

**THE TREATMENT OF COUNTERPARTY CREDIT RISK OF DERIVATIVE  
INSTRUMENTS, REPURCHASE TRANSACTIONS, SECURITIES OR  
COMMODITIES LENDING OR BORROWING TRANSACTIONS, LONG  
SETTLEMENT TRANSACTIONS, AND MARGIN LENDING  
TRANSACTIONS**

**Choice of Method**

1. Subject to the following paragraphs, credit institutions shall determine the exposure value for the contracts listed in Annex III with one of the following 4 methods. The exposure value for a given counterparty is equal to the sum of the exposure values calculated for each netting set with that counterparty.
2. Method 2 may **not** be utilised to determine the exposure value for contracts listed in point 3 of Annex III, or by credit institutions whose trading book is below the thresholds listed in paragraph 31 of Banking Rule BR/08.
3. The combined use of the following methods shall be permitted on a permanent basis within a group, but not within a single credit institution. However a credit institution may use both method 1 and method 3, if the latter method is utilised for transactions listed in paragraph 3.19 of this Annex
4. When a credit institution purchases credit derivative protection against a non-trading book exposure, or against a CCR exposure, it may compute its capital requirement for the hedged asset either according to the credit risk mitigation techniques listed in Appendix 2 Section III.4, or, if the credit institution is eligible to utilise the IRB approach, according to paragraph 1.2.2 of Appendix 2 Section II.2 or paragraphs 2.2.57 to 2.2.64 of Section II.5. In these cases the exposure value for CCR for these credit derivatives is set to zero.

Where a credit derivative included in the trading book forms part of an internal hedge and the credit protection is recognised under this Rule, there shall be deemed not to be any counterparty risk, in terms of Banking Rule BR/08, arising from the position in the credit derivative. Where this option is not applied, the exposure value for CCR for those credit derivatives is set to zero.

However, an institution may choose consistently to include for the purposes of calculating capital requirements for counterparty credit risk all credit derivatives not included in the trading book and purchased as protection against a non-trading book exposure or against a CCR exposure where the credit protection is recognised under this Rule.

5. The exposure value for CCR from sold credit default swaps in the non-trading book, where they are treated as credit protection provided by the credit institution and subject to a capital requirement for credit risk for the full notional amount, is set to zero.
6. An exposure value of zero for CCR can be attributed to derivative contracts, or repurchase transactions, securities or commodities lending or borrowing transactions,

long settlement transactions and margin lending transactions outstanding with a central counterparty and that have not been rejected by the central counterparty. Furthermore, an exposure value of zero can be attributed to credit risk exposures to central counterparties that result from the derivative contracts, repurchase transactions, securities or commodities lending or borrowing transactions, long settlement transactions and margin lending transactions or other exposures, as determined by the authority, that the credit institution has outstanding with the central counterparty. The central counterparty CCR exposure with all participants in its arrangements shall be fully collateralised on a daily basis.

7. Exposures arising from long settlement transactions can be determined using any of the methods below, regardless of the methods chosen for treating OTC derivatives and repurchase transactions, securities or commodities lending or borrowing transactions, and margin lending transactions. In calculating capital requirements for long settlement transactions, credit institutions that use an IRB approach (as per Appendix 2: Section II) may apply the risk weights under the Standardised approach (as per Appendix 2:Section I) on a permanent basis and irrespective of the materiality of such positions.
8. The authority needs to ensure that the notional amount to be taken into account by banks utilising Methods 1 or 2 below, is an appropriate yardstick for the risk inherent in the contract. Where, for instance, the contract provides for a multiplication of cash flows, the notional amount must be adjusted in order to take into account the effects of the multiplication on the risk structure of that contract.

## Method 1: the 'marking to market' approach

Step (a): by attaching current market values to contracts (marking to market) the current replacement cost of all contracts with positive values is obtained.

Step (b): to obtain a figure for potential future credit exposure, except in the case of single currency 'floating/floating interest rate swaps' in which the current replacement cost will be calculated, the notional principal amounts or underlying values are multiplied by the following percentages:

Residual maturity <sup>1</sup>	Interest-rate contracts	Contracts concerning foreign-exchange rates and gold	Contracts concerning equities	Contracts concerning precious metals except gold	Contracts concerning commodities other than precious metals
One year or less	0%	1%	6%	7%	10%
Over one year, less than five years	0,5%	5%	8%	7%	12%
Over five years	1,5%	7,5%	10%	8%	15%

For the purposes of calculating the potential future exposure in accordance with step (b) the authority may allow credit institutions that utilise the extended maturity ladder approach for commodity risk under Banking Rule BR/08, to apply the following percentages instead of those prescribed in Table 1

Contracts which do not fall within one of the five categories indicated in Table 1 shall be treated as contracts concerning commodities other than precious metal.

For contracts with multiple exchanges of principal, the percentages have to be multiplied by the number of remaining payments still to be made according to the contract.

<sup>1</sup> 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 equal to the time until the next reset date. In the case of interest-rate contracts that meet these criteria and have a remaining maturity of over one year, the percentage shall be no lower than 0,5%.

