Chapter 13

The calculation of counterparty risk exposure values for financial derivatives, securities financing transactions and long settlement transactions

13.6 CCR internal model method

Introduction

13.6.1 R BIPRU 13.6 sets out the *rules* relating to the *CCR internal model method*.

13.6.2 R A *firm* may only use the *CCR internal model method* if it has a *CCR internal model method permission*.

13.6.3 G BIPRU 1.3 sets out the process for applying for a *CCR internal model method permission*.

13.6.4 G A *firm's CCR internal model method permission* will modify BIPRU 13.6.2 R and will require the *firm* to use only the *CCR internal model method*, except to the extent that BIPRU 13 permits the *firm* to combine the use of the *CCR internal model method* with one or more other methods.

13.6.5 R

(1) A reference in the *Handbook* to a provision of the *CCR internal model method*, in relation to a *firm*:

(a) excludes any provision of the *CCR internal model method* set out in the *Handbook* which is not applied to that *firm* by its *CCR internal model method permission*;

(b) includes any additional provision contained in the *CCR internal model method permission*; and

(c) takes into account any other amendments made to the provisions in the *Handbook* relating to the *CCR internal model method* made by the *CCR internal model method permission*.

(2) To the extent that a *firm's CCR internal model method permission* does not allow it to use a particular approach in the *Handbook* relating to the *CCR internal model method*, the *Handbook* provision does not apply to the *firm*.

Scope

13.6.6 R A *firm* may determine the *exposure* value for:

(1) financial derivative instruments;

(2) repurchase transactions;

(3) *securities or commodities lending or borrowing transactions*;

(4) *margin lending transactions*; and

(5) *long settlement transactions*

using the *CCR internal model method*.

[**Note**: *BCD* Annex III Part 2 point 2]

13.6.7 R A *firm* may use the *CCR internal model method* to calculate the *exposure* value for:

(1) the transactions in BIPRU 13.6.6 R (1); or

(2) the transactions in BIPRU 13.6.6 R (2), (3) and (4); or

(3) the transactions in BIPRU 13.6.6 R (1) to (4).

[**Note**: *BCD* Annex III Part 6 point 1 (part)]

13.6.8 R In each of BIPRU 13.6.7 R (1), (2) and (3), a *firm* may include *long settlement transactions* as well.

[**Note**: *BCD* Annex III Part 6 point 1 (part)]

Use of other models

13.6.9 G A *firm* using the *CCR internal model method* may use a type of model other than the type set out in BIPRU 13.6. If the *appropriate regulator* agrees to this the details of the model and the necessary calculations will be set out in the *CCR internal model method permission*, which will modify BIPRU 13.6 to the extent necessary. The *appropriate regulator* would not expect to agree to such a request unless the *firm* was able to satisfy the *appropriate regulator* that the method was at least as conservative as the method set out in BIPRU 13.6 and in particular that, for every *counterparty*, any method was more conservative than alpha multiplied by *effective EPE* calculated according to the equation in BIPRU 13.6.27 R.

[**Note**: *BCD* Annex III Part 6 point 2 (second sentence) and point 11]

Partial use

13.6.10 R For all *financial derivative instruments* and for *long settlement transactions* which are outside the scope of a *firm's CCR internal model method permission*, a *firm* must use the *CCR mark to market method* or the *CCR standardised method*.

[**Note**: *BCD* Annex III Part 6 point 3 first sentence]

13.6.11 R Under BIPRU 13.6.10 R, combined use of the *CCR mark to market method* and the *CCR standardised method* is only permitted where one of the methods is used for the cases set out in BIPRU 13.5.9 R to BIPRU 13.5.10 R.

[**Note**: *BCD* Annex III Part 6 point 3 second sentence]

13.6.12 R Notwithstanding BIPRU 13.3.10 R (Combined use), a *firm* may choose not to apply the *CCR internal model method* to *exposures* that are immaterial in size and risk.

[**Note**: *BCD* Annex III Part 6 point 1 third sentence]

13.6.13 R If permitted by its *CCR internal model method permission*, and subject to its terms, a *firm* may carry out the implementation of the *CCR internal model method* sequentially across different transaction types; and during this period the *firm* may use the *CCR mark to market method* or the *CCR standardised method*.

[**Note**: *BCD* Annex III Part 6 point 2]

13.6.14 G After the initial period following the granting of its *CCR internal model method permission*, as referred to in BIPRU 13.6.13 R, a *firm* should extend the use of the *CCR internal model method* to cover any new business within a product category covered by its *CCR internal model method permission*. Subject to BIPRU 13.6.10 R to BIPRU 13.6.13 R, the *firm* should do so within a reasonable period of time. If the *firm* decides to exclude any business on, for example, the basis of materiality, it should document its reasons clearly.

