# Chapter 4

# The IRB approach

# 4.4 The IRB approach: Exposures to corporates, institutions and sovereigns

## Application

4.4.1 R

(1) This section applies with respect to the *sovereign, institution and corporate IRB exposure class*.

(2) The *sovereign, institution and corporate IRB exposure class* includes *specialised lending exposures*.

(3) Both BIPRU 4.4 and BIPRU 4.5 (Specialised lending exposures) apply to *specialised lending exposures*. A *firm* may calculate *risk weighted exposure amounts* for a *specialised lending exposure* either:

(a) (if it is able to do so) in accordance with BIPRU 4.4; or

(b) in accordance with BIPRU 4.4 as modified by BIPRU 4.5.

## Definition

4.4.2 R

The following *exposures* must be treated as *exposures* to central governments and *central banks*:

*(1)* *exposures* to regional governments, local authorities or *public sector entities* which are treated as *exposures* to central governments under the *standardised approach*; and

*(2)* *exposures* to *multilateral development banks* and international organisations which attract a *risk weight* of 0% under the *standardised approach*.

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

4.4.3 R

The following *exposures* must be treated as *exposures* to *institutions*:

*(1)* *exposures* to regional governments and local authorities which are not treated as *exposures* to central governments under the *standardised approach*;

*(2)* *exposures* to *public sector entities* which are treated as *exposures* to *institutions* under the *standardised approach*;

(3) exposures to *multilateral development banks* which do not attract a 0% *risk weight* under the *standardised approach*; and

(4) without prejudice to BIPRU 13.3.13 R and BIPRU 13.8.7 R (Exposures to a central counterparty) *exposures* to *recognised third country investment firms* and *exposures* to *recognised clearing houses* and *designated investment exchanges*.

[**Note**: *BCD* Article 86(3) and *CAD* Article 40]

**4.4.4** R Any credit obligation not assigned to the *IRB exposure classes* referred to in BIPRU 4.3.2 R (1) (Sovereigns), BIPRU 4.3.2 R (2) (Institutions) and BIPRU 4.3.2 R (4) - BIPRU 4.3.2 R (6) (Retail, equity and securitisations) must be assigned to the *corporate exposure* class.

[**Note:** *BCD* Article 86(7)]

## Rating system: Structure of rating system

**4.4.5** R BIPRU 4.4.6 R - BIPRU 4.4.21 R apply in addition to BIPRU 4.3.25 R - BIPRU 4.3.28 R (Rating systems).

**4.4.6** R A *rating system* must take into account obligor and transaction risk characteristics.

[**Note**: *BCD* Annex VII Part 4 point 5]

**4.4.7** R A *rating system* must have an obligor rating scale which reflects exclusively quantification of the risk of obligor *default*. The obligor rating scale must have a minimum of seven grades for non-*defaulted* obligors and one for *defaulted* obligors.

[**Note:** *BCD* Annex VII Part 4 point 6]

**4.4.8** R An *obligor grade* means for the purpose of BIPRU 4 as it applies to the *sovereign, institution and corporate IRB exposure class* a risk category within a *rating system's* obligor rating scale, to which obligors are assigned on the basis of a specified and distinct set of rating criteria, from which estimates of *PD* are derived. A *firm* must document both the relationship between *obligor grades* in terms of the level of *default* risk each grade implies and the criteria used to distinguish that level of *default* risk.

[**Note:** *BCD* Annex VII Part 4 point 7]

**4.4.9** R A *firm* with portfolios concentrated in a particular market segment and range of *default* risk must have enough *obligor grades* within that range to avoid undue concentrations of obligors in a particular grade. Significant concentrations within a single grade must be supported by convincing empirical evidence that the *obligor grade* covers a reasonably narrow *PD* band and that the *default* risk posed by all obligors in the grade falls within that band.

[**Note:** *BCD* Annex VII Part 4 point 8]

## Rating system: Assignment to grades or pools

**4.4.10** G Material on assignment to grades or pools can be found in BIPRU 4.3.43 R - BIPRU 4.3.48 R.

## Rating system: Assignment of exposures

**4.4.11** R Each obligor must be assigned to an *obligor grade* as part of the credit approval process.

[**Note:** *BCD* Annex VII Part 4 point 19]

**4.4.12** R Each separate legal entity to which a *firm* is exposed must be separately rated. A *firm* must be able to demonstrate to the *appropriate regulator* that it has acceptable policies regarding the treatment of individual obligor clients and *groups of connected clients*.

[**Note:** *BCD* Annex VII Part 4 point 22]

**4.4.13** R Separate *exposures* to the same obligor must be assigned to the same *obligor grade*, irrespective of any differences in the nature of each specific transaction. Exceptions, where separate *exposures* are allowed to result in multiple grades for the same obligor are:

(1) country transfer risk, this being dependent on whether the *exposures* are denominated in local or foreign currency;

(2) where the treatment of associated guarantees to an *exposure* may be reflected in an adjusted assignment to an *obligor grade*; and

(3) where consumer protection, bank secrecy or other legislation prohibit the exchange of client data.

[**Note:** *BCD* Annex VII Part 4 point 23]

## Rating system: Overrides

**4.4.14** G Material on overrides can be found in BIPRU 4.3.50 R.

## Rating system: Integrity of assignment process

**4.4.15** R Assignments and periodic reviews of assignments must be completed or approved by an independent party that does not directly benefit from decisions to extend the credit.