TABLE 1a				
Residual maturity	Precious metals (except gold)	Base metals	Agricultural products (softs)	Other, including energy products
One year or less	2%	2,5%	3%	4%
Over one year, less than five years	5%	4%	5%	6%
Over five years	7,5%	8%	9%	10%

Step (c): the sum of current replacement cost and potential future credit exposure is the exposure value.

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**Method 2: the 'original exposure' approach**

Step (a): the notional principal amount of each instrument is multiplied by the percentages given below:

Original Maturity (**)	Interest rate contracts	Contracts concerning foreign exchange rates and gold
One year or less	0.5%	2%
Over one year but not exceeding two years	1.0%	5%
Additional allowance for each additional year	1.0%	3%

Step (b): the original exposure thus obtained shall be the exposure value.

(\*\*) In the case of interest rate contract, credit institutions may, subject to the consent of the authority, choose either original or residual maturity.

### Method 3: the 'standardised' approach

- 3.1 The Standardised Method (SM) can be used only for OTC derivatives and long settlement transactions. The exposure value shall be calculated separately for each netting set. It shall be determined net of collateral, as follows:

Exposure value =

$$\frac{\beta * \max \left( CMV - CMC; \sum_j \left| \sum_i RPT_{ij} - \sum_l RPC_{lj} \right| * CCRM_j \right)}{1}$$

where:

CMV = current market value of the portfolio of transactions within the netting set with a counterparty gross of collateral.

That is, where:

$$CMV = \sum_i CMV_i$$

where:

CMV<sub>i</sub> = the current market value of transaction i;

CMC = current market value of the collateral assigned to the netting set.

That is, where:

$$CMC = \sum_l CMC_l$$

where

CMC<sub>l</sub> = the current market value of collateral l;

i = index designating transaction;

l = index designating collateral;

j = index designating hedging set category. 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<sub>ij</sub> = risk position from transaction i with respect to hedging set j;

RPC<sub>lj</sub> = risk position from collateral l with respect to hedging set j;

CCRM<sub>j</sub> = CCR Multiplier set out in Table 2 with respect to the hedging set j;

β = 1.4.

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

Collateral that is recognised for this method is confined to the collateral that is eligible under the Financial Collateral Comprehensive Method as detailed in paragraph 1.3.6 of Appendix II: Section III.2 (Credit Risk Mitigation).

- 3.2 When an OTC derivative transaction with a linear risk profile stipulates the exchange of a financial instrument for a payment, the payment part is referred to as the payment leg. Transactions that stipulate the exchange of payment against payment consist of two payment legs. The payment legs consist of the contractually

agreed gross payments, including the notional amount of the transaction. Credit institutions may disregard the interest rate risk from payment legs with a remaining maturity of less than one year for the purposes of the following calculations. Credit institutions may treat transactions that consist of two payment legs that are denominated in the same currency, such as interest rate swaps, as a single aggregate transaction. The treatment for payment legs applies to the aggregate transaction.

- 3.3 Transactions with a linear risk profile with equities (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) and an interest rate risk position for the payment leg. If the payment leg is denominated in a foreign currency, it is additionally mapped to a risk position in the respective currency.
- 3.4 Transactions with a linear risk profile with a debt instrument as the underlying instrument are mapped to an interest rate risk position for the debt instrument and another interest rate risk position for the payment leg. Transactions with a linear risk profile 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 risk position in this currency. If a payment leg is denominated in foreign currency, the payment leg is again mapped to a risk position in this currency. The exposure value assigned to a foreign exchange basis swap transaction is zero.
- 3.5 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 credit institution's domestic currency, except for debt instruments.
- 3.6 For debt instruments and for payment legs, the size of the risk position is the effective notional value of the outstanding gross payments (including the notional amount) converted to the credit institution's domestic currency, multiplied by the modified duration of the debt instrument, or payment leg, respectively.
- 3.7 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.
- 3.8 The size of a risk position from an OTC derivative with a 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.

- 3.9 The size of a risk position from an OTC derivative with a non-linear risk profile, including options and swaptions, of which the underlying is a debt instrument or a payment leg, 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, respectively.
- 3.10 For the determination of risk positions, collateral received from a counterparty is to be treated like a claim on the counterparty under a derivative contract (long position) that is due today, while collateral posted is to be treated like an obligation to the counterparty (short position) that is due today.
- 3.11 Credit institutions may use the following formulas to determine the size and sign of a risk position:

for all instruments other than 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  $V$ ;

for debt instruments and the payment legs of all transactions:

effective notional value multiplied by the modified duration, or

delta equivalent in notional value multiplied by the modified duration

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

where:

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

$r$  = interest rate 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.

- 3.12 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 by:

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

in the formulas set out in paragraph 1.

- 3.13 For interest rate risk positions from money deposits received from the counterparty as collateral, from payment legs and from underlying debt instruments, to which according to Table 1 in Annex I of Directive [93/6/EEC] a capital charge of 1.60% or less applies, there are six hedging sets for each currency, set out in Table 1 below. Hedging sets are defined by a combination of the criteria “maturity” and “referenced interest rates”.