13.6.15 G In principle, the use of different measures of *exposure* within the *CCR internal model method* is possible within the same product category, including on a permanent basis. The *appropriate regulator* may allow a *firm*, through the *CCR internal model method permission*, to use a more conservative measure of *exposure* that is less risk sensitive (for instance a measure based on conservative haircuts) for certain parts of the business if justified on a cost-benefit basis. However, a *firm* would still need to meet the use test for these more conservative measures and would need to demonstrate that the aggregation of *CCR exposures* that come from different approaches and have different degrees of conservatism makes sense and is used for its *CCR* management purposes.

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13.6.16 G The *appropriate regulator* may, through the *CCR internal model method permission*, require a *firm* to apply a multiplier to the measures of *exposures* coming out of a less risk-sensitive approach to calculating *exposures* as referred to in BIPRU 13.6.15 G where the *appropriate regulator* considers this to be appropriate due to the complexity of the business or the nature of the risks involved.

Use of CCR internal model method

13.6.17 R Subject to BIPRU 13.6.10 R to BIPRU 13.6.16 G, a *firm* that has a *CCR internal model method permission* must not use the *CCR mark to market method* or the *CCR standardised method* for transactions within the scope of the *firm's CCR internal model method permission*.

[**Note**: *BCD* Annex III Part 6 point 4 (part)]

13.6.18 G A *firm* which wishes to revert to the *CCR mark to market method* or the *CCR standardised method* will need to request the *appropriate regulator* to revoke or vary its *CCR internal model method permission*.

[**Note**: *BCD* Annex III Part 6 point 4 (part)]

13.6.19 G The *appropriate regulator* will not agree to a *firm*'s request to revoke or vary its *CCR internal model method permission* except for demonstrated good cause.

[**Note**: *BCD* Annex III Part 6 point 4 (part)]

13.6.20 R If a *firm* ceases to comply with the requirements set out in BIPRU 13.6, it must either present to the *appropriate regulator* a plan for a timely return to compliance or demonstrate that the effect of non-compliance is immaterial.

[**Note**: *BCD* Annex III Part 6 point 4 (part)]

13.6.21 G If a *firm* ceases to comply with the requirements set out in BIPRU 13.6, the *appropriate regulator* may revoke the *CCR internal model method permission* or take other appropriate supervisory action.

[**Note**: *BCD* Annex III Part 6 point 4 (part)]

Exposure value

13.6.22 R

(1) A *firm* must measure the *exposure* value at the level of the *netting set*.

(2) The model 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.

(3) The model must then compute the *exposure* value for the *netting set* at each future date given the changes in the market variables.

(4) For margined counterparties, the model may also capture future collateral movements.

[**Note**: *BCD* Annex III Part 6 point 5]

13.6.23 R A *firm* may include eligible financial collateral as defined in BIPRU 5.4.8 R (Eligible collateral under financial collateral comprehensive method) and BIPRU 14.2.15 R to BIPRU 14.2.17 R in its forecasting distributions for changes in the market value of the *netting set*, if the quantitative, qualitative and data requirements for the *CCR internal model method* are met for the collateral.

[**Note**: *BCD* Annex III Part 6 point 6]

13.6.24 R A *firm* must calculate the *exposure* value as the product of alpha (), as set out in BIPRU 13.6.31 R, times *effective EPE*:

Exposure value = *effective EPE*

[**Note**: *BCD* Annex III Part 6 point 7 first part]

Effective EPE

13.6.25 R A *firm* must compute *effective EPE* 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. The model estimates *EE* at a series of future dates t1, t2, t3, etc.

[**Note**: *BCD* Annex III Part 6 point 7 third part]

13.6.26 R A *firm* must compute *effective EE* recursively as:

*Effective EE*tk = max(*effective EE*tk-1; *EE*tk)

where:

the current date is denoted as t0 and *Effective EE*t0 equals *current exposure*.

[**Note**: *BCD* Annex III Part 6 point 8]

13.6.27 R For the purposes of BIPRU 13.6.25 R :

(1) *effective EPE* is the average *effective EE* during the first year of future *exposure*;

(2) if all contracts in the *netting set* mature within less than one year, *effective EPE* is the average of *effective EE* until all contracts in the *netting set* mature.

