[253]	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

[253] 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

	Strong	Good	Satisfactory	Weak
Financial strength				
Market conditions	Demand is strong and growing, strong entry barriers, low sensitivity to changes in technology and economic outlook	Demand is strong and stable. Some entry barriers, some sensitivity to changes in technology and economic outlook	Demand is adequate and stable, limited entry barriers, significant sensitivity to changes in technology and economic outlook	Demand is weak and declining, vulnerable to changes in technology and economic outlook, highly uncertain environment
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
Political and legal environment				
Political risk, including transfer risk	Very low; strong mitigation instruments, if needed	Low; satisfactory mitigation instruments, if needed	Moderate; fair mitigation instruments	High; no or weak mitigation instruments

	Strong	Good	Satisfactory	Weak
Legal and regulatory risks	Jurisdiction is favourable to repossession and enforcement of contracts	Jurisdiction is favourable to repossession and enforcement of contracts	Jurisdiction is generally favourable to repossession and enforcement of contracts, even if repossession might be long and/or difficult	Poor or unstable legal and regulatory environment. Jurisdiction may make repossession and enforcement of contracts lengthy or impossible
Transaction characteristics				
Financing term compared to the economic life of the asset	Full payout profile/minimum balloon. No grace period	Balloon more significant, but still at satisfactory levels	Important balloon with potentially grace periods	Repayment in fine or high balloon
Operating risk				
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

	Strong	Good	Satisfactory	Weak
Asset characteristics				
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
Strength of sponsor				
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

	Strong	Good	Satisfactory	Weak
Security Package				
Asset control	Legal documentation provides the lender effective control (e.g. a first perfected security interest, or a leasing structure including such security) on the asset, or on the company owning it	Legal documentation provides the lender effective control (e.g. a perfected security interest, or a leasing structure including such security) on the asset, or on the company owning it	Legal documentation provides the lender effective control (e.g. a perfected security interest, or a leasing structure including such security) on the asset, or on the company owning it	The contract provides little security to the lender and leaves room to some risk of losing control on the asset
Rights and means at the lender's disposal to monitor the location and condition of the asset	The lender is able to monitor the location and condition of the asset, at any time and place (regular reports, possibility to lead inspections)	The lender is able to monitor the location and condition of the asset, almost at any time and place	The lender is able to monitor the location and condition of the asset, almost at any time and place	The lender is able to monitor the location and condition of the asset are limited
Insurance against damages	Strong insurance coverage including collateral damages with top quality insurance companies	Satisfactory insurance coverage (not including collateral damages) with good quality insurance companies	Fair insurance coverage (not including collateral damages) with acceptable quality insurance companies	Weak insurance coverage (not including collateral damages) or with weak quality insurance companies

Table 4 – Supervisory Rating Grades for Commodities Finance Exposures

	Strong	Good	Satisfactory	Weak
Financial strength				
Degree of over-collateralisation of trade	Strong	Good	Satisfactory	Weak
Political and legal environment				
Country risk	No country risk	Limited exposure to country risk (in particular, offshore location of reserves in an emerging country)	Exposure to country risk (in particular, offshore location of reserves in an emerging country)	Strong exposure to country risk (in particular, inland reserves in an emerging country)
Mitigation of country risks	Very strong mitigation: Strong offshore mechanisms Strategic commodity 1st class buyer	Strong mitigation: Offshore mechanisms Strategic commodity Strong buyer	Acceptable mitigation: Offshore mechanisms Less strategic commodity Acceptable buyer	Only partial mitigation: No offshore mechanisms Non-strategic commodity Weak buyer
Asset characteristics				
Liquidity and susceptibility to damage	Commodity is quoted and can be hedged through futures or 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

	Strong	Good	Satisfactory	Weak
Strength of sponsor				
Financial strength of trader	Very strong, relative to trading philosophy and risks	Strong	Adequate	Weak
Track record, including ability to manage the logistic process	Extensive experience with the type of transaction in question. Strong record of operating success and cost efficiency	Sufficient experience with the type of transaction in question. Above average record of operating success and cost efficiency	Limited experience with the type of transaction in question. Average record of operating success and cost efficiency	Limited or uncertain track record in general. Volatile costs and profits
Trading controls and hedging policies	Strong standards for counterparty selection, hedging, and monitoring	Adequate standards for counterparty selection, hedging, and monitoring	Past deals have experienced no or minor problems	Trader has experienced significant losses on past deals
Quality of financial disclosure	Excellent	Good	Satisfactory	Financial disclosure contains some uncertainties or is insufficient
Security package				
Asset control	First perfected security interest provides the lender legal control of the assets at any time if needed	First perfected security interest provides the lender legal control of the assets at any time if needed	At some point in the process, there is a rupture in the control of the assets by the lender. The rupture is mitigated by knowledge of the trade process or a third party undertaking as the case may be	Contract leaves room for some risk of losing control over the assets. Recovery could be jeopardised

	Strong	Good	Satisfactory	Weak
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

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 x (1 + He) – C x (1 – Hc – Hfx)]}

E* = max {0, [100 x (1 + 0) – 80 x (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)

He = 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)

Hc = haircut appropriate to the collateral (0)

Hfx = haircut appropriate for mismatch between the collateral and exposure (0)

Step 2: Capital requirement = (E* / E) x SF capital requirement

where (based on the information provide above):

Capital requirement = €20 / €100 x €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.

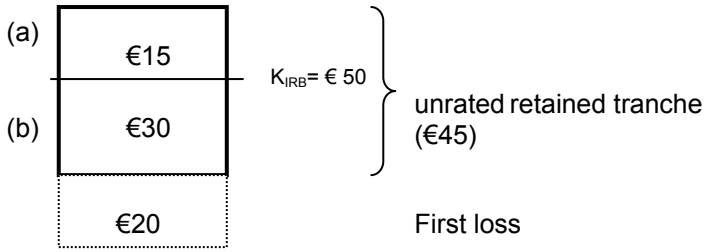
- The protected portion of the securitisation exposure (€80) is to receive the risk weight of the protection provider. The risk weight for the protection provider is equivalent to that for an unsecured loan to the guarantor bank, as determined under the IRB approach. Assume that this risk weight is 10%. Then, the capital charge on the protected portion would be: €80 x 10% x 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 x 20% = €0.32.