[**Note:** *BCD* Annex VII Part 4 point 26]

**4.4.16** R A *firm* must update assignments at least annually. High risk obligors and problem *exposures* must be subject to more frequent review. A *firm* must undertake a new assignment if material information on the obligor or *exposure* becomes available.

[**Note:** *BCD* Annex VII Part 4 point 27]

4.4.17 G Although it will not usually be the case that facility ratings and *conversion factors* will have to be updated more frequently than annually, *LGDs* and *exposure* values are subject to more frequent recalculation due to their connection to drawn balances, which can vary on a daily basis.

4.4.18 R A *firm* must have an effective process to obtain and update relevant information on obligor characteristics that affect *PDs*, and on transaction characteristics that affect *LGDs* and *conversion factors*.

[**Note:** *BCD* Annex VII Part 4 point 28]



## Rating system: Use of models

4.4.19 G Material on the use of models can be found in BIPRU 4.3.51 R - BIPRU 4.3.53 G.

## Rating system: Documentation of rating systems

4.4.20 G Material on the documentation of rating systems can be found in BIPRU 4.3.19 R - BIPRU 4.3.24 R.

## Rating system: Data maintenance

4.4.21 R In addition to complying with the material in BIPRU 4.3.54 R (Data maintenance) a *firm* must collect and store:

(1) complete rating histories on obligors and recognised guarantors;

(2) the dates the ratings were assigned;

(3) the key data and methodology used to derive the rating;

(4) the person responsible for the rating assignment;

(5) the identity of obligors and *exposures* that *defaulted*;

(6) the date and circumstances of such *defaults*;

(7) data on the *PDs* and realised *default* rates associated with rating grades and ratings migration; and

(8) (in the case of a *firm* not using the *advanced IRB approach* in the calculation of *LGDs* and/or *conversion factors*) data on comparisons of realised *LGDs* to the values as set out in BIPRU 4.4.34 R and BIPRU 4.8.25 R and realised *conversion factors* to the values as set out in BIPRU 4.4.37 R, BIPRU 4.4.45 R and BIPRU 4.6.44 R.

[**Note:** *BCD* Annex VII Part 4 point 37]

## Risk quantification: Definition of default

4.4.22 R (1) This *rule*, in accordance with BIPRU 4.3.57 R (4) (Definition of default), sets the exact number of days past due that a *firm* should abide by in the case of *exposures* to *PSEs*.

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(2) For counterparts that are *PSEs* situated within the *United Kingdom* the number of days past due is 180.

(3) [deleted]

(4) For counterparts that are *PSEs* in a state other than the *UK* the number of days past due is the lower of:

(a) 180; and

(b) (if a number of days past due for such *exposures* has been fixed under any law of that state applicable to *undertakings* in the *banking sector* or the *investment services sector* that implements the *IRB approach*) that number.

[**Note:** *BCD* Annex VII Part 4 point 44 (part) and point 48 (part)]

### Risk quantification: Overall requirements for estimation: Requirements specific to PD estimation

4.4.23 R BIPRU 4.4.24 R - BIPRU 4.4.31 R apply to both the *foundation IRB approach* and the *advanced IRB approach*.

4.4.24 R A *firm* must estimate *PDs* by *obligor grade* from long run averages of one-year *default* rates.

[**Note:** *BCD* Annex VII Part 4 point 59]

4.4.25 R A *firm* must use *PD* estimation techniques only with supporting analysis. A *firm* must recognise the importance of judgmental considerations in combining results of techniques and in making adjustments for limitations of techniques and information.

[**Note:** *BCD* Annex VII Part 4 point 62]

4.4.26 G Where rating agency experience or the output of a statistical default model are the primary component of *PD* estimation, a *firm* should consider whether it needs to make adjustments for other relevant information, such as internal experience, conservatism and cyclical effects. In making these adjustments, a *firm* should consider the extent to which it needs to take account of the potential for both under-recording of actual *defaults* experienced and divergence of actual experience from the true underlying average *PD*.

4.4.27 R To the extent that a *firm* uses data on internal *default* experience for the estimation of *PDs* it must be able to demonstrate in its analysis that the estimates are reflective of underwriting standards and of any differences in the *rating system* that generated the data and the current *rating system*. Where underwriting standards or *rating systems* have changed, a *firm* must add a greater margin of conservatism in its estimate of *PD*.

[**Note:** *BCD* Annex VII Part 4 point 63]

4.4.28 R To the extent that a *firm* associates or maps its internal grades to the scale used by an *ECAI* or similar organisations and then attributes the *default* rate observed for the external organisation's grades to the *firm*'s grades, mappings must be based on a comparison of internal rating criteria to the criteria used by the external organisation and on a comparison of the internal and external ratings of any common obligors. Biases or inconsistencies in the mapping approach or underlying data must be avoided. The external organisation's criteria underlying the data used for quantification must be oriented to *default* risk only and not reflect transaction characteristics. The *firm's* analysis must include a comparison of the *default* definitions used, subject to the requirements in BIPRU 4.3.56 R to BIPRU 4.3.71 R and BIPRU 4.4.22 R (Definition of default). The *firm* must document the basis for the mapping.