[**Note**: *BCD* Annex III Part 6 point 9, first part]

13.6.28 R A *firm* must compute *effective EPE* as a weighted average of *effective EE*:

Effective EPE = $(_{k=1}{}^{\min(1\ \text{year};\text{maturity})})((\textit{Effective EE}_{tk})*(t_k))$

where:

the weights ?tk = tk tk-1 allow for the case when future *exposure* is calculated at dates that are not equally spaced over time.

[**Note**: *BCD* Annex III Part 6 point 9, second part]

13.6.29 R A *firm* must calculate *EE* or *peak exposure* measures based on a *distribution of exposures* that accounts for the possible non-normality of the *distribution of exposures*.

[**Note**: *BCD* Annex III Part 6 point 10]

13.6.30 R [deleted]

Alpha

13.6.31 **R** For the purposes of BIPRU 13.6.24 R, alpha () is 1.4 or any higher amount specified in the *firm's CCR internal model method permission*.

[**Note**: *BCD* Annex III Part 6 point 7 second part]

13.6.32 **G** If the *appropriate regulator* does specify an alpha greater than 1.4, the reasons will be set out in the *firm's CCR internal model method permission*.

13.6.33 **R** If a *firm's CCR internal model method permission* permits it, the *firm* may use its own estimates of , subject to a floor of 1.2, where must equal the ratio of internal capital from a full simulation of *CCR exposure* across counterparties (numerator) and internal capital based on *EPE* (denominator).

[**Note**: *BCD* Annex III Part 6 point 12 (part)]

13.6.34 **R** For the purposes of BIPRU 13.6.33 R:

(1) in the denominator, *EPE* must be used as if it were a fixed outstanding amount;

(2) a *firm* must be able to demonstrate that its internal estimates of capture in the numerator material sources of stochastic dependency of *distribution of market values* of transactions or of portfolios of transactions across counterparties;

(3) internal estimates of must take account of the granularity of portfolios.

[**Note**: *BCD* Annex III Part 6 point 12 (part)]

13.6.35 **R** A *firm* must ensure that the numerator and denominator of 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 capital approach, be well-documented and be subject to independent validation. In addition, a *firm* must review their estimates on at least a quarterly basis, and more frequently when the composition of the portfolio varies over time. A *firm* must also assess the model risk.

[**Note**: *BCD* Annex III Part 6 point 13]

13.6.35A **R** Where appropriate, volatilities and correlations of *market risk* factors used in the joint simulation of *market risk* and credit risk must be conditioned on the credit risk factor to reflect potential increases in volatility or correlation in an economic downturn.

[**Note**: *BCD* Annex III Part 6 point 14]

13.6.36 **G** In reviewing its estimate of , a *firm* may not need to perform a full recalculation each quarter if it can demonstrate by other means that the estimate would not be materially different. A full recalculation should however be performed at least annually. If there is a structural change in the *firm*'s portfolio that is likely to have the effect that the existing estimate of will be inappropriate, the *firm* should also recalculate it. A *firm* should have procedures in place to identify any such structural changes.

Maturity adjustment

13.6.37 G A *firm* using the *IRB approach* for *risk weighting* of *exposures* arising from a *CCR internal model method* should also apply a different maturity adjustment as set out in BIPRU 4.4.67 R BIPRU 4.4.70 R.

Margin agreement

13.6.38 R If the *netting set* is subject to a *margin agreement*, a *firm* must use one of the following *EPE* measures:

(1) *effective EPE* without taking into account the *margin agreement*;

(2) the *margin threshold*, if positive, under the *margin agreement* plus an add-on that reflects the potential increase in *exposure* over the *margin period of risk*:

(a) 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*;

(b) 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.

(3) if the model captures the effects of margining when estimating *EE*, the model's *EE* measure may be used directly in the equation in BIPRU 13.6.28 R (Computation of effective EE), unless the *firm's CCR internal model method permission* does not apply this provision or does not permit that use.

[**Note**: *BCD* Annex III Part 6 point 15]

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13.6.39 G Where the effects of margining are captured by the model itself, the *appropriate regulator* does not prescribe any floors for the *margin period of risk* but will challenge a *firm* that looks to use periods shorter than 5 days for *repurchase agreements* or *reverse repurchase agreements* or 10 days for *financial derivative instruments*.

Operational requirements: General

13.6.40 R A *firm's EPE* model must meet the operational requirements set out in BIPRU 13.6.41 R to BIPRU 13.6.66 R.

[**Note**: *BCD* Annex III Part 6 point 16]

Operational requirements: CCR control

13.6.41 R (1) The *firm* must have a control unit that is responsible for the design and implementation of its *CCR* management system, including the initial and on-going validation of the model.

