

Consultation Paper on Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures

European Banking Authority (EBA)

List of abbreviations

| Abbreviations | Meaning |
|------------------|----------------------------------|
| CAs | Competent Authorities |
| CRD IV | Capital Requirements Directive |
| CRR | Capital Requirements Regulation |
| EBA | European Banking Authority |
| EL _{BE} | Best estimate on expected losses |
| GL | Guidelines |
| IRB | Internal Rating-Based Approach |
| LTV | Ratio Loan-to-value |
| MoC | Margin of Conservatism |
| RDS | Reference Data Set |
| RTS | Regulatory Technical Standards |

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Introduction

In November 2016 the EBA published draft Guidelines on PD estimation, LGD estimation and the treatment of defaulted assets, with the aim of harmonising the concepts and methods used in the estimation of estimation of credit risk parameters for the IRB approach

Introduction

In February 2016, the EBA published a Report on the regulatory review of the IRB Approach, outlining the initiatives that has undertaken to reduce the unjustified variability in the outcomes of internal models while preserving the risk sensitivity of capital requirements.

The planned regulatory products will affect nearly all aspects of the IRB Approach and it is expected that they will be able to significantly reduce the unjustified RWA variability which is deemed to stem from the lack of sufficiently specified requirements with regard to certain aspects of the IRB Approach.

- In this context, the EBA published in November 2016 a **Consultation Paper on Guidelines on PD and LGD estimation and on the treatment of defaulted assets**, which is one of those regulatory products above-mentioned.
- These Guidelines (GL) are focused on the definitions and modelling techniques used in the estimation of risk parameters for both non-defaulted exposures (PD and LGD) and for defaulted exposures (best estimate of expected loss and LGD-in default).
- In particular these draft GL aim at:
 - Aligning the terminology and definitions, and provide clarification on the application of certain regulatory requirements that were until now interpreted in various ways.
 - Specifying aspects common for all risk parameters such as the use of human judgement, the margin of conservatism (MoC) that should be incorporated in risk parameters, the regular reviews of the models that should be conducted in order to ensure timely implementation of necessary changes in case of deteriorated performance of the models, etc.

This **Technical Note** includes an analysis of the requirements arising from the consultative GL.

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Executive summary

These consultative GL on estimation of credit risk parameters for IRB provide guidance on the following aspects: i) general estimation requirements; ii) PD estimation; iii) LGD estimation; iv) estimation of risk parameters for defaulted exposures; and v) other aspects

Executive summary

Scope of application

- **Institutions** using the **IRB approach** and subject to the Capital Requirements Directive (CRD IV) and to the Capital Requirements Regulation (CRR)

Regulatory context

- **CRR**, published by the European Parliament and the Council in June 2013, and in particular provisions regarding the IRB approach.

Next steps

- The proposed deadline for implementation is **end-2020**, as already specified by the EBA.

Main content

General estimation requirements

Segmentation principles, general data requirements, human judgement, and Margin of Conservatism.

PD estimation (non-defaulted exposures)

General requirements, specific data requirements, observed default rates, long-run average default rates, and PD estimation methodologies.

LGD estimation (non-defaulted exposures)

General requirements, specific data requirements, calculation of economic loss and realised LGD, long-run average default rates, LGD estimation methodologies, and treatment of collaterals.

Estimation of risk parameters for defaulted exposures

General requirements, specific data requirements, reference dates, calculation of realised LGD and long-run average LGD for defaulted exposures, risk drivers, and specific requirements for LGD in-default estimation.

Other aspects

Application of risk parameters (conservatism and human judgement); re-development, re-estimation and re-calibration of internal models; and calculation of shortfall or excess of provisions against EL for IRB portfolios.

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General estimation requirements

These GL include policy proposals for
segmentation principles, data requirements...

General estimation requirements (1/2)

Segmentation principles

- A **rating system**, should cover exposures where the obligors or facilities show **common characteristics of credit-worthiness**.
- **Exposures covered by the same rating system** should be **treated similarly** in terms of risk management, decision making and credit approval process and should be assigned to a common obligor rating scale.
- Institutions should **ensure consistency** with respect to the applicable **definition of default**.

Data requirements

- In the course of assigning exposures to obligors or facility grades or pools, data should be **sufficiently precise** to avoid material distortion of the outcome.
- Data used as inputs into the models should provide **comprehensive information for the institution**, including data for all relevant business lines and all relevant variables, and institutions should attempt to minimise the occurrence of missing data.
- These data should **not contain biases** which make them unfit-for-purpose.
- Institutions should specify **internal policies, standards and procedures** for data collection, storage, migration, actualisation and use, with such characteristics so as to ensure regular updating and correcting.
- The process for **vetting data** should include all of the following:
 - The **assessment of reliability and quality** of the internal and external data sources and the range of data obtained from those sources, as well as the time period the sources cover.
 - The **data merging**, where the model is fed with data from multiple data sources.
 - The **rationale and scale of data exclusions** broken down by reason for exclusion.
 - The **procedures for dealing with erroneous and missing data** and treatment of outliers and categorical data.
 - The **data transformation**, including standardization and the procedures for ensuring the appropriateness of those transformations in terms of the risk of model overfitting.

