Chapter 4

The IRB approach

4

4.7 The IRB approach: Equity exposures

Application

4.7.1 R ■ BIPRU 4.7 applies with respect to the *exposures* referred to in ■ BIPRU 4.7.2 R.

Definition of equity exposures

4.7.2 R The following *exposures* must be classed as *equity exposures*:

(1) non-debt *exposures* conveying a subordinated, residual claim on the assets or income of the issuer; and

(2) debt *exposures* the economic substance of which is similar to the *exposures* specified in (1).

[**Note:** *BCD* Article 86(2)]

Calculation of risk-weighted exposure amounts

4.7.3 R Notwithstanding ■ BIPRU 4.3.5 R (Relevant parameters), the calculation of *risk weighted exposure amounts* for credit risk for all *exposures* belonging to the *equity exposure IRB exposure class* must be calculated in accordance with one of the following ways:

(1) the simple risk weight approach (see ■ BIPRU 4.7.8 R;

(2) the *PD/LGD approach* (see ■ BIPRU 4.7.13 R); and

(3) the internal models approach (see ■ BIPRU 4.7.23 R);

in accordance with ■ BIPRU 4.7 and subject to the *firm's IRB permission*.

[**Note:** *BCD* Article 87(4) (part)]

4.7.4 R Even if a *firm's IRB permission* would otherwise permit the use of the internal models approach as referred to in ■ BIPRU 4.7.3 R (3), it may only use that approach if it meets the minimum requirements in ■ BIPRU 4.7.27 R - ■ BIPRU 4.7.35 R.

[**Note:** *BCD* Article 87(4) (part)]

4.7.5 R A *firm* may employ different approaches to different portfolios where the *firm* itself uses different approaches internally. A *firm* must, if it uses different approaches in accordance with the previous sentence, be able to

demonstrate to the *appropriate regulator* that the choice is made consistently and is not determined by regulatory arbitrage considerations.

[**Note:** *BCD* Annex VII Part 1 point 17]

4.7.6 R Notwithstanding ■ BIPRU 4.7.5 R a firm may, if its *IRB permission* permits it to do so, attribute the *risk weighted exposure amounts* for *equity exposures* to *ancillary services undertakings* according to the treatment of *non credit-obligation assets*.

[**Note:** *BCD* Annex VII Part 1 point 18]

Exposure value

4.7.7 R The *exposure* value must be the value presented in the financial statements. Admissible *equity exposure* measures are the following:

(1) for investments held at fair value with changes in value flowing directly through income and into *capital resources*, the *exposure* value is the fair value presented in the balance sheet;

(2) for investments held at fair value with changes in value not flowing through income but into a tax-adjusted separate component of equity, the *exposure* value is the fair value presented in the balance sheet; and

(3) for investments held at cost or at the lower of cost or market value, the *exposure* value is the cost or market value presented in the balance sheet.

[**Note:** *BCD* Annex VII Part 3 point 12]

The calculation of risk-weighted exposure amounts for equity exposures: The simple risk weight approach: Introduction

4.7.8 R ■ BIPRU 4.7.9 R to ■ BIPRU 4.7.12 R set out the simple risk weight approach for calculating the *risk weighted exposure amounts* for *equity exposures* as referred to in ■ BIPRU 4.7.3 R (1).

The calculation of risk-weighted exposure amounts for equity exposures: The simple risk weight approach: Risk weighted exposure amounts

4.7.9 R The *risk weighted exposure amounts* must be calculated according to the following formula:

risk-weighted exposure amounts = RW * *exposure* value;

where:

(1) risk weight (RW) = 190% for private *equity exposures* in sufficiently diversified portfolios;

(2) risk weight (RW) = 290% for exchange traded *equity exposures*; and

(3) *risk weight* (RW) = 370% for all other *equity exposures*.

[**Note:** *BCD* Annex VII Part 1 point 19]

4.7.10 R Short cash positions and derivative instruments held in the *non-trading book* are permitted to offset long positions in the same individual stocks provided that these instruments have been explicitly designated as hedges of specific *equity exposures* and that they provide a hedge for at least another year. Other short positions must be treated as if they are long positions with the relevant *risk weight* assigned to the absolute value of each position. In the context of maturity mismatched positions, the method is that for *corporate exposures* as set out in ■ BIPRU 4.4.70 R.