(2) 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.

(3) This unit must be:

(a) independent from units responsible for originating, renewing or trading *exposures* and free from undue influence;

(b) it must be adequately staffed; and

(c) it must report directly to the senior management of the *firm*.

(4) The work of this unit must be closely integrated into the day-to-day credit risk management process of the *firm*; its output must, accordingly, be an integral part of the process of planning, monitoring and controlling the *firm's* credit and overall risk profile.

[**Note**: *BCD* Annex III Part 6 point 17]

13.6.42 R

(1) A *firm* must have *CCR* management policies, processes and systems that are conceptually sound and implemented with integrity.

(2) A sound *CCR* management framework must include the identification, measurement, management, approval and internal reporting of *CCR*.

[**Note**: *BCD* Annex III Part 6 point 18]

13.6.43 R

(1) A *firm's* risk management policies must take account of *market risk*, *liquidity risk*, and legal and *operational risk* that can be associated with *CCR*.

(2) The *firm* must not undertake business with a counterparty without assessing its creditworthiness and must take due account of settlement and pre-settlement credit risk.

(3) These risks must be managed as comprehensively as practicable at the counterparty level (aggregating *CCR exposures* with other credit *exposures*) and at the *firm*-wide level.

[**Note**: *BCD* Annex III Part 6 point 19]

13.6.44 R

A *firm's governing body* and senior management must be actively involved in the *CCR* control process and must regard this as an essential aspect of the business to which significant resources need to be devoted. Senior management must be aware of the limitations and assumptions of the model used and the impact these can have on the reliability of the output. Senior management must also consider the uncertainties of the market environment and operational issues and be aware of how these are reflected in the model.

[**Note**: *BCD* Annex III Part 6 point 20]

13.6.45 R

A *firm* must ensure that the daily reports prepared on its *exposures* to *CCR* are 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 *firm's* overall *CCR exposure*.

[**Note**: *BCD* Annex III Part 6 point 21]

13.6.46 R

(1) A *firm's CCR* management system must be used in conjunction with internal credit and trading limits.

(2) A *firm* must ensure that its credit and trading limits are related to its risk measurement model in a manner that is:

(a) consistent over time; and

(b) well understood by credit managers, traders and senior management.

[**Note**: *BCD* Annex III Part 6 point 22]

13.6.47 R

(1) A *firm's* measurement of *CCR* must include measuring daily and intra-day usage of credit lines.

(2) The *firm* must measure *current exposure* gross and net of collateral.

(3) At portfolio and counterparty level, the *firm* must calculate and monitor *peak exposure* or potential future *exposure* (PFE) at the confidence interval chosen by the *firm*.

(4) The *firm* must take account of large or concentrated positions, including by groups of related counterparties, by industry, by market, etc.

[**Note**: *BCD* Annex III Part 6 point 23]

13.6.48 R

(1) A *firm* must 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 *firm's* risk measurement model.

(2) The results of this stress testing must be reviewed periodically by senior management and must be reflected in the *CCR* policies and limits set by management and the *governing body*.

(3) Where stress tests reveal particular vulnerability to a given set of circumstances, prompt steps must be taken to manage those risks appropriately.

[**Note**: *BCD* Annex III Part 6 point 24]

13.6.49 R

(1) A *firm* must 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.

(2) The *firm's CCR* management system must be well documented and must provide an explanation of the empirical techniques used to measure *CCR*.

[**Note**: *BCD* Annex III Part 6 point 25]

13.6.50 R A *firm* must conduct an independent review of the *CCR* management system regularly through its own internal auditing process. This review must include both the activities of the business units referred to in BIPRU 13.6.41 R and of the independent *CCR* control unit. A review of the overall *CCR* management process must take place at regular intervals and must specifically address, at a minimum:

(1) the adequacy of the documentation of the *CCR* management system and process;

(2) the organisation of the *CCR* control unit;

(3) the integration of *CCR* measures into daily risk management;

(4) the approval process for risk pricing models and valuation systems used by front and back-office personnel;

(5) the validation of any significant change in the *CCR* measurement process;

(6) the scope of *CCR* captured by the risk measurement model;

(7) the integrity of the management information system;

(8) the accuracy and completeness of *CCR* data;

(9) the verification of the consistency, timeliness and reliability of data sources used to run models, including the independence of such data sources;

(10) the accuracy and appropriateness of volatility and correlation assumptions;

(11) the accuracy of valuation and risk transformation calculations; and

(12) the verification of the model's accuracy through frequent back-testing.