The total capital requirement for the protected and unprotected portions is:

€0.64 (protected portion) + €0.32 (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:

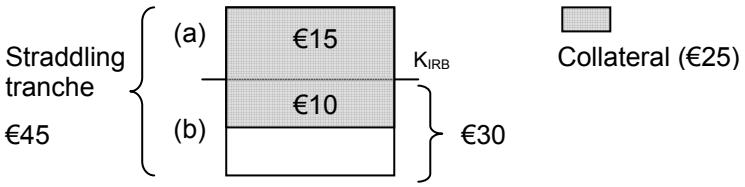
(a) Assume the SF risk weight for this subtranche is 820%. Thus, risk-weighted assets are €15 x 820% = €123. Capital charge is €123 x 8%= €9.84

(b) The subtranche below K_{IRB} must be deducted. Risk-weighted assets: €30 x 1250% = €375. Capital charge of €375 x 8% = €30

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

$E^* = \max \{0, [E \times (1 + He) - C \times (1 - Hc - Hfx)]\} = \max \{0, [15 - 15]\} = €0$

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)

He = haircut appropriate to the exposure (not relevant here, thus 0)

Hc and Hfx = haircut appropriate to the collateral and that for the mismatch between the collateral and exposure (to simplify, 0)

Step 2: Capital requirement = (E^* / E) x SF capital requirement

Capital requirement = 0 x €9.84 = €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

$E^* = \max \{0, [30 \times (1 + 0) - 10 \times (1 - 0 - 0)]\} = €20$

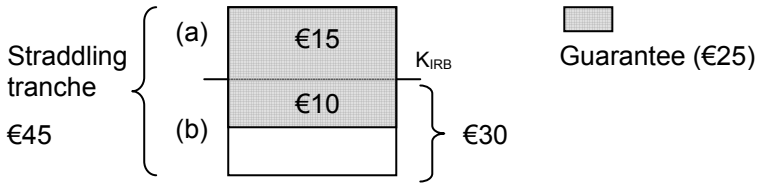
Step 2: Capital requirement = (E^* / E) x SF capital requirement

Capital requirement = €20 / €30 x €30 = €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 x 20% x 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 x 20% x 8% = €0.16

  The capital charge for the unprotected portion (for an unrated position below K_{IRB}) is €20 x 1250% x 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}) = €20.4

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[254]	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

[254] Payment and settlement losses related to a bank's own activities would be incorporated in the loss experience of the affected business line.

Principles for business line mapping[255]

(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.

(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.

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[255] **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.

(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.

Annex 9

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

Event-Type Category (Level 1)	Definition	Categories (Level 2)	Activity Examples (Level 3)
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
		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

Event-Type Category (Level 1)	Definition	Categories (Level 2)	Activity Examples (Level 3)
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

Annex 10

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.

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.

Annex 10a

Supervisory Framework for the Use of "Backtesting" in Conjunction with the Internal Models Approach to Market Risk Capital Requirements

I. Introduction

1. This Annex presents the framework developed by the Committee for incorporating backtesting into the internal models approach to market risk capital requirements. It represents an elaboration of paragraph 718(Lxxvi) (j) of this Framework.

2. Many banks that have adopted an internal model-based approach to market risk measurement routinely compare daily profits and losses with model-generated risk measures to gauge the quality and accuracy of their risk measurement systems. This process, known as "backtesting", has been found useful by many institutions as they have developed and introduced their risk measurement models.

3. As a technique for evaluating the quality of a firm's risk measurement model, backtesting continues to evolve. New approaches to backtesting are still being developed and discussed within the broader risk management community. At present, different banks perform different types of backtesting comparisons, and the standards of interpretation also differ somewhat across banks. Active efforts to improve and refine the methods currently in use are underway, with the goal of distinguishing more sharply between accurate and inaccurate risk models.

4. The essence of all backtesting efforts is the comparison of actual trading results with model-generated risk measures. If this comparison is close enough, the backtest raises no issues regarding the quality of the risk measurement model. In some cases, however, the comparison uncovers sufficient differences that problems almost certainly must exist, either with the model or with the assumptions of the backtest. In between these two cases is a grey area where the test results are, on their own, inconclusive.

5. The Committee believes that backtesting offers the best opportunity for incorporating suitable incentives into the internal models approach in a manner that is consistent and that will cover a variety of circumstances. Indeed, many of the public comments on the April 1995 internal models proposal stressed the need to maintain strong incentives for the continual improvement of banks' internal risk measurement models. In considering how to incorporate backtesting more closely into the internal models approach to market risk capital requirements, the Committee has sought to reflect both the fact that the industry has not yet settled on a single backtesting methodology and concerns over the imperfect nature of the signal generated by backtesting.

6. The Committee believes that the framework outlined in this document strikes an appropriate balance between recognition of the potential limitations of backtesting and the need to put in place appropriate incentives. At the same time, the Committee recognises that the techniques for risk measurement and backtesting are still evolving, and the Committee is committed to incorporating important new developments in these areas into its framework.

7. The remainder of this document describes the backtesting framework that is to accompany the internal models capital requirement. The aim of this framework is the

promotion of more rigorous approaches to backtesting and the supervisory interpretation of backtesting results. The next section deals with the nature of the backtests themselves, while the section that follows concerns the supervisory interpretation of the results and sets out the agreed standards of the Committee in this regard.

II. Description of the backtesting framework

8. The backtesting framework developed by the Committee is based on that adopted by many of the banks that use internal market risk measurement models. These backtesting programs typically consist of a periodic comparison of the bank's daily value-at-risk measures with the subsequent daily profit or loss ("trading outcome"). The value-at-risk measures are intended to be larger than all but a certain fraction of the trading outcomes, where that fraction is determined by the confidence level of the value-at-risk measure. Comparing the risk measures with the trading outcomes simply means that the bank counts the number of times that the risk measures were larger than the trading outcome. The fraction actually covered can then be compared with the intended level of coverage to gauge the performance of the bank's risk model. In some cases, this last step is relatively informal, although there are a number of statistical tests that may also be applied.

9. The supervisory framework for backtesting in this document involves all of the steps identified in the previous paragraph, and attempts to set out as consistent an interpretation of each step as is feasible without imposing unnecessary burdens. Under the value-at-risk framework, the risk measure is an estimate of the amount that could be lost on a set of positions due to general market movements over a given holding period, measured using a specified confidence level.

10. The backtests to be applied compare whether the observed percentage of outcomes covered by the risk measure is consistent with a *99% level of confidence*. That is, they attempt to determine if a bank's 99th percentile risk measures truly cover 99% of the firm's trading outcomes. While it can be argued that the extreme-value nature of the 99th percentile makes it more difficult to estimate reliably than other, lower percentiles, the Committee has concluded that it is important to align the test with the confidence level specified in the Amendment to the Capital Accord.

11. An additional consideration in specifying the appropriate risk measures and trading outcomes for backtesting arises because the value-at-risk approach to risk measurement is generally based on the sensitivity of a static portfolio to instantaneous price shocks. That is, end-of-day trading positions are input into the risk measurement model, which assesses the possible change in the value of this static portfolio due to price and rate movements over the assumed holding period.

12. While this is straightforward in theory, in practice it complicates the issue of backtesting. For instance, it is often argued that value-at-risk measures cannot be compared against actual trading outcomes, since the actual outcomes will inevitably be "contaminated" by changes in portfolio composition during the holding period. According to this view, the inclusion of fee income together with trading gains and losses resulting from changes in the composition of the portfolio should not be included in the definition of the trading outcome because they do not relate to the risk inherent in the static portfolio that was assumed in constructing the value-at-risk measure.