[**Note:** *BCD* Annex VII Part 1 point 20]

4.7.11 R A *firm* may recognise *unfunded credit protection* obtained on an *equity exposure* in accordance with the methods set out in ■ BIPRU 5 (Credit risk mitigation), as modified by ■ BIPRU 4.10.

[**Note:** *BCD* Annex VII Part 1 point 21]

The calculation of risk-weighted exposure amounts for equity exposures: The simple risk weight approach: Expected loss

4.7.12 R The *expected loss* amounts for *equity exposures* must be calculated according to the following formula:

(1) *expected loss* amount = *EL* × *exposure* value; and

(2) the *EL* values must be the following:

(a) *expected loss* (*EL*) = 0.8% for private *equity exposures* in sufficiently diversified portfolios;

(b) *expected loss* (*EL*) = 0.8% for exchange traded *equity exposures*; and

(c) *expected loss* (*EL*) = 2.4% for all other *equity exposures*.

[**Note:** *BCD* Annex VII Part 1 point 32]

The calculation of risk-weighted exposure amounts for equity exposures: The PD/LGD approach: Introduction

4.7.13 R ■ BIPRU 4.7.14 R to ■ BIPRU 4.7.22 R set out the *PD/LGD approach* for calculating the *risk weighted exposure amounts* for *equity exposures*.

The calculation of risk-weighted exposure amounts for equity exposures: The PD/LGD approach: Risk weighted exposure amounts

4.7.14 R The *risk weighted exposure amounts* must be calculated according to the formulas in ■ BIPRU 4.4.58 R (Risk weighted exposure amounts for sovereigns, institutions and corporates). If a *firm* does not have sufficient information to use the definition of *default* a scaling factor of 1.5 must be assigned to the *risk weights*.

[**Note:** *BCD* Annex VII Part 1 point 22]

4.7.15 R At the individual *exposure* level the sum of the *expected loss* amount multiplied by 12.5 and the *risk weighted exposure amount* must not exceed the *exposure* value multiplied by 12.5.

[**Note:** *BCD* Annex VII Part 1 point 23]

4.7.16 R A *firm* may recognise *unfunded credit protection* obtained on an *equity exposure* in accordance with the methods set out in BIPRU 5 (Credit risk mitigation) as modified by BIPRU 4.10. This must be subject to an *LGD* of 90% on the *exposure* to the provider of the hedge. For private *equity exposures* in sufficiently diversified portfolios an *LGD* of 65% may be used.

[**Note:** *BCD* Annex VII Part 1 point 24]

The calculation of risk-weighted exposure amounts for equity exposures: The PD/LGD approach: Calculation of expected loss amounts

4.7.17 R The *expected loss* amounts for *equity exposures* must be calculated according to the following formulae:

(1) *expected loss* (EL) = *PD* × *LGD*; and

(2) *expected loss* amount = *EL* × *exposure* value.

[**Note:** *BCD* Annex VII Part 1 point 33]

The calculation of risk-weighted exposure amounts for equity exposures: The PD/LGD approach: PDs

4.7.18 R *PDs* must be determined according to the methods for *corporate exposures*. The following minimum *PDs* must be applied:

(1) 0.09% for exchange traded *equity exposures* where the investment is part of a long-term customer relationship;

(2) 0.09% for non-exchange traded *equity exposures* where the returns on the investment are based on regular and periodic cash flows not derived from capital gains;

(3) 0.40% for exchange traded *equity exposures* including other short positions as set out in BIPRU 4.7.10 R; and

(4) 1.25% for all other *equity exposures* including other short positions as set out in BIPRU 4.7.10 R.