[**Note**: *BCD* Annex III Part 6 point 26]

Operational requirements: Use test

13.6.51 R The *distribution of exposures* generated by the model used to calculate *effective EPE* must be closely integrated into the day-to-day *CCR* management process of the *firm*. The model's output must accordingly play an essential role in the credit approval, *CCR* management, internal capital allocation, and corporate governance of the *firm*.

[**Note**: *BCD* Annex III Part 6 point 27]

13.6.52 R A *firm* must have a track record in the use of models that generate a *distribution of exposures* to *CCR*. Thus, the *firm* must be able to demonstrate that it has been using a model to calculate the *distribution of exposures* upon which the *EPE* calculation is based that meets, broadly, the minimum requirements set out in BIPRU 13.6 for at least one year prior to the date of its *CCR internal model method permission*.

[**Note**: *BCD* Annex III Part 6 point 28]

13.6.53 R

(1) A *firm* must ensure that the model used to generate a *distribution of exposures* to *CCR* is part of a *CCR* management framework that includes the identification, measurement, management, approval and internal reporting of *CCR*. This framework must include the measurement of usage of credit lines (aggregating *CCR exposures* with other credit *exposures*) and internal capital allocation.

(2) In addition to *EPE*, a *firm* must measure and manage *current exposures*.

(3) Where appropriate, the *firm* must measure *current exposure* gross and net of collateral.

(4) The use test is satisfied if a *firm* uses other *CCR* measures, such as *peak exposure* or PFE (see BIPRU 13.6.47 R), based on the *distribution of exposures* generated by the same model to compute *EPE*.

[**Note**: *BCD* Annex III Part 6 point 29]

13.6.54 R

A *firm* must have the systems capability to estimate *EE* daily if necessary, unless it is able to demonstrate to the *appropriate regulator* that its *exposures* to *CCR* warrant less frequent calculation. The *firm* must 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*.

[**Note**: *BCD* Annex III Part 6 point 30]

13.6.55 R

(1) *Exposure* must be measured, monitored and controlled over the life of all contracts in the *netting set* (not just to the one year horizon).

(2) A *firm* must have procedures in place to identify and control the risks for counterparties where the *exposure* rises beyond the one-year horizon.

(3) A *firm* must input the forecast increase in *exposure* into the *firm's* internal capital model.

[**Note**: *BCD* Annex III Part 6 point 31]

Operational requirements: Stress testing

13.6.56 R

(1) A *firm* must have in place sound stress testing processes for use in the assessment of capital adequacy for *CCR*.

(2) These stress measures must be compared with the measure of *EPE* and considered by the *firm* as part of the process set out in GENPRU 1.2.42 R.

(3) 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 an assessment of the *firm's* ability to withstand such changes.

[**Note**: *BCD* Annex III Part 6 point 32]

13.6.57 R (1) A *firm* must stress test its *CCR exposures*, including jointly stressing *market risk* and credit risk factors.

(2) In its stress tests of *CCR*, a *firm* must consider concentration risk (to a single counterparty or groups of counterparties), correlation risk across *market risk* and credit risk, and the risk that liquidating the counterparty's positions could move the market.

(3) In its stress tests a *firm* must also consider the impact on its own positions of such market moves and integrate that impact in its assessment of *CCR*.

[**Note**: *BCD* Annex III Part 6 point 33]

Operational requirements: Wrong-way risk

13.6.58 R A *firm* must give due consideration to *exposures* that give rise to a significant degree of *general wrong-way risk*.

[**Note**: *BCD* Annex III Part 6 point 34]

13.6.59 R A *firm* must 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.

[**Note**: *BCD* Annex III Part 6 point 35]

Operational requirements: Integrity of modelling process

13.6.60 R A *firm* must ensure that:

(1) the model reflects transaction terms and specifications in a timely, complete, and conservative fashion;

(2) such terms include at least:

(a) contract notional amounts;

(b) maturity;

(c) reference assets;

(d) margining arrangements; and

(e) netting arrangements;

(3) the terms and specifications are maintained in a database that is subject to formal and periodic audit;

(4) the process for recognising netting arrangements requires:

(a) signoff by legal staff to verify the legal enforceability of netting and

(b) input into the database by an independent unit;

(5) the transmission of transaction terms and specifications data to the model is also subject to internal audit; and

(6) formal reconciliation processes are 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.