Table 1:

	Government referenced interest rates	Non-government referenced interest rates
Maturity	<= 1 year	<= 1 year
Maturity	>1 – <=5 years	>1 – <=5 years
Maturity	> 5 years	> 5 years

- 3.14 For interest rate risk positions from underlying debt instruments or payment legs for which the interest rate is linked to a reference interest rate that represents a general market interest level, the remaining maturity is the length of the time interval up to the next re-adjustment of the interest rate. In all other cases, it is the remaining life of the underlying debt instrument, or in the case of a payment leg the remaining life of the transaction.
- 3.15 There is one hedging set for each issuer of a reference debt instrument that underlies a credit default swap. “Nth to default” basket credit default swaps shall be treated as follows:
- (a) The size of a risk position in a reference debt instrument in a basket underlying an ‘nth to default’ credit default swap is the effective notional value of the reference debt instrument, multiplied by the modified duration of the ‘nth to default’ derivative with respect to a change in the credit spread of the reference debt instrument;

- (b) There is one hedging set for each reference debt instrument in a basket underlying a given 'nth to default' credit default swap; risk positions from different 'nth to default' credit default swaps shall not be included in the same hedging set;
- (c) The CCR multiplier applicable to each hedging set created for one of the reference debt instruments of an 'nth to default' derivative is 0.3% for reference debt instruments that have a credit assessment from a recognised ECAI equivalent to credit quality step 1 to 3 and 0.6% for other debt instruments.
- 3.16 For interest rate risk positions from money deposits that are posted with a counterparty as collateral when that counterparty does not have debt obligations of low specific risk outstanding and from underlying debt instruments, to which according to Table 1 of Annex III of Banking Rule BR/08 a capital charge of more than 1.60% applies, there is one hedging set for each issuer. When a payment leg emulates such a debt instrument, there is also one hedging set for each issuer of the reference debt instrument. Credit institutions 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.
- 3.17 Underlying financial instruments other than debt instruments shall be assigned to the same respective hedging sets only if they are identical or similar instruments. In all other cases they shall be assigned to separate hedging sets. 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 electric power, similar instruments are those delivery rights and obligations that refer to the same peak or off-peak load time interval within any 24 hour interval; and
- for commodities, similar instruments are those of the same commodity. A commodity index is treated as a separate commodity.
- 3.18 The CCR multipliers (CCRM) for the different hedging set categories are set out in Table below.

Table 2:

Hedging set categories	CCR
1. Interest Rates	0.2%
2. Interest Rates for risk positions from a reference debt instrument that underlies a credit default swap and to which a capital charge of 1.60%, or less, applies under Table 1 in Annex I of Directive [93/6/EEC].	0.3%
3. Interest Rates for risk positions from a debt instrument or reference debt instrument to which a capital charge of	0.6%

	more than 1.60% applies under Table 1 in Annex I of Directive [93/6/EEC].	
4.	Exchange Rates	2.5%
5.	Electric power	4.0%
6.	Gold	5.0%
7.	Equity	7.0%
8.	Precious Metals (except gold)	8.5%
9.	Other Commodities (excluding precious metals and electricity power)	10.0%
10.	Underlying instruments of OTC derivatives that are not in any of the categories above.	10.0%

Underlying instruments of OTC derivatives, as referred to in point 10 of the above table, shall be assigned to separate individual hedging sets for each category of underlying instrument.

- 3.19 For transactions with a non-linear risk profile or for payment legs and transactions with debt instruments as underlying for which the credit institution cannot determine the delta or the modified duration, respectively, with an instrument model that the authority has approved for the purposes of determining the minimum capital requirements for market risk, the authority shall determine the size of the risk positions and the applicable CCRMjs conservatively. Alternatively, the authority may require the use of method 1 above. Netting shall not be recognised: that is, the exposure value s all be determined as if there were a netting set that comprises just the individual transaction.
- 3.20 A credit institution shall have internal procedures to verify that, prior to including a transaction in a hedging set, the transaction is covered by a legally enforceable netting contract that meets the requirements set out under the Contractual Netting section below.
- 3.21 A credit institution that makes use of collateral to mitigate its CCR shall have internal procedures to verify that, prior to recognising the effect of collateral in its calculations, the collateral meets the legal certainty standards set out in Appendix 2: Section III (Credit Risk Mitigation).

## Method 4: the 'internal model' approach

4.1 Subject to the approval of the authority, a credit institution may use the Internal Model Method (IMM) to calculate the exposure value of:

- (i) contracts listed in Annex III,
- (ii) repurchase transactions,
- (iii) securities or commodities lending or borrowing transactions,
- (iv) margin lending transactions, and
- (v) long settlement transactions.

IMM may be utilised partially either for transactions in (i) above, or transactions in (ii)-(iv) or transactions in (i)-(iv). In each of these cases the transactions in (v) may be included as well. Furthermore, notwithstanding paragraph 4.3, credit institutions may choose not to apply this method to exposures that are immaterial in size and risk. To apply the IMM, a credit institution shall meet the requirements set out below.