[**Note:** *BCD* Annex VII Part 2 point 24]

4.7.19 R BIPRU 4.4.29 G (five year observation period) applies to the *PD/LGD approach*.

[**Note:** *BCD* Annex VII Part 4 point 66 (part)]

The calculation of risk-weighted exposure amounts for equity exposures: The PD/LGD approach: LGDs

4.7.20 R Private *equity exposures* in sufficiently diversified portfolios may be assigned an *LGD* of 65%.

[**Note:** *BCD* Annex VII Part 2 point 25]

4.7.21 R All other *exposures* must be assigned an *LGD* of 90%.

[**Note:** *BCD* Annex VII Part 2 point 26]

The calculation of risk-weighted exposure amounts for equity exposures: The PD/LGD approach: Maturity

4.7.22 R M (maturity) assigned to all *exposures* must be 5 years.

[**Note:** *BCD* Annex VII Part 2 point 27]

The calculation of risk-weighted exposure amounts for equity exposures: The internal models approach: Introduction

4.7.23 R ■ BIPRU 4.7.24 R to ■ BIPRU 4.7.35 R set out the internal models approach for calculating the *risk weighted exposure amounts* for *equity exposures* as referred to in ■ BIPRU 4.7.3 R (3).

The calculation of risk-weighted exposure amounts for equity exposures: The internal models approach: Risk weighted exposure amounts

4.7.24 R The *risk weighted exposure amount* is the potential *loss* on the *firm's equity exposures* as derived using internal value-at-risk models subject to the 99th percentile, one-tailed confidence interval of the difference between quarterly returns and an appropriate risk-free rate computed over a long-term sample period, multiplied by 12.5. The *risk weighted exposure amounts* at the *equity exposure* portfolio level must not be less than the total of the sums of the minimum *risk weighted exposure amounts* required under the *PD/LGD approach* and the corresponding *expected loss* amounts multiplied by 12.5 and calculated on the basis of the *PD* values set out in ■ BIPRU 4.7.18 R (1) and the corresponding *LGD* values set out in ■ BIPRU 4.7.20 R and ■ BIPRU 4.7.21 R.

[**Note:** *BCD* Annex VII Part 1 point 25]

4.7.25 R A *firm* may recognise *unfunded credit protection* obtained on an *equity position*.

[**Note:** *BCD* Annex VII Part 1 point 26]

The calculation of risk weighted exposure amounts for equity exposures: The internal models approach: Expected loss amounts

4.7.26 R The *expected loss* amounts for *equity exposures* under the internal models approach must be 0%.

[**Note:** *BCD* Annex VII Part 1 point 34]

The calculation of risk weighted exposure amounts for equity exposures: The internal models approach: Capital requirements and risk quantification

4.7.27 R

(1) A firm must meet the standards set out in (2) to (9) for the purpose of calculating capital requirements.

(2) The estimate of potential *loss* must be robust to adverse market movements relevant to the long-term risk profile of the *firm's* specific holdings. The data used to represent return distributions must reflect the longest sample period for which data is available and be meaningful in representing the risk profile of the firm's specific *equity exposures*. The data used must be sufficient to provide conservative, statistically reliable and robust loss estimates that are not based purely on subjective or judgmental considerations. A *firm* must be able to demonstrate to the *appropriate regulator* that the shock employed provides a conservative estimate of potential *losses* over a relevant long-term market or business cycle.

(3) A *firm* must combine empirical analysis of available data with adjustments based on a variety of factors in order to attain model outputs that achieve appropriate realism and conservatism. In constructing Value at Risk (VaR) models estimating potential quarterly losses, a *firm* may use quarterly data or convert shorter horizon period data to a quarterly equivalent using an analytically appropriate method supported by empirical evidence and through a well-developed and documented thought process and analysis. Such an approach must be applied conservatively and consistently over time. Where only limited relevant data is available a *firm* must add appropriate margins of conservatism.

(4) The models used must be able to capture adequately all of the material risks embodied in equity returns including both the *general market risk* and *specific risk* exposure of the *firm's equity exposure* portfolio. The internal models must adequately explain historical price variation, capture both the magnitude and changes in the composition of potential concentrations, and be robust to adverse market environments. The population of risk *exposures* represented in the data used for estimation must be closely matched to or at least comparable with those of the *firm's equity exposures*.

(5) The internal model must be appropriate for the risk profile and complexity of a *firm's equity exposure* portfolio. Where a *firm* has material holdings with values that are highly non-linear in nature the internal models must be designed to capture appropriately the risks associated with such instruments.