[**Note**: *BCD* Annex III Part 6 point 36]

13.6.61 R A *firm* must ensure that:

(1) the model employs current market data to compute *current exposures*;

(2) when using historical data to estimate volatility and correlations, at least three years of historical data are used and updated quarterly or more frequently if market conditions warrant;

(3) the data covers a full range of economic conditions, such as a full business cycle;

(4) a unit independent from the business unit validates the price supplied by the business unit;

(5) the data is 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;

(6) it has a well-developed data integrity process to clean the data of erroneous and/or anomalous observations; and

(7) 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 identify suitable proxies and the *firm* demonstrates empirically that the proxy provides a conservative representation of the underlying risk under adverse market conditions.

[**Note**: *BCD* Annex III Part 6 point 37]

13.6.62 R If the model includes the effect of collateral on changes in the market value of the *netting set*, a *firm* must have adequate historical data to model the volatility of the collateral.

13.6.63 R A *firm* must ensure that the model is subject to a validation process which:

(1) is clearly articulated in *firms*' policies and procedures;

(2) specifies the kind of testing needed to ensure model integrity

(3) identifies conditions under which assumptions are violated and may result in an understatement of *EPE*; and

(4) includes a review of the comprehensiveness of the model.

[**Note**: *BCD* Annex III Part 6 point 38]

13.6.64 R A *firm* must monitor the appropriate risks and have processes in place to adjust its estimation of *EPE* when those risks become significant. This includes the following:

(1) the *firm* must identify and manage its *exposures* to *specific wrong-way risk*;

(2) for *exposures* with a rising risk profile after one year, the *firm* must compare on a regular basis the estimate of *EPE* over one year with *EPE* over the life of the *exposure*; and

(3) for *exposures* with a residual maturity below one year, the *firm* must 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.

[**Note**: *BCD* Annex III Part 6 point 39]

13.6.65 R A *firm* 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 requirements set out in BIPRU 13.7.

[**Note**: *BCD* Annex III Part 6 point 40]

13.6.66 R A *firm* that makes use of collateral to mitigate its *CCR* must 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 BIPRU 5 as modified, where relevant, by BIPRU 4.10.

[**Note**: *BCD* Annex III Part 6 point 41]

Validation requirements

13.6.67 R

(1) A *firm's CCR internal model method* model must meet the validation requirements in (2) to (8).

(2) The qualitative validation requirements set out in BIPRU 7.10 must be met.

(3) Interest rates, *foreign currency* rates, equity prices, *commodities*, and other *market risk* factors must be forecast over long time horizons for measuring *CCR exposure*. The performance of the forecasting model for *market risk* factors must be validated over a long time horizon.

(4) The pricing models used to calculate *CCR exposure* for a given scenario of future shocks to *market risk* factors must be tested as part of the *CCR internal model method* model validation process. Pricing models for *options* must account for the nonlinearity of option value with respect to *market risk* factors.

(5) The *CCR internal model method* model must capture transaction-specific information in order to aggregate *exposures* at the level of the *netting set*. A *firm* must verify that transactions are assigned to the appropriate *netting set* within the model.

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(6) The *CCR internal model method* model must also include transaction-specific information to capture the effects of margining. It must take into account both the current amount of margin and margin that would be passed between counterparties in the future. Such a model must account for the nature of *margin agreements* (unilateral or bilateral), the frequency of margin calls, the *margin period of risk*, the minimum threshold of unmargined *exposure* the *firm* 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 the *rules* set out in BIPRU 5 as modified, where relevant, by BIPRU 4.10.

(7) Static, historical backtesting on representative counterparty portfolios must be part of the *CCR internal model method* model validation process. At regular intervals, a *firm* 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 *firm* is exposed.

(8) If backtesting indicates that the *CCR internal model method* model is not sufficiently accurate, a *firm* must increase the *credit risk capital component* and, where BIPRU 13 is applied for the purposes of BIPRU 14, the *counterparty risk capital component* by an amount which is conservatively estimated to compensate for the inaccuracy of the model.

[**Note**: *BCD* Annex III Part 6 point 42 (part)]

13.6.68 G If backtesting indicates that the *CCR internal model method* model is not sufficiently accurate, the *appropriate regulator* may revoke a *firm*'s *CCR internal model method permission* or take appropriate measures to ensure that the model is improved promptly. Measures taken by the *appropriate regulator* may include the use of its *own-initiative power* to require the *firm* to hold more *capital resources*.

[**Note**: *BCD* Annex III Part 6 point 42 (part)]