13. This argument is persuasive with regard to the use of value-at-risk measures based on price shocks calibrated to longer holding periods. That is, comparing the ten-day, 99th percentile risk measures from the internal models capital requirement with actual ten-day

trading outcomes would probably not be a meaningful exercise. In particular, in any given ten day period, significant changes in portfolio composition relative to the initial positions are common at major trading institutions. For this reason, *the backtesting framework described here involves the use of risk measures calibrated to a one-day holding period*. Other than the restrictions mentioned in this paper, the test would be based on how banks model risk internally.

14. Given the use of one-day risk measures, it is appropriate to employ one-day trading outcomes as the benchmark to use in the backtesting program. The same concerns about "contamination" of the trading outcomes discussed above continue to be relevant, however, even for one-day trading outcomes. That is, there is a concern that the overall one-day trading outcome is not a suitable point of comparison, because it reflects the effects of intra-day trading, possibly including fee income that is booked in connection with the sale of new products.

15. On the one hand, intra-day trading will tend to increase the volatility of trading outcomes, and may result in cases where the overall trading outcome exceeds the risk measure. This event clearly does not imply a problem with the methods used to calculate the risk measure; rather, it is simply outside the scope of what the value-at-risk method is intended to capture. On the other hand, including fee income may similarly distort the backtest, but in the other direction, since fee income often has annuity-like characteristics.

16. Since this fee income is not typically included in the calculation of the risk measure, problems with the risk measurement model could be masked by including fee income in the definition of the trading outcome used for backtesting purposes.

17. Some have argued that the actual trading outcomes experienced by the bank are the most important and relevant figures for risk management purposes, and that the risk measures should be benchmarked against this reality, even if the assumptions behind their calculations are limited in this regard. Others have also argued that the issue of fee income can be addressed sufficiently, albeit crudely, by simply removing the mean of the trading outcomes from their time series before performing the backtests. A more sophisticated approach would involve a detailed attribution of income by source, including fees, spreads, market movements, and intra-day trading results.

18. To the extent that the backtesting program is viewed purely as a statistical test of the integrity of the calculation of the value-at-risk measure, it is clearly most appropriate to employ a definition of daily trading outcome that allows for an "uncontaminated" test. To meet this standard, banks should develop the capability to perform backtests based on the hypothetical changes in portfolio value that would occur were end-of-day positions to remain unchanged.

19. Backtesting using actual daily profits and losses is also a useful exercise since it can uncover cases where the risk measures are not accurately capturing trading volatility in spite of being calculated with integrity.

20. For these reasons, *the Committee urges banks to develop the capability to perform backtests using both hypothetical and actual trading outcomes*. Although national supervisors may differ in the emphasis that they wish to place on these different approaches to backtesting, it is clear that each approach has value. In combination, the two approaches are likely to provide a strong understanding of the relation between calculated risk measures and trading outcomes.

21. The next step in specifying the backtesting program concerns the nature of the backtest itself, and the frequency with which it is to be performed. The framework adopted by

the Committee, which is also the most straightforward procedure for comparing the risk measures with the trading outcomes, is simply to calculate the number of times that the trading outcomes are not covered by the risk measures ("exceptions"). For example, over 200 trading days, a 99% daily risk measure should cover, on average, 198 of the 200 trading outcomes, leaving two exceptions.

22. With regard to the frequency of the backtest, the desire to base the backtest on as many observations as possible must be balanced against the desire to perform the test on a regular basis. The backtesting framework to be applied entails a *formal testing and accounting of exceptions on a quarterly basis using the most recent twelve months of data*.

23. The implementation of the backtesting program should formally begin on the date that the internal models capital requirement becomes effective, that is, by year-end 1997 at the latest. This implies that *the first formal accounting of exceptions under the backtesting program would occur by year-end 1998*. This of course does not preclude national supervisors from requesting backtesting results prior to that date, and in particular does not preclude their usage, at national discretion, as part of the internal model approval process.

24. Using the most recent twelve months of data yields approximately 250 daily observations for the purposes of backtesting. *The national supervisor will use the number of exceptions (out of 250) generated by the bank's model as the basis for a supervisory response.* In many cases, there will be no response. In other cases, the supervisor may initiate a dialogue with the bank to determine if there is a problem with a bank's model. In the most serious cases, the supervisor may impose an increase in a bank's capital requirement or disallow use of the model.

25. The appeal of using the number of exceptions as the primary reference point in the backtesting process is the simplicity and straightforwardness of this approach. From a statistical point of view, using the number of exceptions as the basis for appraising a bank's model requires relatively few strong assumptions. In particular, the primary assumption is that each day's test (exception/no exception) is independent of the outcome of any of the others.

26. The Committee of course recognises that tests of this type are limited in their power to distinguish an accurate model from an inaccurate model. To a statistician, this means that it is not possible to calibrate the test so that it correctly signals all the problematic models without giving false signals of trouble at many others. This limitation has been a prominent consideration in the design of the framework presented here, and should also be prominent among the considerations of national supervisors in interpreting the results of a bank's backtesting program. However, the Committee does not view this limitation as a decisive objection to the use of backtesting. Rather, conditioning supervisory standards on a clear framework, though limited and imperfect, is seen as preferable to a purely judgmental standard or one with no incentive features whatsoever.

III. Supervisory framework for the interpretation of backtesting results

A. Description of three-zone approach

27. It is with the statistical limitations of backtesting in mind that the Committee is introducing a framework for the supervisory interpretation of backtesting results that encompasses a range of possible responses, depending on the strength of the signal generated from the backtest. These responses are classified into three zones, distinguished

by colours into a hierarchy of responses. The green zone corresponds to backtesting results that do not themselves suggest a problem with the quality or accuracy of a bank's model. The yellow zone encompasses results that do raise questions in this regard, but where such a conclusion is not definitive. The red zone indicates a backtesting result that almost certainly indicates a problem with a bank's risk model.

28. The Committee has agreed to standards regarding the definitions of these zones in respect of the number of exceptions generated in the backtesting program, and these are set forth below. To place these definitions in proper perspective, however, it is useful to examine the probabilities of obtaining various numbers of exceptions under different assumptions about the accuracy of a bank's risk measurement model.

B. Statistical considerations in defining the zones

29. Three zones have been delineated and their boundaries chosen in order to balance two types of statistical error: (1) the possibility that an accurate risk model would be classified as inaccurate on the basis of its backtesting result, and (2) the possibility that an inaccurate model would not be classified that way based on its backtesting result.

30. Table 1 reports the probabilities of obtaining a particular number of exceptions from a sample of 250 independent observations under several assumptions about the actual percentage of outcomes that the model captures (that is, these are binomial probabilities). For example, the left-hand portion of Table 1 reports probabilities associated with an accurate model (that is, a true coverage level of 99%). Under these assumptions, the column labelled "exact" reports that exactly five exceptions can be expected in 6.7% of the samples.