4.2 In the case of applications for permissions to utilise the IMM submitted by an EU parent credit institution and its subsidiaries, or jointly by the subsidiaries of an EU parent financial holding company, the authorities in the relevant jurisdictions shall work together, in full consultation, to decide whether or not to grant the permission sought and to determine the terms and conditions, if any, to which such permission should be subject. Such an application shall be submitted only to the authority responsible for the exercise of supervision on a consolidated basis of the EU parent credit institutions and/or the credit institutions controlled by EU parent financial holding companies (i.e. the consolidating authority).

The authorities shall do everything within their power to reach a joint decision on the application within six months. This joint decision shall be set out in a document containing the fully reasoned decision which shall be provided to the applicant institution by the consolidating authority.

The six months referred to in the subparagraph above shall begin on the date of receipt of the complete application by the consolidating authority. The latter shall forward the complete application to the other authorities without delay.

In the absence of a joint decision between the authorities within six months, the consolidating authority shall make its own decision on the application. The decision shall be set out in a document containing the fully reasoned decision and shall take into account the views and reservations of the other authorities expressed during the six months period. The decision shall be provided to the applicant institution and the other authorities by the consolidating authority.

The decisions referred to in this paragraph shall be recognised as determinative and applied consistently by the authorities in all Member States concerned.

- 4.3 Subject to the approval of the authority, implementation of the IMM may be carried out sequentially across different transaction types, and during this period a credit institution may use the methods 1 or 3 set out above. Notwithstanding the remainder of this Part, credit institutions shall not be required to use a specific type of model.
- 4.4 For all OTC derivative transactions and for long settlement transactions for which a credit institution has not received approval to use the IMM, the credit institution shall use the methods 1 or 3 set out above. Combined use of these two methods is permitted on a permanent basis within a group. Combined use of these two methods within a legal entity is only permissible where one of the methods is used for the cases set out in paragraph 3.19.
- 4.5 Credit institutions which have obtained permission to use the IMM shall not revert to the use of the methods 1 or 3 set out above except for demonstrated good cause and subject to approval of the authority. If a credit institution ceases to comply with the requirements set out in this Part, it shall either present to the authority a plan for a timely return to compliance or demonstrate that the effect of non-compliance is immaterial.

### *Exposure value*

- 4.6 The exposure value shall be measured at the level of the netting set. The model shall specify the forecasting distribution for changes in the market value of the netting set attributable to changes in market variables, such as interest rates and foreign exchange rates. The model shall then compute the exposure value 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.
- 4.7 Credit institutions may include eligible financial collateral as defined in paragraph 1.3.6 of Appendix 2 Section III.2 and paragraph 11 of Annex II of Banking Rule BR/08 in their forecasting distributions for changes in the market value of the netting set, if the quantitative, qualitative and data requirements for the IMM are met for the collateral.
- 4.8 The exposure value shall be calculated as the product of  $\alpha$  times Effective Expected Positive Exposure (Effective EPE):
- $$\text{Exposure value} = \alpha \times \text{Effective EPE}$$

*where:*

Alpha ( $\alpha$ ) shall be 1.4, (but the authority may require a higher  $\alpha$ , as it deems fit) and Effective EPE shall be computed by estimating expected exposure (EEt) as the average exposure at future date t, where the average is taken across possible future

values of relevant market risk factors. The model estimates EE at a series of future dates  $t_1, t_2, t_3 \dots$

4.9 Effective EE shall be computed recursively as:

$$\text{Effective EE}_k = \max(\text{Effective EE}_{k-1}; \text{EE}_k)$$

where:

the current date is denoted as  $t_0$  and Effective  $\text{EE}_{t_0}$  equals current exposure.

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

$$\text{Effective EPE} = \sum_{k=1}^{\min(1\text{year}; \text{maturity})} \text{Effective EE}_k * \Delta t_k$$

where:

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

4.11 EE or peak exposure measures shall be calculated based on a distribution of exposures that accounts for the possible non-normality of the distribution of exposures.

4.12 Credit institutions may use a measure that is more conservative than  $\alpha$  times Effective EPE for every counterparty, instead of  $\alpha$  times Effective EPE calculated according to the equation above.

4.13 Notwithstanding paragraph 4.8 the authority may permit credit institutions to use their own estimates of  $\alpha$ , subject to a floor of 1.2, where  $\alpha$  shall equal the ratio of internal capital from a full simulation of CCR exposure across counterparties (numerator) and internal capital based on EPE (denominator). In the denominator, EPE shall be used as if it were a fixed outstanding amount. Credit institutions shall demonstrate that their internal estimates of  $\alpha$  capture in the numerator material sources of stochastic dependency of distribution of market values of transactions or of portfolios of transactions across counterparties. Internal estimates of  $\alpha$  shall take account of the granularity of portfolios.

4.14 A credit institution shall 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 shall be based on the credit institution's internal capital approach, be well-documented and be subject to independent validation. In addition, credit institutions shall review their

estimates on at least a quarterly basis, and more frequently when the composition of the portfolio varies over time. Credit institutions shall also assess the model risk.