[**Note:** *BCD* Annex VII Part 4 point 64]

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**4.4.29** G It is unlikely that a *firm* will be able to convince the *appropriate regulator* that it had considered all relevant and available information, as required by BIPRU 4.3.74 R, if it used only data from one *ECAI* or similar organisation, where other relevant information is available.

**4.4.30** R To the extent that a *firm* uses statistical *default* prediction models it may estimate *PDs* as the simple average of *default*-probability estimates for individual obligors in a given grade. The firm's use of *default* probability models for this purpose must meet the standards specified in BIPRU 4.3.51 R.

[**Note:** *BCD* Annex VII Part 4 point 65]

**4.4.31** R Irrespective of whether a *firm* is using external, internal, or pooled data sources, or a combination of the three, for its *PD* estimation, the length of the underlying historical observation period used must be at least five years for at least one source. If the available observation period spans a longer period for any source, and this data is relevant, this longer period must be used. A *firm* not permitted to use own estimates of *LGDs* or *conversion factors* may have, when it implements the *IRB approach*, relevant data covering a period of two years. The period to be covered must increase by one year each year until relevant data cover a period of five years.

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

## IRB foundation approach: General

**4.4.32** R BIPRU 4.4.33 R - BIPRU 4.4.39 R set out requirements specific to the *foundation IRB approach*.

**4.4.33** R Under the *foundation IRB approach* a *firm* must apply the *LGD* values set out in BIPRU 4.4.34 R and BIPRU 4.8.25 R and the *conversion factors* set out in BIPRU 4.4.37 R.

[**Note:** *BCD* Article 87(8)]

## IRB foundation approach: LGDs

**4.4.34** R A *firm* must use the following *LGD* values:

(1) senior *exposures* without eligible collateral, 45%;

(2) subordinated *exposures* without eligible collateral, 75%;

(3) a *firm* may recognise funded and *unfunded credit protection* in the *LGD* in accordance with BIPRU 5 (Credit risk mitigation), as modified by BIPRU 4.10;

*(4)* *covered bonds* may be assigned an *LGD* value of 11.25%; and

(5) for certain senior *corporate exposure* purchased receivables, for certain subordinated *corporate exposure* purchased receivables and for *dilution risk* of *corporate* purchased receivables the provisions of BIPRU 4.8.25 R (LGDs for corporate receivables) apply.

[**Note:** *BCD* Annex VII Part 2 point 8 (part)]

**4.4.35** R [deleted]

(1) [deleted]

(2) [deleted]

(3) [deleted]

(4) [deleted]

### Foundation IRB approach: Exposure value and conversion factors

**4.4.36** R BIPRU 4.4.37 R - BIPRU 4.4.39 R apply in addition to BIPRU 4.4.71 R - BIPRU 4.4.78 R.

**4.4.37** R

(1) The *exposure* value for the items set out in this *rule* must be calculated as the committed but undrawn amount multiplied by the applicable *conversion factor* set out in this *rule*.

(2) For credit lines which are uncommitted, that are unconditionally cancellable at any time by the *firm* without prior notice, or that effectively provide for automatic cancellation due to deterioration in a borrower's credit worthiness, a *conversion factor* of 0 % applies. To apply a *conversion factor* of 0% a *firm* must actively monitor the financial condition of the obligor, and its internal control systems must enable it immediately to detect a deterioration in the credit quality of the obligor.

(3) For short-term letters of credit arising from the movement of goods, a *conversion factor* of 20% applies for both the issuing and confirming *firms*.

(4) For other credit lines, note issuance facilities (NIFs), and revolving underwriting facilities (RUFs), a *conversion factor* of 75% applies.

(5) For undrawn purchase commitments for revolving purchased receivables falling under BIPRU 4.8.29 R, the *conversion factor* set out in that *rule* applies.

[**Note:** *BCD* Annex VII Part 3 point 9 (part)]

4.4.38 R Where a commitment refers to the extension of another commitment, the lower of the two *conversion factors* associated with the individual commitment must be used.

[**Note:** *BCD* Annex VII Part 3 point 10]

4.4.39 R For all off-balance sheet items other than mentioned in BIPRU 4.4.37 R, BIPRU 4.4.45 R, BIPRU 4.4.71 R - BIPRU 4.4.78 R, BIPRU 4.6.44 R, BIPRU 4.8.28 R and BIPRU 4.8.29 R, the *exposure* value must be the following percentage of its value:

(1) 100% if it is a full risk item;

(2) 50% if it is a medium risk item;

(3) 20% if it is a medium/low risk item; and

(4) 0% if it is a low risk item.

For the purposes of this *rule* the off-balance sheet items must be assigned to risk categories as indicated in BIPRU 3.7 (Classification of off-balance sheet items).

[**Note:** *BCD* Annex VII Part 3 point 11]

## Advanced IRB approach: General

4.4.40 R BIPRU 4.4.41 R - BIPRU 4.4.55 R set out requirements specific to the *advanced IRB approach*.

4.4.41 R Under the *advanced IRB approach* a *firm* must use its own estimates of *LGDs* and *conversion factors* in accordance with BIPRU 4.

[**Note:** *BCD* Article 87(9)]

## Advanced IRB approach: LGDs and PDs

4.4.42 R A *firm* using own *LGD* estimates under the *advanced IRB approach* may recognise *unfunded credit protection* by adjusting *PDs* subject to BIPRU 4.4.43 R.