31. The right-hand portion of Table 1 reports probabilities associated with several possible inaccurate models, namely models whose true levels of coverage are 98%, 97%, 96%, and 95%, respectively. Thus, the column labelled "exact" under an assumed coverage level of 97% shows that five exceptions would then be expected in 10.9% of the samples.

32. Table 1 also reports several important error probabilities. For the assumption that the model covers 99% of outcomes (the desired level of coverage), the table reports the probability that selecting a given number of exceptions as a threshold for rejecting the accuracy of the model will result in an erroneous rejection of an accurate model ("type 1" error). For example, if the threshold is set as low as one exception, then accurate models will be rejected fully 91.9% of the time, because they will escape rejection only in the 8.1% of cases where they generate zero exceptions. As the threshold number of exceptions is increased, the probability of making this type of error declines.

33. Under the assumptions that the model's true level of coverage is not 99%, Table 1 reports the probability that selecting a given number of exceptions as a threshold for rejecting the accuracy of the model will result in an erroneous acceptance of a model with the assumed (inaccurate) level of coverage ("type 2" error). For example, if the model's actual level of coverage is 97%, and the threshold for rejection is set at seven or more exceptions, the table indicates that this model would be erroneously accepted 37.5% of the time.

34. In interpreting the information in Table 1, it is also important to understand that although the alternative models appear close to the desired standard in probability terms (97% is close to 99%), the difference between these models in terms of the size of the risk measures generated can be substantial. That is, a bank's risk measure could be substantially less than that of an accurate model and still cover 97% of the trading outcomes. For example, in the case of normally distributed trading outcomes, the 97th percentile corresponds to 1.88 standard deviations, while the 99th percentile corresponds to 2.33

standard deviations, an increase of nearly 25%. Thus, the supervisory desire to distinguish between models providing 99% coverage, and those providing say, 97% coverage, is a very real one.

C. Definition of the green, yellow, and red zones

35. The results in Table 1 also demonstrate some of the statistical limitations of backtesting. In particular, there is no threshold number of exceptions that yields both a low probability of erroneously rejecting an accurate model and a low probability of erroneously accepting all of the relevant inaccurate models. It is for this reason that the Committee has rejected an approach that contains only a single threshold.

36. Given these limitations, the Committee has classified outcomes into three categories. In the first category, the test results are consistent with an accurate model, and the possibility of erroneously accepting an inaccurate model is low (green zone). At the other extreme, the test results are extremely unlikely to have resulted from an accurate model, and the probability of erroneously rejecting an accurate model on this basis is remote (red zone). In between these two cases, however, is a zone where the backtesting results could be consistent with either accurate or inaccurate models, and the supervisor should encourage a bank to present additional information about its model before taking action (yellow zone).

37. Table 2 sets out the Committee's agreed boundaries for these zones and the presumptive supervisory response for each backtesting outcome, based on a sample of 250 observations. For other sample sizes, the boundaries should be deduced by calculating the binomial probabilities associated with true coverage of 99%, as in Table 1. The yellow zone begins at the point such that the probability of obtaining that number or fewer exceptions equals or exceeds 95%. Table 2 reports these cumulative probabilities for each number of exceptions. For 250 observations, it can be seen that five or fewer exceptions will be obtained 95.88% of the time when the true level of coverage is 99%. Thus, the yellow zone begins at five exceptions.

38. Similarly, the beginning of the red zone is defined as the point such that the probability of obtaining that number or fewer exceptions equals or exceeds 99.99%. Table 2 shows that for a sample of 250 observations and a true coverage level of 99%, this occurs with ten exceptions.

D. The green zone

39. The green zone needs little explanation. Since a model that truly provides 99% coverage would be quite likely to produce as many as four exceptions in a sample of 250 outcomes, there is little reason for concern raised by backtesting results that fall in this range. This is reinforced by the results in Table 1, which indicate that accepting outcomes in this range leads to only a small chance of erroneously accepting an inaccurate model.

E. The yellow zone

40. The range from five to nine exceptions constitutes the yellow zone. Outcomes in this range are plausible for both accurate and inaccurate models, although Table 1 suggests that they are generally more likely for inaccurate models than for accurate models. Moreover, the results in Table 1 indicate that the presumption that the model is inaccurate should grow as the number of exceptions increases in the range from five to nine.

41. The Committee has agreed that, within the yellow zone, the number of exceptions should generally guide the size of potential supervisory increases in a firm's capital requirement. Table 2 sets out the Committee's agreed guidelines for increases in the multiplication factor applicable to the internal models capital requirement, resulting from backtesting results in the yellow zone.

42. These guidelines help in maintaining the appropriate structure of incentives applicable to the internal models approach. In particular, the potential supervisory penalty increases with the number of exceptions. The results in Table 1 generally support the notion that nine exceptions is a more troubling result than five exceptions, and these steps are meant to reflect that.

43. These particular values reflect the general idea that the increase in the multiplication factor should be sufficient to return the model to a 99th percentile standard. For example, five exceptions in a sample of 250 implies only 98% coverage. Thus, the increase in the multiplication factor should be sufficient to transform a model with 98% coverage into one with 99% coverage. Needless to say, precise calculations of this sort require additional statistical assumptions that are not likely to hold in all cases. For example, if the distribution of trading outcomes is assumed to be normal, then the ratio of the 99th percentile to the 98th percentile is approximately 1.14, and the increase needed in the multiplication factor is therefore approximately 0.40 for a scaling factor of 3. If the actual distribution is not normal, but instead has "fat tails", then larger increases may be required to reach the 99th percentile standard. The concern about fat tails was also an important factor in the choice of the specific increments set out in Table 2.

44. It is important to stress, however, that these increases are not meant to be purely automatic. The results in Table 1 indicate that results in the yellow zone do not always imply an inaccurate model, and the Committee has no interest in penalising banks solely for bad luck. *Nevertheless, to keep the incentives aligned properly, backtesting results in the yellow zone should generally be presumed to imply an increase in the multiplication factor unless the bank can demonstrate that such an increase is not warranted.*

45. In other words, the burden of proof in these situations should not be on the supervisor to prove that a problem exists, but rather should be on the bank to prove that their model is fundamentally sound. In such a situation, there are many different types of additional information that might be relevant to an assessment of the bank's model.

46. For example, it would then be particularly valuable to see the results of backtests covering disaggregated subsets of the bank's overall trading activities. Many banks that engage in regular backtesting programs break up their overall trading portfolio into trading units organised around risk factors or product categories. Disaggregating in this fashion could allow the tracking of a problem that surfaced at the aggregate level back to its source at the level of a specific trading unit or risk model.

47. Banks should also document all of the exceptions generated from their ongoing backtesting program, including an explanation for the exception. This documentation is important to determining an appropriate supervisory response to a backtesting result in the yellow zone. Banks may also implement backtesting for confidence intervals other than the 99th percentile, or may perform other statistical tests not considered here. Naturally, this information could also prove very helpful in assessing their model.