- 4.15 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.
- 4.16 If the netting set is subject to a margin agreement, credit institutions shall use one of the following EPE measures:
- (a) Effective EPE without taking into account the margin agreement;
  - (b) 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 a current exposure of zero over the margin period of risk. A floor of five business days for netting sets consisting only of repo-style transactions subject to daily remargining and daily mark-to-market, and ten business days for all other netting sets is imposed on the margin period of risk used for this purpose;
  - (c) if the model captures the effects of margining when estimating EE, the model's EE measure may be used directly in the equation in paragraph 8 subject to the approval of the authorities.

***Minimum requirements for EPE models***

- 4.17 A credit institution's EPE model shall meet the operational requirements set out in paragraphs 4.18 to 4.42.

**CCR control**

- 4.18 The credit institution shall have a control unit that is responsible for the design and implementation of its Counterparty Credit Risk (CCR) management system, including the initial and on-going validation of the model. This unit shall control input data integrity and produce and analyse reports on the output of the credit institution's risk measurement model, including an evaluation of the relationship between measures of risk exposure and credit and trading limits. This unit shall be independent from units responsible for originating, renewing or trading exposures and free from undue influence; it shall be adequately staffed; it shall report directly to the senior management of the credit institution. The work of this unit shall be closely integrated into the day-to-day credit risk management process of the credit institution. Its output shall, accordingly, be an integral part of the process of planning, monitoring and controlling the credit institution's credit and overall risk profile.
- 4.19 A credit institution shall have CCR management policies, processes and systems that are conceptually sound and implemented with integrity. A sound CCR management framework shall include the identification, measurement, management, approval and internal reporting of CCR.
- 4.20 A credit institution's risk management policies shall take account of market, liquidity, and legal and operational risks that can be associated with CCR. The credit institution shall not undertake business with a counterparty without assessing its creditworthiness and shall take due account of settlement and pre-settlement credit risk. These risks shall be managed as comprehensively as practicable at the counterparty level (aggregating CCR exposures with other credit exposures) and at the firm-wide level.
- 4.21 A credit institution's board of directors and senior management shall be actively involved in the CCR control process and shall regard this as an essential aspect of the business to which significant resources need to be devoted. Senior management shall be aware of the limitations and assumptions of the model used and the impact these can have on the reliability of the output. They shall also consider the uncertainties of the market environment and operational issues and be aware of how these are reflected in the model.
- 4.22 The daily reports prepared on a credit institution's exposures to CCR shall be reviewed by a level of management with sufficient seniority and authority to enforce both reductions of positions taken by individual credit managers or traders and reductions in the credit institution's overall CCR exposure.
- 4.23 A credit institution's CCR management system shall be used in conjunction with internal credit and trading limits. Credit and trading limits shall be related to the



credit institution's risk measurement model in a manner that is consistent over time and that is well understood by credit managers, traders and senior management.

- 4.24 A credit institution's measurement of CCR shall include measuring daily and intra-day usage of credit lines. The credit institution shall measure current exposure gross and net of collateral. At portfolio and counterparty level, the credit institution shall calculate and monitor peak exposure or potential future exposure (PFE) at the confidence interval chosen by the credit institution. The credit institution shall take account of large or concentrated positions, including by groups of related counterparties, by industry, by market, etc.
- 4.25 A credit institution shall have a routine and rigorous program of stress testing in place as a supplement to the CCR analysis based on the day-to-day output of the credit institution's risk measurement model. The results of this stress testing shall be reviewed periodically by senior management and shall be reflected in the CCR policies and limits set by management and the board of directors. Where stress tests reveal particular vulnerability to a given set of circumstances, prompt steps shall be taken to manage those risks appropriately.
- 4.26 A credit institution shall have a routine in place for ensuring compliance with a documented set of internal policies, controls and procedures concerning the operation of the CCR management system. The credit institution's CCR management system shall be well documented and shall provide an explanation of the empirical techniques used to measure CCR.
- 4.27 A credit institution shall conduct an independent review of the CCR management system regularly through its own internal auditing process. This review shall include both the activities of the business units referred to in paragraph 4.18 and of the independent CCR control unit. A review of the overall CCR management process shall take place at regular intervals and shall specifically address, at a minimum:
- (a) the adequacy of the documentation of the CCR management system and process;
  - (b) the organisation of the CCR control unit;
  - (c) the integration of CCR measures into daily risk management;
  - (d) the approval process for risk pricing models and valuation systems used by front and back-office personnel;
  - (e) the validation of any significant change in the CCR measurement process;
  - (f) the scope of CCR captured by the risk measurement model;
  - (g) the integrity of the management information system;
  - (h) the accuracy and completeness of CCR data;
  - (i) the verification of the consistency, timeliness and reliability of data sources used to run models, including the independence of such data sources;

- (j) the accuracy and appropriateness of volatility and correlation assumptions;
- (k) the accuracy of valuation and risk transformation calculations;
- (l) the verification of the model's accuracy through frequent back-testing.