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

4.4.43 R Notwithstanding BIPRU 4.4.34 R and BIPRU 4.8.25 R, if a *firm's IRB permission* permits it to use own *LGD* estimates under the *advanced IRB approach* for *exposures* to which BIPRU 4 applies and permits it to use the approach in this *rule*, *unfunded credit protection* may be recognised by adjusting *PD* and/or *LGD* estimates subject to the *minimum IRB standards*. A *firm* must not assign guaranteed exposures an adjusted *PD* or *LGD* such that the adjusted *risk weight* would be lower than that of a comparable, direct *exposure* to the guarantor.

[**Note:** *BCD* Annex VII Part 2 point 10]

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**4.4.44** G A *firm* using the *advanced IRB approach* may only recognise *unfunded credit protection* in accordance with BIPRU 4.4.43 R. The other methods for recognising unfunded *credit risk mitigation* under the *standardised approach* and *foundation IRB approach* are not available to a *firm* on the *advanced IRB approach*.

## Advanced IRB approach: Conversion factors

**4.4.45** R If a *firm* uses its own estimates of *conversion factors* under the *advanced IRB approach* it must calculate the *exposure* value of off-balance sheet *exposures* calculated with the use of *conversion factors* by using its own estimates of *conversion factors* across different product types as mentioned in BIPRU 4.4.37 R and BIPRU 4.4.39 R (2) to BIPRU 4.4.39 R (4).

[**Note:** *BCD* Annex VII Part 3 point 9 (part)]

**4.4.46** G Under BIPRU 4.4.45 R, a *firm* may calculate *exposure* values by calculating the amount expected to be claimed, instead of the maximum possible amount of the potential claim. The figure for the amount expected to be claimed should not be less than the current outstandings from time to time.

## Advanced IRB approach: Structure of the rating system

**4.4.47** R BIPRU 4.4.48 R - BIPRU 4.4.50 R are in addition to BIPRU 4.3.25 R - BIPRU 4.3.28 R and BIPRU 4.4.6 R - BIPRU 4.4.9 R.

**4.4.48** R If a *firm's IRB permission* provides for it to use the *advanced IRB approach* for the calculation of *LGDs*, its *rating system* must incorporate a distinct facility rating scale which exclusively reflects *LGD* related transaction characteristics.

[**Note:** *BCD* Annex VII Part 4 point 9]

**4.4.49** R A *facility grade* means for the purpose of the *advanced IRB approach* a risk category within a *rating system's* facility scale to which *exposures* are assigned on the basis of a specified and distinct set of rating criteria from which own estimates of *LGDs* are derived. The grade definition must include both a description of how *exposures* are assigned to the grade and of the criteria used to distinguish the level of risk across grades.

[**Note:** *BCD* Annex VII Part 4 point 10]

**4.4.50** R Significant concentrations within a single *facility grade* must be supported by convincing empirical evidence that the *facility grade* covers a reasonably narrow *LGD* band, respectively, and that the risk posed by all *exposures* in the grade falls within that band.

[**Note:** *BCD* Annex VII Part 4 point 11]

## Advanced IRB approach: Assignment of exposures

**4.4.51** R For a *firm* permitted to use own estimates of *LGDs* or *conversion factors* under the *advanced IRB approach*, each *exposure* must be assigned to a *facility grade* as part of the credit approval process. This is in addition to the requirements in ■ BIPRU 4.4.11 R - ■ BIPRU 4.4.13 R.

[**Note:** *BCD* Annex VII Part 4 point 20]

4.4.52 G ■ BIPRU 4.4.50 R and ■ BIPRU 4.4.51 R should be read in the light of ■ BIPRU 4.3.28 R.

### Advanced IRB approach: Data maintenance

4.4.53 R As well as complying with ■ BIPRU 4.3.54 R and ■ BIPRU 4.4.21 R (Data maintenance), a *firm* using own estimates of *LGDs* and/or *conversion factors* under the *advanced IRB approach* must collect and store:

(1) complete histories of data on the facility ratings and *LGD* and *conversion factor* estimates associated with each rating scale;

(2) the dates the ratings were assigned and the estimates were done;

(3) the key data and methodology used to derive the facility ratings and *LGD* and *conversion factor* estimates;

(4) the person who assigned the facility rating and the person who provided *LGD* and *conversion factor* estimates;

(5) data on the estimated and realised *LGDs* and *conversion factors* associated with each *defaulted exposure*;

(6) data on the *LGD* of the *exposure* before and after evaluation of the effects of a guarantee or credit derivative, for a *firm* that reflects the credit risk mitigating effects of guarantees or credit derivatives through *LGD*; and

(7) data on the components of *loss* for each *defaulted exposure*.

[**Note:** *BCD* Annex VII Part 4 Point 38]

### Advanced IRB approach: Requirements specific to own-LGD estimates

4.4.54 R In addition to the requirements in ■ BIPRU 4.3.74 R - ■ BIPRU 4.3.94 R (General requirements about risk quantification) and ■ BIPRU 4.3.98 R - ■ BIPRU 4.3.123 R (Requirements for risk quantification specific to own-LGD estimates), estimates of *LGD* must be based on data over a minimum of five years, increasing by one year each year after implementation until a minimum of seven years is reached, for at least one data source. If the available observation period spans a longer period for any source, and the data is relevant, this longer period must be used.