48. In practice, there are several possible explanations for a backtesting exception, some of which go to the basic integrity of the model, some of which suggest an under-specified or low-quality model, and some of which suggest either bad luck or poor intra-day

trading results. Classifying the exceptions generated by a bank's model into these categories can be a very useful exercise.

Basic integrity of the model

(1) The bank's systems simply are not capturing the risk of the positions themselves (e.g. the positions of an overseas office are being reported incorrectly).

(2) Model volatilities and/or correlations were calculated incorrectly (e.g. the computer is dividing by 250 when it should be dividing by 225).

Model's accuracy could be improved

(3) The risk measurement model is not assessing the risk of some instruments with sufficient precision (e.g. too few maturity buckets or an omitted spread).

Bad luck or markets moved in fashion unanticipated by the model

(4) Random chance (a very low probability event).

(5) Markets moved by more than the model predicted was likely (i.e. volatility was significantly higher than expected).

(6) Markets did not move together as expected (i.e. correlations were significantly different than what was assumed by the model).

Intra-day trading

(7) There was a large (and money-losing) change in the bank's positions or some other income event between the end of the first day (when the risk estimate was calculated) and the end of the second day (when trading results were tabulated).

49. In general, problems relating to the basic integrity of the risk measurement model are potentially the most serious. If there are exceptions attributed to this category for a particular trading unit, the plus should apply. In addition, the model may be in need of substantial review and/or adjustment, and the supervisor would be expected to take appropriate action to ensure that this occurs.

50. The second category of problem (lack of model precision) is one that can be expected to occur at least part of the time with most risk measurement models. No model can hope to achieve infinite precision, and thus all models involve some amount of approximation. If, however, a particular bank's model appears more prone to this type of problem than others, the supervisor should impose the plus factor and also consider what other incentives are needed to spur improvements.

51. The third category of problems (markets moved in a fashion unanticipated by the model) should also be expected to occur at least some of the time with value-at-risk models. In particular, even an accurate model is not expected to cover 100% of trading outcomes. Some exceptions are surely the random 1% that the model can be expected not to cover. In other cases, the behaviour of the markets may shift so that previous estimates of volatility and correlation are less appropriate. No value-at-risk model will be immune from this type of problem; it is inherent in the reliance on past market behaviour as a means of gauging the risk of future market movements.

52. Finally, depending on the definition of trading outcomes employed for the purpose of backtesting, exceptions could also be generated by intra-day trading results or an unusual event in trading income other than from positioning. Although exceptions for these reasons would not necessarily suggest a problem with the bank's value-at-risk model, they could still be cause for supervisory concern and the imposition of the plus should be considered.

53. The extent to which a trading outcome exceeds the risk measure is another relevant piece of information. All else equal, exceptions generated by trading outcomes far in excess of the risk measure are a matter of greater concern than are outcomes only slightly larger than the risk measure.

54. In deciding whether or not to apply increases in a bank's capital requirement, it is envisioned that the supervisor could weigh these factors as well as others, including an appraisal of the bank's compliance with applicable qualitative standards of risk management. Based on the additional information provided by the bank, the supervisor will decide on the appropriate course of action.

55. In general, the imposition of a higher capital requirement for outcomes in the yellow zone is an appropriate response when the supervisor believes the reason for being in the yellow zone is a correctable problem in a bank's model. This can be contrasted with the case of an unexpected bout of high market volatility, which nearly all models may fail to predict. While these episodes may be stressful, they do not necessarily indicate that a bank's risk model is in need of redesign. Finally, in the case of severe problems with the basic integrity of the model, the supervisor should consider whether to disallow the use of the model for capital purposes altogether.

F. The red zone

56. Finally, in contrast to the yellow zone where the supervisor may exercise judgement in interpreting the backtesting results, outcomes in the red zone (ten or more exceptions) should generally lead to an automatic presumption that a problem exists with a bank's model. This is because it is extremely unlikely that an accurate model would independently generate ten or more exceptions from a sample of 250 trading outcomes.

57. In general, therefore, if a bank's model falls into the red zone, the supervisor should automatically increase the multiplication factor applicable to a firm's model by one (from three to four). Needless to say, the supervisor should also begin investigating the reasons why the bank's model produced such a large number of misses, and should require the bank to begin work on improving its model immediately.

58. Although ten exceptions is a very high number for 250 observations, there will on very rare occasions be a valid reason why an accurate model will produce so many exceptions. In particular, when financial markets are subjected to a major regime shift, many volatilities and correlations can be expected to shift as well, perhaps substantially. Unless a bank is prepared to update its volatility and correlation estimates instantaneously, such a regime shift could generate a number of exceptions in a short period of time. In essence, however, these exceptions would all be occurring for the same reason, and therefore the appropriate supervisory reaction might not be the same as if there were ten exceptions, but each from a separate incident. For example, one possible supervisory response in this instance would be to simply require the bank's model to take account of the regime shift as quickly as it can while maintaining the integrity of its procedures for updating the model.

59. It should be stressed, however, that the Committee believes that this exception should be allowed only under the most extraordinary circumstances, and that it is committed

to an automatic and non-discretionary increase in a bank's capital requirement for backtesting results that fall into the red zone.

IV. Conclusion

60. The above framework is intended to set out a consistent approach for incorporating backtesting into the internal models approach to market risk capital requirements. The goals of this effort have been to build appropriate and necessary incentives into a framework that relies heavily on the efforts of banks themselves to calculate the risks they face, to do so in a way that respects the inherent limitations of the available tools, and to keep the burdens and costs of the imposed procedures to a minimum.

61. The Basel Committee believes that the framework described above strikes the right balance in this regard. Perhaps more importantly, however, the Committee believes that this approach represents the first, and therefore critical, step toward a tighter integration of supervisory guidelines with verifiable measures of bank performance.