#### *Use test*

- 4.28 The distribution of exposures generated by the model used to calculate effective EPE shall be closely integrated into the day-to-day CCR management process of the credit institution. The model's output shall accordingly play an essential role in the credit approval, CCR management, internal capital allocation, and corporate governance of the credit institution.
- 4.29 A credit institution shall have a track record in the use of models that generate a distribution of exposures to CCR. Thus, the credit institution shall demonstrate that it has been using a model to calculate the distributions of exposures upon which the EPE calculation is based that meets, broadly, the minimum requirements set out in this Part for at least one year prior to approval by the authority.
- 4.30 The model used to generate a distribution of exposures to CCR shall be part of a CCR management framework that includes the identification, measurement, management, approval and internal reporting of CCR. This framework shall include the measurement of usage of credit lines (aggregating CCR exposures with other credit exposures) and internal capital allocation. In addition to EPE, a credit institution shall measure and manage current exposures. Where appropriate, the credit institution shall measure current exposure gross and net of collateral. The use test is satisfied if a credit institution uses other CCR measures, such as peak exposure or potential future exposure (PFE), based on the distribution of exposures generated by the same model to compute EPE.
- 4.31 A credit institution shall have the systems capability to estimate EE daily if necessary, unless it demonstrates to its authority that its exposures to CCR warrant less frequent calculation. The credit institution shall compute EE along a time profile of forecasting horizons that adequately reflects the time structure of future cash flows and maturity of the contracts and in a manner that is consistent with the materiality and composition of the exposures.
- 4.32 Exposure shall be measured, monitored and controlled over the life of all contracts in the netting set (not just to the one year horizon). The credit institution shall have procedures in place to identify and control the risks for counterparties where the exposure rises beyond the one-year horizon. The forecast increase in exposure shall be an input into the credit institution's internal capital model.

***Stress testing***

- 4.33 Credit institutions must have in place sound stress testing processes for use in the assessment of capital adequacy for CCR. These stress measures shall be compared with the measure of EPE and considered by the credit institution as part of the ICAAP process set out in Banking Rule BR/12. Stress testing shall also involve identifying possible events or future changes in economic conditions that could have unfavourable effects on a credit institution's credit exposures and an assessment of the credit institution's ability to withstand such changes.
- 4.34 The credit institution shall stress test its CCR exposures, including jointly stressing market and credit risk factors. Stress tests of CCR shall consider concentration risk (to a single counterparty or groups of counterparties), correlation risk across market and credit risk, and the risk that liquidating the counterparty's positions could move the market. Stress tests shall also consider the impact on the credit institution's own positions of such market moves and integrate that impact in its assessment of CCR.

***Wrong-way risk***

- 4.35 Credit institutions shall give due consideration to exposures that give rise to a significant degree of general wrong-way risk.
- 4.36 Credit institutions shall have procedures in place to identify, monitor and control cases of specific wrong way risk, beginning at the inception of a transaction and continuing through the life of the transaction.

***Integrity of the modelling process***

- 4.37 The model shall reflect transaction terms and specifications in a timely, complete, and conservative fashion. Such terms shall include at least contract notional amounts, maturity, reference assets, margining arrangements, netting arrangements. The terms and specifications shall be maintained in a database that is subject to formal and periodic audit. The process for recognising netting arrangements shall 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 model shall also be subject to internal audit and formal reconciliation processes shall be in place between the 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.
- 4.38 The model shall employ current market data to compute current exposures. When using historical data to estimate volatility and correlations, at least three years of historical data shall be used and shall be updated quarterly or more frequently if

market conditions warrant. The data shall cover a full range of economic conditions, such as a full business cycle. A unit independent from the business unit shall validate the price supplied by the business unit. The data shall be acquired independently of the lines of business, fed into the model in a timely and complete fashion, and maintained in a database subject to formal and periodic audit. A credit institution shall also have a well-developed data integrity process to clean the data of erroneous and/or anomalous observations. To the extent that the model relies on proxy market data, including for new products where three years of historical data may not be available, internal policies shall identify suitable proxies and the credit institution shall demonstrate empirically that the proxy provides a conservative representation of the underlying risk under adverse market conditions. If the model includes the effect of collateral on changes in the market value of the netting set, the credit institution shall have adequate historical data to model the volatility of the collateral.

- 4.39 The model shall be subject to a validation process. The process shall be clearly articulated in credit institutions' policies and procedures. The validation process shall 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 shall include a review of the comprehensiveness of the model.
- 4.40 Credit institutions shall monitor the appropriate risks and have processes in place to adjust their estimation of EPE when those risks become significant. This includes the following:
- (a) the credit institution shall identify and manage its exposures to specific wrong-way risk;
  - (b) for exposures with a rising risk profile after one year, the credit institution shall compare on a regular basis the estimate of EPE over one year with EPE over the life of the exposure;
  - (c) for exposures with a residual maturity below one year, the credit institution shall compare on a regular basis the replacement cost (current exposure) and the realised exposure profile, and/or store data that would allow such a comparison.
- 4.41 Credit institutions shall 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 requirements set out under Contractual Netting below.
- 4.42 Credit institutions that makes use of collateral to mitigate their CCR shall have internal procedures to verify that, prior to recognising the effect of collateral in their calculations, the collateral meets the legal certainty standards set out in Appendix I Section III (Credit Risk Mitigation).