[**Note:** *BCD* Annex VII Part 4 point 82]

### Advanced IRB approach: Requirements specific to own-conversion factor estimates

4.4.55 R In addition to the requirements in ■ BIPRU 4.3.124 R - ■ BIPRU 4.3.131 R (Requirements specific to own-conversion factor estimates), estimates of *conversion factors* must be based on data over a minimum of five years, increasing by one year each year after implementation until a minimum of seven years is reached, for at least one data source. If the available observation period spans a longer period for any source, and the data is relevant, this longer period must be used.

[**Note:** *BCD* Annex VII Part 4 point 93]

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## Calculations: General

4.4.56 R The remainder of this section applies to both the *foundation IRB approach* and the *advanced IRB approach*.

## Calculations: Risk-weighted exposure amounts

4.4.57 R Subject to BIPRU 4.4.59 R to BIPRU 4.4.60 R, BIPRU 4.5.6 R, BIPRU 4.5.8 R - BIPRU 4.5.10 R (Risk weights for specialised lending), BIPRU 4.8.16 R, BIPRU 4.8.17 R (Risk weights for corporate exposure purchased receivables) and BIPRU 4.9.3 R (Securitisation: provision of credit protection), *risk weighted exposure amounts* must be calculated according to the formulae in the table in BIPRU 4.4.58 R and the adjustment formula in BIPRU 4.4.79 R (Double default).

[**Note:** *BCD* Annex VII Part 1 point 3]

4.4.58 R Table: Formulae for the calculation of *risk weighted exposure amounts*

This table belongs to BIPRU 4.4.57 R

| | | |
|---|---|---|
| Correlation (R) | 0.12 × (1 - EXP(-50*PD))/(1-EXP(-50)) + 0.24* [1-(1-EXP(-50*$PD$))/(1-EXP(-50))] | |
| Maturity factor (b) | $(0.11852-0.05478*1n(PD))^2$ | |
| | $(LGD*N[(1-R)^{-0.5}*G(PD)+(R/(1-R))^{0.5}*G(0.999)]-PD*LGD)*(1-1.5*b)^{-1}*(1+(M-2.5)*b)*12.5*1.06$ | |
| N(x) | denotes the cumulative distribution function for a standard normal random variable (i.e. the probability that a normal random variable with mean zero and variance of one is less than or equal to x). G(z) denotes the inverse cumulative distribution function for a standard normal random variable (i.e. the value x such that N(x) = z). | |
| *PD* = 0 | For *PD* = 0, RW shall be: 0 | |
| *PD* = 1 | For *PD* = 1: | |
| | (i) | for *defaulted exposures* where a *firm* applies the *LGD* values set out in BIPRU 4.4.32R and BIPRU 4.8.25R RW shall be: 0; |
| | (ii) | for *defaulted exposures* where a *firm* uses its own estimates of *LGDs*, RW shall be: Max {0, 12.5 *(LGD-$EL_{BE}$)}; |
| | where $EL_{BE}$ must be the *firm's* best estimate of *expected loss* for the *defaulted exposure* according to BIPRU 4.3.122 R. | |

[**Note:** *BCD* Annex VII Part 1 point 3]

4.4.59 R For *exposures* to companies where the total annual sales for the consolidated group of which the firm is a part is less than EUR 50 million a *firm* may use the following correlation formula for the calculation of *risk weights* for *corporate exposures*. In this formula S is expressed as total annual sales in millions of Euros with EUR 5 million < = S < = EUR 50 million. Reported sales of less than EUR 5 million must be treated as if they were equivalent to EUR 5 million. In accordance with BIPRU 4.8.21 R, for purchased receivables the total annual sales are the weighted average by individual *exposures* of the pool. The formula for the calculation of correlation (R) is:

0.12×(1-EXP(-50*PD))/(1-EXP(-50))+ 0.24*

[1-(1-EXP(-50*PD))/(1-EXP(-50))]

-0.04*(1-(S-5)/45)

[**Note:** *BCD* Annex VII Part 1 point 5 (part)]

4.4.60 R A *firm* must for the purpose of BIPRU 4.4.59 R substitute total assets of the consolidated group for total annual sales when total annual sales are not a meaningful indicator of firm size and total assets are a more meaningful indicator than total annual sales.

[**Note:** *BCD* Annex VII Part 1 point 5 (part)]

## Calculations: Expected loss amounts

4.4.61 R *Expected loss* amounts must be calculated according to the formulae in the table in BIPRU 4.4.62 R.

[**Note:** *BCD* Annex VII Part 1 point 30 (part)]

4.4.62 R Table: Formulae for the calculation of *expected loss* amounts

This table belongs to BIPRU 4.4.61 R

| | |
|---|---|
| *Expected loss* (*EL*) | equals *PD*×*LGD* |
| *Expected loss* amount | equals *EL*×*exposure* value |
| For *defaulted exposures* (*PD* = 1) where a *firm* uses its own estimates of *LGDs*, *EL* must be $EL_{BE,}$ the *firm's* best estimate of *expected loss* for the *defaulted exposure* according to BIPRU 4.3.122 R. | |
| For exposures subject to the treatment set out in BIPRU 4.4.79 R (Double default) *EL* must be 0. | |

[**Note:** *BCD* Annex VII Part 1 point 30 (part)]

## Calculations: PD

4.4.63 R A *firm* must provide its own estimates of *PDs* in accordance with its *IRB permission* and the *minimum IRB standards*.