Table 1

Model is accurate			Model is inaccurate: Possible alternative levels of coverage							
Exceptions (our of 250)	Coverage = 99% exact	type 1	Exceptions (our of 250)	Coverage = 98% exact	type 2	Coverage = 97% exact	type 2	Coverage = 96% exact	type 2	Coverage = 95% exact	type 2
0	8.1 %	100.0 %	0	0.6 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
1	20.5 %	91.9 %	1	3.3 %	0.6 %	0.4 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
2	25.7 %	71.4 %	2	8.3 %	3.9 %	1.5 %	0.4 %	0.2 %	0.0 %	0.0 %	0.0 %
3	21.5 %	45.7 %	3	14.0 %	12.2 %	3.8 %	1.9 %	0.7 %	0.2 %	0.1 %	0.0 %
4	13.4 %	24.2 %	4	17.7 %	26.2 %	7.2 %	5.7 %	1.8 %	0.9 %	0.3 %	0.1 %
5	6.7 %	10.8 %	5	17.7 %	43.9 %	10.9 %	12.8 %	3.6 %	2.7 %	0.9 %	0.5 %
6	2.7 %	4.1 %	6	14.8 %	61.6 %	13.8 %	23.7 %	6.2 %	6.3 %	1.8 %	1.3 %
7	1.0 %	1.4 %	7	10.5 %	76.4 %	14.9 %	37.5 %	9.0 %	12.5 %	3.4 %	3.1 %
8	0.3 %	0.4 %	8	6.5 %	86.9 %	14.0 %	52.4 %	11.3 %	21.5 %	5.4 %	6.5 %
9	0.1 %	0.1 %	9	3.6 %	93.4 %	11.6 %	66.3 %	12.7 %	32.8 %	7.6 %	11.9 %
10	0.0 %	0.0 %	10	1.8 %	97.0 %	8.6 %	77.9 %	12.8 %	45.5 %	9.6 %	19.5 %
11	0.0 %	0.0 %	11	0.8 %	98.7 %	5.8 %	86.6 %	11.6 %	58.3 %	11.1 %	29.1 %
12	0.0 %	0.0 %	12	0.3 %	99.5 %	3.6 %	92.4 %	9.6 %	69.9 %	11.6 %	40.2 %
13	0.0 %	0.0 %	13	0.1 %	99.8 %	2.0 %	96.0 %	7.3 %	79.5 %	11.2 %	51.8 %
14	0.0 %	0.0 %	14	0.0 %	99.9 %	1.1 %	98.0 %	5.2 %	86.9 %	10.0 %	62.9 %
15	0.0 %	0.0 %	15	0.0 %	100.0 %	0.5 %	99.1 %	3.4 %	92.1 %	8.2 %	72.9 %

Notes: The table reports both exact probabilities of obtaining a certain number of exceptions from a sample of 250 independent observations under several assumptions about the true level of coverage, as well as type 1 or type 2 error probabilities derived from these exact probabilities.

The left-hand portion of the table pertains to the case where the model is accurate and its true level of coverage is 99%. Thus, the probability of any given observation being an exception is 1% (100% - 99% = 1%). The column labelled "exact" reports the probability of obtaining exactly the number of exceptions shown under this assumption in a sample of 250 independent observations. The column labelled "type 1" reports the probability that using a given number of exceptions as the cut-off for rejecting a model will imply erroneous rejection of an accurate model using a sample of 250 independent observations. For example, if the cut-off level is set at five or more exceptions, the type 1 column reports the probability of falsely rejecting an accurate model with 250 independent observations is 10.8%.

The right-hand portion of the table pertains to models that are inaccurate. In particular, the table concentrates of four specific inaccurate models, namely models whose true levels of coverage are 98%, 97%, 96% and 95% respectively. For each inaccurate model, the "exact" column reports the probability of obtaining exactly the number of exceptions shown under this assumption in a sample of 250 independent observations. The columns labelled "type 2" report the probability that using a given number of exceptions as the cut-off for rejecting a model will imply erroneous acceptance of an inaccurate model with the assumed level of coverage using a sample of 250 independent observations. For example, if the cut-off level is set at five or more exceptions, the type 2 column for an assumed coverage level of 97% reports the probability of falsely accepting a model with only 97% coverage with 250 independent observations is 12.8%.

Table 2

Zone	Number of exceptions	Increase in scaling factor	Cumulative probability
Green Zone	0	0.00	8.11%
	1	0.00	28.58%
	2	0.00	54.32%
	3	0.00	75.81%
	4	0.00	89.22%
Yellow Zone	5	0.40	95.88%
	6	0.50	98.63%
	7	0.65	99.60%
	8	0.75	99.89%
	9	0.85	99.97%
Red Zone	10 or more	1.00	99.99%

Notes: The table defines the green, yellow and red zones that supervisors will use to assess backtesting results in conjunction with the internal models approach to market risk capital requirements. The boundaries shown in the table are based on a sample of 250 observations. For other sample sizes, the yellow zone begins at the point where the cumulative probability equals or exceeds 95%, and the red zone begins at the point where the cumulative probability equals or exceeds 99.99%.

The cumulative probability is simply the probability of obtaining a given number or fewer exceptions in a sample of 250 observations when the true coverage level is 99%. For example, the cumulative probability shown for four exceptions is the probability of obtaining between zero and four exceptions.

Note that these cumulative probabilities and the type 1 error probabilities reported in Table 1 do not sum to one because the cumulative probability for a given number of exceptions includes the possibility of obtaining exactly that number of exceptions, as does the type 1 error probability. Thus, the sum of these two probabilities exceeds one by the amount of the probability of obtaining exactly that number of exceptions.

Annex 11

The Simplified Standardised Approach[256]

I. Credit risk – general rules for risk weights

1. Exposures should be risk weighted net of specific provisions.

A. Claims on sovereigns and central banks

2. Claims on sovereigns and their central banks will be risk-weighted on the basis of the consensus country risk scores of export credit agencies (ECA) participating in the "Arrangement on Officially Supported Export Credits". These scores are available on the OECD's website.[257] The methodology establishes eight risk score categories associated with minimum export insurance premiums. As detailed below, each ECA risk score will correspond to a specific risk weight category.

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

3. At national discretion, a lower risk weight may be applied to banks' exposures to their sovereign (or central bank) of incorporation denominated in domestic currency and funded[258] in that currency.[259] Where this discretion is exercised, other national supervisory authorities may also permit their banks to apply the same risk weight to domestic currency exposures to this sovereign (or central bank) funded in that currency.

B. Claims on other official entities

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

5. The following Multilateral Development Banks (MDBs) will be eligible for a 0% risk weight:

- the World Bank Group, comprised of the International Bank for Reconstruction and Development (IBRD) and the International Finance Corporation (IFC),
- the Asian Development Bank (ADB),

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[256] This approach should not be seen as another approach for determining regulatory capital. Rather, it collects in one place the simplest options for calculating risk-weighted assets.

[257] 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.

[258] This is to say that the bank should also have liabilities denominated in the domestic currency.

[259] This lower risk weight may be extended to the risk weighting of collateral and guarantees.

- the African Development Bank (AfDB),
- the European Bank for Reconstruction and Development (EBRD),
- the Inter-American Development Bank (IADB),
- the European Investment Bank (EIB),
- the European Investment Fund (EIF),
- the Nordic Investment Bank (NIB),
- the Caribbean Development Bank (CDB),
- the Islamic Development Bank (IDB), and
- the Council of Europe Development Bank (CEDB).

6. The standard risk weight for claims on other MDBs will be 100%.

7. Claims on domestic public sector entitles (PSEs) will be risk-weighted according to the risk weight framework for claims on banks of that country. Subject to national discretion, claims on a domestic PSE may also be treated as claims on the sovereign in whose jurisdiction the PSEs are established.[260] Where this discretion is exercised, other national supervisors may allow their banks to risk weight claims on such PSEs in the same manner.