### *Validation requirements for EPE models*

- 4.43 A credit institution's EPE model shall meet the following validation requirements:
- the qualitative validation requirements set out in Annex VII of Banking Rule BR/08;
  - interest rates, foreign exchange rates, equity prices, commodities, and other market risk factors shall be forecast over long time horizons for measuring CCR exposure. The performance of the forecasting model for market risk factors shall be validated over a long time horizon;
  - the pricing models used to calculate CCR exposure for a given scenario of future shocks to market risk factors shall be tested as part of the model validation process. Pricing models for options shall account for the nonlinearity of option value with respect to market risk factors;
  - the EPE model shall capture transaction-specific information in order to aggregate exposures at the level of the netting set. A credit institution shall verify that transactions are assigned to the appropriate netting set within the model;
  - the EPE model shall also include transaction-specific information to capture the effects of margining. It shall take into account both the current amount of margin and margin that would be passed between counterparties in the future. Such a model shall account for the nature of margin agreements (unilateral or bilateral), the frequency of margin calls, the margin period of risk, the minimum threshold of unmargined exposure the credit institution is willing to accept, and the minimum transfer amount. Such a model shall either model the mark-to-market change in the value of collateral posted or apply the rules set out in Appendix I Section III (Credit Risk Mitigation);
  - static, historical backtesting on representative counterparty portfolios shall be part of the model validation process. At regular intervals, a credit institution shall conduct such backtesting on a number of representative counterparty portfolios (actual or hypothetical). These representative portfolios shall be chosen based on their sensitivity to the material risk factors and correlations to which the credit institution is exposed;
  - if backtesting indicates that the model is not sufficiently accurate, the authorities shall revoke the model approval or impose appropriate measures to ensure that the model is improved promptly. They may also require additional own funds to be held pursuant to Article 136 of EU Directive 2006/48/EC.

## Contractual Netting (Contracts for novation and other netting agreements)

### 5.1 Types of netting that may be recognised

For the purpose of this Part :

“*counterparty*” means any entity (including natural persons) that has the power to conclude a contractual netting agreement; and,

“*contractual cross product netting agreement*” means a written bilateral agreement between a credit institution and a counterparty which creates a single legal obligation covering all included bilateral master agreements and transactions belonging to different product categories. Contractual cross product netting agreements do not cover netting other than on a bilateral basis.

For the purposes of cross product netting, the following are considered different product categories:

- (i) repurchase transactions, reverse repurchase transactions, securities and commodities lending and borrowing transactions;
- (ii) margin lending transactions; and
- (iii) the contracts listed in Annex III.

The following types of contractual netting may also be recognised:

- (i) bilateral contracts for novation between a credit institution and its counterparty under which mutual claims and obligations are automatically amalgamated in such a way that this novation fixes one single net amount each time novation applies and thus creates a legally binding, single new contract extinguishing former contracts;
- (ii) other bilateral agreements between a credit institution and its counterparty.
- (iii) contractual cross product netting agreements for credit institutions that have received approval by their authorities to use the method 4 set out in this Annex, for transactions falling under the scope of that method. Netting across transactions entered by members of a group is not recognised for the purposes of calculating capital requirements.

### 5.2 Conditions for recognition

Contractual netting may be recognised as risk-reducing only under the following conditions:

- (i) a credit institution must have a contractual netting agreement with its counterparty which creates a single legal obligation, covering all included transactions, such that, in the event of a counterparty's failure to perform owing to default, bankruptcy, liquidation or any other similar circumstance, the credit institution would have a claim to receive or an obligation to pay only the net sum of the positive and negative mark-to-market values of included individual transactions;

- (ii) a credit institution must have made available to the authorities written and reasoned legal opinions to the effect that, in the event of a legal challenge, the relevant courts and administrative authorities would, in the cases described under (i), find that the credit institution's claims and obligations would be limited to the net sum, as described in (i), under:
  - the law of the jurisdiction in which the counterparty is incorporated and, if a foreign branch of an undertaking is involved, also under the law of the jurisdiction in which the branch is located;
  - the law that governs the individual transactions included;
  - the law that governs any contract or agreement necessary to effect the contractual netting;
- (iii) a credit institution must have procedures in place to ensure that the legal validity of its contractual netting is kept under review in the light of possible changes in the relevant laws.
- (iv) the credit institution maintains all required documentation in its files;
- (v) the effects of netting shall be factored into the credit institution's measurement of each counterparty's aggregate credit risk exposure and the credit institution manages its CCR on such a basis;
- (vi) credit risk to each counterparty is aggregated to arrive at a single legal exposure across transactions. This aggregation shall be factored into credit limit purposes and internal capital purposes.