[**Note**: *BCD* Article 87(6) (part)]

4.4.64 R The *PD* of a *corporate exposure* or an *exposure* in the *IRB exposure class* referred to in BIPRU 4.3.2 R (2) (Institutions) must be at least 0.03%.

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

**4.4.65** R The *PD* of obligors in *default* must be 100%.

[**Note:** *BCD* Annex VII Part 2 point 4]

**4.4.66** R Subject to BIPRU 4.4.42 R (*Advanced IRB approach*: *LGDs* and *PDs*) a *firm* may recognise *unfunded credit protection* in the *PD* in accordance with the provisions of BIPRU 5 (Credit risk mitigation), as modified by BIPRU 4.10. For *dilution risk*, however, a *firm* may also recognise *unfunded credit protection* providers which are specified in its *IRB permission* in addition to those indicated in the *CRM eligibility conditions*.

[**Note:** *BCD* Annex VII Part 2 point 5]

## Calculations: Maturity

**4.4.67** R

(1) A *firm* must calculate maturity (M) for each of the *exposures* referred to in this *rule* in accordance with this *rule* and subject to BIPRU 4.4.68 R to BIPRU 4.4.70 R. In all cases, M must be no greater than 5 years.

(2) For an instrument subject to a cash flow schedule M must be calculated according to the following formula:

$$M = MAX\{1;\ MIN\{\sum_t t * CF_t / \sum_t CF_t\ ;5\}\}$$

where $CF_t$ denotes the cash flows (principal, interest payments and fees) contractually payable by the obligor in period t.

(3) For derivatives subject to a master netting agreement M must be the weighted average remaining maturity of the *exposure*, where M must be at least 1 year. The notional amount of each *exposure* must be used for weighting the maturity.

(4) For *exposures* arising from fully or nearly-fully collateralised *financial derivative instruments* transactions and fully or nearly-fully collateralised *margin lending transactions* which are subject to a master netting agreement M must be the weighted average remaining maturity of the transactions where M must be at least 10 days. For *repurchase transactions* or securities or commodities lending or borrowing transactions which are subject to a master netting agreement, M must be the weighted average remaining maturity of transactions, where M must be at least 5 days. The notional amount of each transaction must be used for weighting the maturity.

(5) Where a *firm* uses the *CCR internal model method* to calculate the *exposure* values, M must be calculated for *exposures* to which a *firm* applies this method and for which the maturity of the longest-dated contract contained in the *netting set* is greater than one year according to the following formula:

$$M = MIN\left(\frac{\sum_{k=1}^{tk\le 1year} EffectiveEE_k * \Delta t_k * df_k + \sum_{tk>1year}^{maturity} EE_k * \Delta t_k * df_k}{\sum_{k=1}^{tk\le 1year} EffectiveEE_k * \Delta t_k * df_k};5\right)$$

where:

dfk = the risk-free discount factor for future time period tk and the remaining symbols are defined in BIPRU 13.6.

(6) Notwithstanding (7), a *firm* that uses a *CCR internal model method* model to calculate a *one-sided credit valuation adjustment* (CVA) may use the effective credit duration estimated by the model as M if permitted to do so by its *CCR internal model method permission*.

(7) Subject to BIPRU 4.4.68 R, for *netting sets* in which all contracts have an original maturity of less than one year the formula in (2) must be applied.

(8) If a *firm* is permitted under its *IRB permission* to use own *PD* estimates for *corporate exposure* purchased receivables, for drawn amounts M must equal the purchased receivables *exposure* weighted average maturity, where M must be at least 90 days. This same value of M must also be used for undrawn amounts under a committed purchase facility provided the facility contains effective covenants, early amortisation triggers, or other features that protect the purchasing *firm* against a significant deterioration in the quality of the future receivables it is required to purchase over the facility's term. Absent such effective protections, M for undrawn amounts must be calculated as the sum of the longest-dated potential receivable under the purchase agreement and the remaining maturity of the purchase facility, where M must be at least 90 days.



(9) For any other instrument than mentioned in this *rule* or when a *firm* is not in a position to calculate M as set out in (2), M must be the maximum remaining time (in years) that the obligor is permitted to take fully to discharge its contractual obligations, where M must be at least 1 year.

(10) Notwithstanding (2) and (9), M must be at least one-day for:

(a) import letters of credit (including standby letters of credit issued for similar purposes) and acceptances under them;

(b) export letters of credit confirmation and negotiation;

(c) pre-shipment and post-shipment acceptances and financing;

(d) export and import loans collateralised by underlying goods, up to a maximum maturity of 180 days; and

(e) performance guarantees, bid bonds and other guarantees (including standby letters of credit issued for similar purposes) relating to the export and import of goods and services;

provided these *exposures* are not part of the *firm*'s ongoing financing of the obligor.

[**Note:** *BCD* Annex VII Part 2 point 13 (part)]

**4.4.68** R Notwithstanding BIPRU 4.4.67 R (2) - (4) and (8)-(9), M must be at least one-day for:

(1) fully or nearly-fully collateralised *financial derivative instruments*;

(2) fully or nearly-fully collateralised *margin lending transactions*; and

*(3) repurchase transactions, securities or commodities lending or borrowing transactions,*

provided the documentation requires daily remargining and daily revaluation and includes provisions that allow for the prompt liquidation or setoff of collateral in the event of *default* or failure to re-margin.