C. Claims on banks and securities firms

8. Banks will be assigned a risk weight based on the weighting of claims on the country in which they are incorporated (see paragraph 2). The treatment is summarised in the table below:

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

[260] The following examples outline how PSEs might be categorised when focusing upon the existence of revenue raising powers. However, there may be other ways of determining the different treatments applicable to different types of PSEs, for instance by focusing on the extent of guarantees provided by the central government:

- **Regional governments and local authorities** could qualify for the same treatment as claims on their sovereign or central government if these governments and local authorities have specific revenue-raising powers and have specific institutional arrangements the effect of which is to reduce their risks of default.
- **Administrative bodies responsible to central governments, regional governments or to local authorities and other non-commercial undertakings** owned by the governments or local authorities may not warrant the same treatment as claims on their sovereign if the entities do not have revenue raising powers or other arrangements as described above. If strict lending rules apply to these entities and a declaration of bankruptcy is not possible because of their special public status, it may be appropriate to treat these claims in the same manner as claims on banks.
- **Commercial undertakings** owned by central governments, regional governments or by local authorities might be treated as normal commercial enterprises. However, if these entities function as a corporate in competitive markets even though the state, a regional authority or a local authority is the major shareholder of these entities, supervisors should decide to consider them as corporates and therefore attach to them the applicable risk weights.

9. When the national supervisor has chosen to apply the preferential treatment for claims on the sovereign as described in paragraph 3, it can also assign a risk weight that is one category less favourable than that assigned to claims on the sovereign, subject to a floor of 20%, to claims on banks of an original maturity of 3 months or less denominated and funded in the domestic currency.

10. Claims on securities firms may be treated as claims on banks provided such firms are subject to supervisory and regulatory arrangements comparable to those under this Framework (including, in particular, risk-based capital requirements).[261] Otherwise such claims would follow the rules for claims on corporates.

D. Claims on corporates

11. The standard risk weight for claims on corporates, including claims on insurance companies, will be 100%.

E. Claims included in the regulatory retail portfolios

12. Claims that qualify under the criteria listed in paragraph 13 may be considered as retail claims for regulatory capital purposes and included in a regulatory retail portfolio. Exposures included in such a portfolio may be risk-weighted at 75%, except as provided in paragraph 18 for past due loans.

13. 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 (see paragraph 15).
- 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. One way of achieving this may be to set a numerical limit that no aggregate exposure to one counterpart[262] can exceed 0.2% of the overall regulatory retail portfolio.

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[261] 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.

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

- Low value of individual exposures. The maximum aggregated retail exposure to one counterpart cannot exceed an absolute threshold of €1 million.

14. National supervisory authorities should evaluate whether the risk weights in paragraph 12 are considered to be too low based on the default experience for these types of exposures in their jurisdictions. Supervisors, therefore, may require banks to increase these risk weights as appropriate.

F. Claims secured by residential property

15. Lending fully secured by mortgages on residential property that is or will be occupied by the borrower, or that is rented, will be risk-weighted at 35%. In applying the 35% weight, the supervisory authorities should satisfy themselves, according to their national arrangements for the provision of housing finance, that this concessionary weight is applied restrictively for residential purposes and in accordance with strict prudential criteria, such as the existence of substantial margin of additional security over the amount of the loan based on strict valuation rules. Supervisors should increase the standard risk weight where they judge the criteria are not met.

16. National supervisory authorities should evaluate whether the risk weights in paragraph 15 are considered to be too low based on the default experience for these types of exposures in their jurisdictions. Supervisors, therefore, may require banks to increase these risk weights as appropriate.

G. Claims secured by commercial real estate

17. Mortgages on commercial real estate will be risk-weighted at 100%.

H. Treatment of past due loans

18. 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:[263]

- 150% risk weight when provisions are less than 20% of the outstanding amount of the loan;
- 100% risk weight when specific provisions are no less than 20% of the outstanding amount of the loan; and
- 100% risk weight when specific provisions are no less than 50% of the outstanding amount of the loan, but with supervisory discretion to reduce the risk weight to 50%.

19. 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 Section II).[264] Past due retail loans are to be excluded from the overall regulatory retail

[263] Subject to national discretion, supervisors may permit banks to treat non-past due loans extended to counterparties subject to a 150% risk weight in the same way as past due loans described in paragraphs 18 to 20.

[264] There will be a transitional period of three years during which a wider range of collateral may be recognised, subject to national discretion.

portfolio when assessing the granularity criterion specified in paragraph 13, for risk-weighting purposes.

20. In addition to the circumstances described in paragraph 18, where a past due loan is fully secured by those forms of collateral that are not recognised in paragraph 50, a 100% risk weight may apply when specific provisions reach 15% of the outstanding amount of the loan. These forms of collateral are not recognised elsewhere in the simplified standardised approach. Supervisors should set strict operational criteria to ensure the quality of collateral.

21. In the case of qualifying residential mortgage loans, when such loans are past due for more than 90 days they will be risk-weighted at 100%, net of specific provisions. If such loans are past due but specific provisions are no less than 20% of their outstanding amount, the risk weight applicable to the remainder of the loan can be reduced to 50% at national discretion.

I. Higher-risk categories

22. National supervisors may decide to apply a 150% or higher risk weight reflecting the higher risks associated with some other assets, such as venture capital and private equity investments.

J. Other assets

23. The treatment of securitisation exposures is presented separately in Section III. The standard risk weight for all other assets will be 100%.[265] Investments in equity or regulatory capital instruments issued by banks or securities firms will be risk-weighted at 100%, unless deducted from the capital base according to Part 1 of the present Framework.

K. Off-balance sheet items

24. Off-balance sheet items under the simplified standardised approach will be converted into credit exposure equivalents through the use of credit conversion factors (CCF). Counterparty risk weights for OTC derivative transactions will not be subject to any specific ceiling.

25. Commitments with an original maturity up to one year and commitments with an original maturity over one year will receive a CCF of 20% and 50%, respectively. However, any commitments that are unconditionally cancellable at any time by the bank without prior notice, or that effectively provide for automatic cancellation due to deterioration in a borrower's creditworthiness, will receive a 0% credit conversion factor.[266]

25(i). Direct credit substitutes, e.g. general guarantees of indebtedness (including standby letters of credit serving as financial guarantees for loans and securities) and acceptances (including endorsements with the character of acceptances) will receive a CCF of 100%.

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[265] However, at national discretion, gold bullion held in own vaults or on an allocated basis to the extent backed by bullion liabilities can be treated as cash and therefore risk-weighted at 0%. In addition, cash items in the process of collection can be risk-weighted at 20%.

[266] In certain countries, retail commitments are considered unconditionally cancellable if the terms permit the bank to cancel them to the full extent allowable under consumer protection and related legislation.

25(ii). Sale and repurchase agreements and asset sales with recourse,[267] where the credit risk remains with the bank will receive a CCF of 100%.