The authority must be satisfied, if necessary after consulting the other authorities concerned, that the contractual netting is legally valid under the law of each of the relevant jurisdictions. If any of the authorities are not satisfied in that respect, the contractual netting agreement will not be recognised as risk-reducing for either of the counterparties.

The authority may accept reasoned legal opinions drawn up by types of contractual netting.

No contract containing a provision which permits a non-defaulting counterparty to make limited payments only, or no payments at all, to the estate of the defaulter, even if the defaulter is a net creditor (a «walkaway» clause), may be recognised as risk-reducing.

In addition to the above, for contractual cross-product netting agreements the following criteria shall be met:

- (a) the net sum in (i) shall be the net sum of the positive and negative close out values of any included individual bilateral master agreement and of the positive and negative mark-to-market value of the individual transactions (the 'Cross-Product Net Amount');
- (b) the written and reasoned legal opinion in (ii) shall address the validity and enforceability of the entire contractual cross-product netting agreement under its terms and the impact of the netting arrangement on the material provisions of any included bilateral master agreement. A legal opinion shall be generally recognised as such by the legal community in the Member State in which the credit institution is

authorised or a memorandum of law that addresses all relevant issues in a reasoned manner;

- (c) the credit institution shall have procedures in place under (iii) to verify that any transaction which is to be included in a netting set is covered by a legal opinion;
- (d) taking into account the contractual cross product netting agreement, the credit institution shall continue to comply with the requirements for the recognition of bilateral netting and the requirements of Appendix 2 Section III.1 for the recognition of credit risk mitigation, as applicable, with respect to each included individual bilateral master agreement and transaction.

### 5.3 Effects of recognition

Netting for the purposes of Method 3 (Standardised method) and Method 4 (Internal Model method) shall be recognised as set out in the respective sections.

#### *(i) Contracts for novation*

The single net amounts fixed by contracts for novation, rather than the gross amounts involved, may be weighted. Thus, in the application of Method 1 (mark-to-market approach), in

- step (a): the current replacement cost, and in
- step (b): the notional principal amounts or underlying values

may be obtained taking account of the contract for novation.

In the application of Method 2 (Original exposure method), in step (a) the notional principal amount may be calculated taking account of the contract for novation; the percentages of Table 2 must apply.

#### *(ii) Other netting agreements*

In application of method 1 (Mark-to-market approach):

- in step (a) the current replacement cost for the contracts included in a netting agreement may be obtained by taking account of the actual hypothetical net replacement cost which results from the agreement; in the case where netting leads to a net obligation for the credit institution calculating the net replacement cost, the current replacement cost is calculated as «0»,
- in step (b) the figure for potential future credit exposure for all contracts included in a netting agreement may be reduced according to the following equation:

$$PCE_{\text{red}} = 0.4 * PCE_{\text{gross}} + 0.6 * NGR * PCE_{\text{gross}}$$



Where:

PCE <sub>red</sub>	the reduced figure for potential future credit exposure for all contracts with a given counterparty included in a legally valid bilateral netting agreement
PCE <sub>gross</sub>	the sum of the figures for potential future credit exposure for all contracts with a given counterparty which are included in a legally valid bilateral netting agreement and are calculated by multiplying their notional principal amounts by the percentages set out in Table 1
NGR	<p>«net-to-gross ratio»: (one of the following methods must be chosen and used consistently)</p> <p>(i) separate calculation: the quotient of the net replacement cost for all contracts included in a legally valid bilateral netting agreement with a given counterparty (numerator) and the gross replacement cost for all contracts included in a legally valid bilateral netting agreement with that counterparty (denominator), or</p> <p>(ii) aggregate calculation: the quotient of the sum of the net replacement cost calculated on a bilateral basis for all counterparties taking into account the contracts included in legally valid netting agreements (numerator) and the gross replacement cost for all contracts included in legally valid netting agreements (denominator).</p> <p>If Member States permit credit institutions a choice of methods, the method chosen is to be used consistently.</p>

For the calculation of the potential future credit exposure according to the above formula perfectly matching contracts included in the netting agreement may be taken into account as a single contract with a notional principal equivalent to the net receipts. Perfectly matching contracts are forward foreign-exchange contracts or similar contracts in which a notional principal is equivalent to cash flows if the cash flows fall due on the same value date and fully or partly in the same currency.

In the application of Method 2 (Original exposure approach), in step (a):

- perfectly matching contracts included in the netting agreement may be taken into account as a single contract with a notional principal equivalent to the net receipts, the notional principal amounts are multiplied by the percentages given in Table 2,
- for all other contracts included in a netting agreement, the percentages applicable may be reduced as indicated in Table 3:

TABLE 3		
Original maturity <sup>1</sup>	Interest-rate contracts	Foreign-exchange contracts
One year or less	0.35%	1.50%
More than one year but not more than two years	0.75%	3.75%
Additional allowance for each additional year	0.75%	2.25%

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<sup>1</sup> In the case of interest-rate contracts, credit institutions may, subject to the consent of the authority, choose either original or residual maturity.