[**Note:** *BCD* Annex VII Part 2 point 14 (part)]

4.4.69 G The last paragraph of paragraph 14 of Part 2 of Annex VII of the *Banking Consolidation Directive* says: "In addition, for other short-term exposures specified by the competent authorities which are not part of the credit institution's ongoing financing of the obligor, M shall be at least one-day. A careful review of the particular circumstances shall be made in each case." BIPRU 4.4.67R (10) is currently the only instance where the *appropriate regulator* has specified any such short-term exposures.

[**Note:** *BCD* Annex VII Part 2 point 14 (part)]

4.4.70 R Maturity mismatches must be treated as specified in BIPRU 4.10 and BIPRU 5 (Credit risk mitigation).

[**Note:** *BCD* Annex VII Part 2 point 16]

## Calculations: Exposure value

4.4.71 R Unless provided otherwise in BIPRU 4 the *exposure* value of on-balance sheet *exposures* must be measured gross of value adjustments. This also applies to assets purchased at a price different than the amount owed. For purchased assets, the difference between the amount owed and the net value recorded on the balance-sheet of the firm is denoted discount if the amount owed is larger, and premium if it is smaller.

[**Note:** *BCD* Annex VII Part 3 point 1]

4.4.72 R A *firm* must not treat the *exposure* value of a facility as being less than current drawings under it. Interest accrued to date on an *exposure* under a facility must be included in current drawings or an allowance for it must be built into the *conversion factor*.

4.4.73 R Where a *firm* uses master netting agreements in relation to *repurchase transactions* or *securities or commodities lending or borrowing transactions* the *exposure* value must be calculated in accordance with BIPRU 5 (Credit risk mitigation), as modified by BIPRU 4.10, and BIPRU 13.8.

[**Note:** *BCD* Annex VII Part 3 point 2]

4.4.74 R For on-balance sheet netting of loans and deposits a *firm* must apply for the calculation of the *exposure* value the methods set out in BIPRU 5 (Credit risk mitigation), as modified by BIPRU 4.10.

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

4.4.75 R The *exposure* value for leases must be the discounted minimum lease payments. Minimum lease payments are the payments over the lease term that the lessee is or can be required to make and any bargain option (i.e. option the exercise of which is reasonably certain). Any guaranteed residual value fulfilling the set of conditions in BIPRU 5.7.1 R (Eligibility), as modified by BIPRU 4.10.38 R and BIPRU 4.10.39 R (Unfunded credit protection: Eligibility of providers) regarding the eligibility of protection providers as well as the minimum requirements for recognising other types of guarantees provided in BIPRU 5.7.6 R (Minimum requirements: General) to BIPRU 5.7.12 R (Additional requirements for guarantees) should also be included in the minimum lease payments.

[**Note:** *BCD* Annex VII Part 3 point 4]

**4.4.76** R Where an *exposure* takes the form of *securities* or *commodities* sold, posted or lent under *repurchase transactions* or *securities or commodities lending or borrowing transactions*, *long settlement transactions* and *margin lending transactions*, the *exposure* value must be the value of the *securities* or *commodities* determined in accordance with GENPRU 1.3 (Valuation). Where the *financial collateral comprehensive method* is used, the *exposure* value must be increased by the volatility adjustment appropriate to such *securities* or *commodities* as set out in BIPRU 4.10 and BIPRU 5 (Credit risk mitigation). The *exposure* value of *repurchase transactions*, *securities or commodities lending or borrowing transactions*, *long settlements transactions* and *margin lending transactions* must be determined in accordance with BIPRU 13.

[**Note:** *BCD* Annex VII Part 3 point 7]

**4.4.77** R Notwithstanding BIPRU 4.4.76 R, the *exposure* value of credit risk *exposures* outstanding, as determined by the *firm*, with a *central counterparty* must be determined in accordance with BIPRU 13.3.3 R and BIPRU 13.8.8 R (Exposure to central counterparty), provided that the *central counterparty's CCR exposures* with all participants in its arrangements are fully collateralised on a daily basis.

[**Note:** *BCD* Annex VII Part 3 point 8]

**4.4.78** R In the case of any *financial derivative instrument*, the *exposure* value must be determined by the methods set out in BIPRU 13.

[**Note:** *BCD* Annex VII Part 3 point 5]

## Double default

**4.4.79** R The *risk weighted exposure amount* for each *exposure* which meets the requirements set out in BIPRU 5.7.2 R and BIPRU 4.4.83 R (Double default) may be adjusted according to the following formula:

*(1)* *Risk weighted exposure amount* = RW **exposure* value * (0.15 + 160**PDpp*)]

*(2)* *PDpp* = *PD* of the protection provider

(3) RW must be calculated using the relevant *risk weight* formula set out in BIPRU 4.4.57 R for the *exposure*, the *PD* of the obligor and the *LGD* of a comparable direct *exposure* to the protection provider. The

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maturity factor (b) must be calculated using the lower of the *PD* of the protection provider and the *PD* of the obligor.