(6) Mapping of individual positions to proxies, market indices, and risk factors must be plausible, intuitive, and conceptually sound.

(7) A *firm* must be able to demonstrate to the *appropriate regulator* through empirical analyses the appropriateness of risk factors, including their ability to cover both *general market risk* and *specific risk*.

(8) The estimates of the return volatility of *equity exposures* must incorporate relevant and available data, information, and methods.

Independently reviewed internal data or data from external sources (including pooled data) must be used.

(9) A rigorous and comprehensive stress-testing programme must be in place.

[**Note:** *BCD* Annex VII Part 4 point 115]

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The calculation of risk-weighted exposure amounts for equity exposures: The internal models approach: Risk management and controls

4.7.28 R

(1) With regard to the development and use of internal models for capital requirement purposes, a *firm* must establish policies, procedures, and controls to ensure the integrity of the model and modelling process. These policies, procedures, and controls must include the ones set out in the rest of this paragraph.

(2) There must be full integration of the internal model into the overall management information systems of the *firm* and in the management of the *non-trading book equity exposure* portfolio. In particular they must be used in:

(a) measuring and assessing *equity exposure* portfolio performance (including the risk adjusted performance);

(b) allocating economic capital to *equity exposures*; and

(c) evaluating overall capital adequacy and the investment management process.

(3) A *firm* must have established management systems, procedures, and control functions for ensuring the periodic and independent review of all elements of the internal modelling process, including approval of model revisions, vetting of model inputs, and review of model results, such as direct verification of risk computations. These reviews must assess the accuracy, completeness, and appropriateness of model inputs and results and focus on both finding and limiting potential errors associated with known weaknesses and identifying unknown model weaknesses. Such reviews may be conducted by an internal independent unit, or by an independent external third party.

(4) There must be adequate systems and procedures for monitoring investment limits and the risk exposures of *equity exposures*.

(5) The units responsible for the design and application of the model must be functionally independent from the units responsible for managing individual investments.

(6) Parties responsible for any aspect of the modelling process must be adequately qualified. Management must allocate sufficient skilled and competent resources to the modelling function.

[**Note:** *BCD* Annex VII Part 4 point 116]

The calculation of risk-weighted exposure amounts for equity exposures: The internal models approach: Validation and documentation

4.7.29 R A *firm* must have a robust system in place to validate the accuracy and consistency of its internal models and modelling processes. All material elements of the internal models and the modelling process and validation must be documented.

[**Note:** *BCD* Annex VII Part 4 point 117]

4.7.30 R A *firm* must use the internal validation process to assess the performance of its internal models and processes in a consistent and meaningful way.

[**Note:** *BCD* Annex VII Part 4 point 118]

4.7.31 R The methods and data used for quantitative validation must be consistent through time. Changes in estimation and validation methods and data (both data sources and periods covered) must be documented.

[**Note:** *BCD* Annex VII Part 4 point 119]

4.7.32 R A *firm* must regularly compare actual *equity exposure* returns (computed using realised and unrealised gains and losses) with modelled estimates. Such comparisons must make use of historical data that cover as long a period as possible. A *firm* must document the methods and data used in such comparisons. This analysis and documentation must be updated at least annually.

[**Note:** *BCD* Annex VII Part 4 point 120]

4.7.33 R A firm must make use of other quantitative validation tools and comparisons with external data sources. The analysis must be based on data that are appropriate to the portfolio, are updated regularly, and cover a relevant observation period. A *firm's* internal assessments of the performance of its models must be based on as long a period as possible.

[**Note:** *BCD* Annex VII Part 4 point 121]

4.7.34 R A *firm* must have sound internal standards for situations where comparison of actual *equity exposure* returns with the models' estimates calls the validity of the estimates or of the models as such into question. These standards must take account of business cycles and similar systematic variability in *equity exposure* returns. All adjustments made to internal models in response to model reviews must be documented and consistent with the *firm's* model review standards.

[**Note:** *BCD* Annex VII Part 4 point 122]

4.7.35 R The internal model and the modelling process must be documented, including the responsibilities of parties involved in the modelling, and the model approval and model review processes.

[**Note:** *BCD* Annex VII Part 4 point 123]