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

26(i). Forward asset purchases, forward forward deposits and partly-paid shares and securities[268], which represent commitments with certain drawdown will receive a CCF of 100%.

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

26(iii). Note issuance facilities (NIFs) and revolving underwriting facilities (RUFs) will receive a CCF of 50%.

27. For short-term self-liquidating trade letters of credit arising from the movement of goods (e.g. documentary credits collateralised by the underlying shipment), a 20% credit conversion factor will be applied to both issuing and confirming banks.

28. Where there is an undertaking to provide a commitment on an off-balance sheet items, banks are to apply the lower of the two applicable CCFs.

29. The credit equivalent amount of transactions that expose banks to counterparty credit risk must be calculated under the rules specified in Section VII of Annex 4 of this Framework.

30. Banks must closely monitor securities, commodities, and foreign exchange transactions that have failed, starting the first day they fail. A capital charge to failed transactions must be calculated in accordance with Annex 3 of this Framework.

31. With regard to unsettled securities, commodities, and foreign exchange transactions, the Committee is of the opinion that banks are exposed to counterparty credit risk from trade date, irrespective of the booking or the accounting of the transaction. Therefore, banks are encouraged to develop, implement and improve systems for tracking and monitoring the credit risk exposure arising from unsettled transactions as appropriate for producing management information that facilitates action on a timely basis. Furthermore, when such transactions are not processed through a delivery-versus-payment (DvP) or payment-versus-payment (PvP) mechanism, banks must calculate a capital charge as set forth in Annex 3 of this Framework.

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[267] These items are to be weighted according to the type of asset and not according to the type of counterparty with whom the transaction has been entered into.

[268] These items are to be weighted according to the type of asset and not according to the type of counterparty with whom the transaction has been entered into.

II. Credit risk mitigation

A. Overarching issues

1. Introduction

32. Banks use a number of techniques to mitigate the credit risks to which they are exposed. Exposure may be collateralised in whole or in part with cash or securities, or a loan exposure may be guaranteed by a third party.

33. Where these various techniques meet the operational requirements below credit risk mitigation (CRM) may be recognised.

2. General remarks

34. The framework set out in this section is applicable to the banking book exposures under the simplified standardised approach.

35. 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.

36. 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. Principal-only ratings will also not be allowed within the framework of CRM.

37. Although banks use CRM techniques to reduce their credit risk, these techniques give rise to risks (residual risks) which may render the overall risk reduction less effective. Where these risks are not adequately controlled, supervisors may impose additional capital charges or take other supervisory actions as detailed in Pillar 2.

38. While the use of CRM techniques reduces or transfers credit risk, it simultaneously may increase other risks to the bank, such as 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.

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

3. Legal certainty

40. In order for banks to obtain capital relief, all documentation used in collateralised transactions and for documenting guarantees 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. Proportional cover

41. Where the amount collateralised or 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 the collateral or counterparty, with the remainder treated as unsecured.

B. Collateralised transactions

42. 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 the counterparty[269] or by a third party on behalf of the counterparty.

43. Under the simplified standardised approach, only the simple approach from the standardised approach will apply, 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). Partial collateralisation is recognised. Mismatches in the maturity or currency of the underlying exposure and the collateral will not be allowed.

1. Minimum conditions

44. In addition to the general requirements for legal certainty set out in paragraph 40, the following operational requirements must be met.

45. 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.

46. 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.

47. The bank must have clear and robust procedures for the timely liquidation of collateral.

48. 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.

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

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[269] 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 derivative contract.

2. Eligible collateral

50. The following collateral instruments are eligible for recognition:

- 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,[270, 271]
- Gold,
- Debt securities issued by sovereigns rated category 4 or above, [272] and
- Debt securities issued by PSE that are treated as sovereigns by the national supervisor and that are rated category 4 or above.[272]

3. Risk weights

51. 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%. 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.

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

- the collateral is cash on deposit; 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%.

C. Guaranteed transactions

53. Where guarantees meet and supervisors are satisfied that banks fulfil the minimum operational conditions set out below, they may allow banks to take account of such credit protection in calculating capital requirements.

1. Minimum conditions

54. A guarantee (counter-guarantee) 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 increase the effective cost of

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[270] 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.

[271] 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.

[272] The rating category refers to the ECA country risk score as described in paragraph 2.

cover as a result of deteriorating credit quality in the hedged exposure. It must also be unconditional; there should be no clause in the protection contract outside the 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.

55. In addition to the legal certainty requirements in paragraph 40 above, the following conditions must be satisfied:

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

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

(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

2. Eligible guarantors (counter-guarantors)

56. Credit protection given by the following entities will be recognised: sovereign entities,[273] PSEs and other entities with a risk weight of 20% or better and a lower risk weight than the counterparty.

3. Risk weights

57. 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.

58. As specified in paragraph 3, a lower risk weight may be applied at national discretion to a bank's exposure 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.

59. Materiality thresholds on payments below which no payment will be 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.

[273] This includes the Bank for International Settlements, the International Monetary Fund, the European Central Bank and the European Community.

D. Other items related to the treatment of CRM techniques

Treatment of pools of CRM techniques

60. In the case where a bank has multiple CRM 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 tool (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.

III. Credit risk — Securitisation framework

A. Scope of transactions covered under the securitisation framework

61. 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 a liquidation.

62. Banks' exposures to securitisation are referred to as "securitisation exposures".

B. Permissible role of banks

63. A bank operating under the simplified standardised approach can only assume the role of an investing bank in a traditional securitisation. An investing bank is an institution, other than the originator or the servicer that assumes the economic risk of a securitisation exposure.

64. A bank is considered to be an originator if it originates directly or indirectly credit exposures included in the securitisation. A servicer bank is one that manages the underlying credit exposures of a securitisation on a day-to-day basis in terms of collection of principal and interest, which is then forwarded to investors in securitisation exposures. A bank under the simplified standardised approach should not offer credit enhancement, liquidity facilities or other financial support to a securitisation.

C. Treatment of Securitisation Exposures

65. Banks using the simplified standardised approach to credit risk for the type of underlying exposure(s) securitised are permitted to use a simplified version of the standardised approach under the securitisation framework.

66. The standard risk weight for securitisation exposures for an investing bank will be 100%. For first loss positions acquired, deduction from capital will be required. The deduction will be taken 50% from Tier 1 and 50% from Tier 2 capital.

IV. Operational risk

67. The simplified standardised approach for operational risk is the Basic Indicator Approach under which banks must hold capital equal to a fixed percentage (15%) of average annual gross income, where positive, over the previous three years.

68. Gross income is defined as net interest income plus net non-interest income.[274] 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;[275] (iii) exclude realised profits/losses from the sale of securities in the banking book;[276] and (iv) exclude extraordinary or irregular items as well as income derived from insurance.

69. 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).

[274] As defined by national supervisors and/or national accounting standards.

[275] 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.

[276] Realised profit/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.