[**Note:** *BCD* Annex VII Part 1 point 4]

**4.4.80** R Notwithstanding BIPRU 4.4.34 R and BIPRU 4.4.43 R, for the purposes of BIPRU 4.4.79 R, the *LGD* of a comparable direct *exposure* to the protection provider shall either be the *LGD* associated with an unhedged facility to the guarantor or the unhedged facility of the obligor, depending upon whether in the event both the guarantor and the obligor *default* during the life of the hedged transaction available evidence and the structure of the guarantee indicate that the amount recovered would depend on the financial condition of the guarantor or obligor, respectively

[**Note:** *BCD* Annex VII Part 2 point 11]

**4.4.81** R For the purposes of BIPRU 4.4.79 R, M must be the effective maturity of the credit protection but at least 1 year.

[**Note:** *BCD* Annex VII Part 2 point 13 (part)]

**4.4.82** R BIPRU 4.4.83 R applies to the eligibility of protection providers under the *IRB approach* which qualify for the treatment set out in BIPRU 4.4.79 R.

**4.4.83** R An *institution*, an *insurance undertaking* (including an *insurance undertaking* that carries out *reinsurance*) or an export credit agency which fulfils the following conditions may be recognised as an eligible provider of *unfunded credit protection* which qualifies for the treatment set out in BIPRU 4.4.79 R:

(1) the protection provider has sufficient expertise in providing *unfunded credit protection*;

(2) the protection provider is regulated in a manner equivalent to the rules laid down in *GENPRU* and *BIPRU* or had, at the time the credit protection was provided, a credit assessment by an *eligible ECAI* which is associated with *credit quality step* 3 or above under the *rules* for the *risk weighting* of *exposures* to *corporates* under the *standardised approach*;

(3) the protection provider had, at the time the credit protection was provided, or for any period of time thereafter, an internal rating with a *PD* equivalent to or lower than that associated with *credit quality step* 2 or above under the *rules* for the *risk weighting* of *exposures* to *corporates* under the *standardised approach*;

(4) the protection provider has an internal rating with a *PD* equivalent to or lower than that associated with *credit quality step* 3 or above under the *rules* for the *risk weighting* of *exposures* to *corporates* under the *standardised approach*;

For the purpose of this *rule*, credit protection provided by an export credit agency must not benefit from any explicit central government counter-guarantee.

[**Note:** *BCD* Annex VIII Part 1 point 29]

**4.4.84** R BIPRU 4.4.85 R applies to the requirements to qualify for the treatment set out in BIPRU 4.4.79 R.

**4.4.85** R To be eligible for the treatment set out in BIPRU 4.4.79 R, credit protection deriving from a guarantee or credit derivative must meet the following conditions:

(1) the underlying obligation must be to:

(a) a *corporate exposure*, excluding an *exposure* to an *insurance undertaking* (including an *insurance undertaking* that carries out *reinsurance*); or

(b) an *exposure* to a regional government, local authority or *public sector entity* which is not treated as an *exposure* to a central government or a *central bank* according to BIPRU 4.4.2 R; or

(c) an *exposure* to *retail SME*, classified as a *retail exposure* according to BIPRU 4.6.2 R;

(2) the underlying obligors must not be members of the same *group* as the protection provider;

(3) the *exposure* must be hedged by one of the following instruments:

(a) single name unfunded credit derivatives or single name guarantees;

(b) first to *default* basket products, with these the treatment must be applied to the asset within the basket with the lowest *risk weighted exposure amount*;

(c) $n^{th}$ to *default* basket products, with these the protection obtained is only eligible for consideration under this framework if eligible $(n-1)^{th}$ *default* protection has also been obtained or where (n-1) of the assets within the basket has/have already *defaulted* and where this is the case the treatment must be applied to the asset within the basket with the lowest *risk weighted exposure amount*;

(4) the credit protection must meet the requirements set out in BIPRU 5.7.6 R - BIPRU 5.7.8 R (Minimum requirements: Operational requirements), BIPRU 5.7.11 R (Additional requirements for guarantees) and BIPRU 5.7.13 R - BIPRU 5.7.14 R (Additional requirements for credit derivatives);

(5) the *risk weight* that is associated with the *exposure* prior to the application of the treatment in BIPRU 4.4.79 R does not already factor in any aspect of the credit protection;

(6) a *firm* must have the right and expectation to receive payment from the protection provider without having to take legal action in order to pursue the counterparty for payment;

(7) the purchased credit protection must absorb all credit losses incurred on the hedged portion of an *exposure* that arise due to the occurrence of credit events outlined in the contract;

(8) if the payout structure provides for physical settlement, then there must be legal certainty with respect to the deliverability of a loan,

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bond or contingent liability and if a *firm* intends to deliver an obligation other than the underlying *exposure*, it must ensure that the deliverable obligation is sufficiently liquid so that the *firm* would have the ability to purchase it for delivery in accordance with the contract;

(9) the terms and conditions of credit protection arrangements must be legally confirmed in writing by both the protection provider and the *firm*;

(10) a *firm* must have a process in place to detect excessive correlation between the creditworthiness of a protection provider and the obligor of the underlying *exposure* due to their performance being dependent on common factors beyond the systematic risk factor;

(11) in the case of protection against *dilution risk*, the seller of purchased receivables must not be a member of the same *group* as the protection provider; and

(12) with reference to (6), to the extent possible, a *firm* must take steps to satisfy itself that the protection provider is willing to pay promptly should a credit event occur.

[**Note:** *BCD* Annex VIII Part 2 point 22]