...human judgement and margin of conservatism

General estimation requirements (2/2)

Human Judgement

- In order for institutions to complement their statistical models with human judgement, they should:
 - **Assess the modelling assumptions** and whether the selected risk drivers contribute to the risk assessment in line with their economic meaning.
 - Ensure that any form of **human judgement is properly justified** and should analyse the impact of the human judgement on the performance of the model.
 - **Document the application of human judgement** in the model, including at least the criteria for the assessment, rationale, assumptions, experts involved and description of the process.

Margin of conservatism (MoC)

- Institutions should add a **MoC** that is related to the expected range of estimation errors. In this regard, institutions should implement a **framework** that consists of the following phases:

Identification of deficiencies

- Institutions should have a **robust process for identifying all deficiencies**, including data errors and any uncertainties that lead to estimation errors, and for **classifying them in 4 categories** (i.e. A, B, C and D¹).
- For categories A, B and D, the EBA specifies minimum triggers that should be considered by institutions.

Quantification of estimation errors

- Institutions should apply **adequate methodologies** for correcting the errors stemming from the categories of deficiencies A, B or D (**'appropriate adjustment'**). Where such appropriate adjustments are used institutions should apply a MoC to account for the additional estimation error associated with them. They should also apply a MoC to address any errors that have not been corrected via appropriate adjustments.

Monitoring

- Institutions should regularly monitor the levels of the **appropriate adjustments** and **MoC**.
- At reviewing the levels of MoC institutions should ensure that: i) the MoC stemming from categories A, B, and D is reduced over time; ii) the MoC stemming from category C is eliminated.

Documentation

- For each rating system, the **MoC applied should be documented** in the relevant model documentation and methodology manuals. The documentation should contain, among others, a complete list of potential and identified deficiencies, the potentially affected model components or risk parameters, etc.

Detail

PD estimation

The PD-Model should cover exposures where obligors show common drivers of risk and should be managed homogeneously. Moreover, specific data requirements are provided to calculate the default rate and on the reference data set for model development

PD estimation (1/4)

General requirements

- The PD-Model should cover exposures where the obligors show **common drivers of risk**.
- Exposures covered by **one PD Model** should be **managed homogeneously** by the institution in terms of risk management, decision making and credit approval process.
- Institutions should ensure that:
 - **Each and every natural or legal person** that represents an IRB exposure is rated by the institution with the model approved to be used on.
 - Where **new information is received** with respect to a relevant risk driver or rating criterion, this information is taken into account in the rating calculation in a timely manner (e.g. on relevant IT systems, a review of rating assignment should not be made later than 3 months after the information is available).

Specific data requirements

- For calculating the **default rate calculation**, institutions should ensure that all data relevant for identifying the non-default exposures at the beginning of a one-year observation period has to be available as well as all relevant default information, considering that:
 - **Exclusion of observations** should be done exclusively when obligors are wrongly included in the data set of defaults and where obligors are wrongly assigned to the considered rating model.
 - Institutions should **document all data cleansing** with respect to the default rate calculation.
- Regarding the **reference data set for model development**, institutions should provide for sound processes and sophisticated methods so as to take into account of all of the following¹: i) unsatisfactory quality of data; ii) lack of homogeneous pools of exposures; iii) changes in business processes, the economic or legal environment; and iv) other factors related to the quality of data.
 - Institutions should ensure that the **representative requirement** is met, complying with particular requirements specified in the EBA GL (e.g. statistical methodologies used to demonstrate representativeness, the definition of default is consistent over time, etc.).
 - Moreover, it should be ensured that the reference data set contains the values of the risk drivers for the **appropriate points in time**, which may vary between different risk drivers.

Detail

PD estimation

The GL clarify which obligors should be taken into account in the numerator and denominator for the purpose of calculating a 1-year default rate and how the long run average default rate should be calculated according to the historical observation period

PD estimation (2/4)

Observed default rates

- For calculating the **1-year default rate**, both of the following should apply: i) the **denominator** should consist of the **number of non-defaulted** obligors observed at the beginning of the 1-year observation period; ii) the **numerator** should include all obligors considered in the denominator with at least **one default event** during the 1-year observation period.
 - Where the 1-year-default-rate is calculated by rating grade or pool the denominator should refer to all obligors assigned to a rating grade or pool at the **beginning of the observation period**.
 - Institutions should calculate the 1-year default rates also for the **subset of obligors** that did not have a rating at the start of the relevant observation period but were in the range of application of the model under consideration, even if these obligors were assigned to a rating grade or pool in a conservative manner for the purpose of calculation of capital requirements ('missing ratings').
- Institutions should calculate the **observed average default rate** per rating grade or pool and should additionally be calculated for the portfolio covered with the according PD Model and relevant calibration segment. The defaults are not to be weighted but each counted as 1. For choosing an appropriate approach they should analyse, among others, the share of short term and terminated contracts that cannot be observed during the observation period and the possible bias due to specific reporting dates chosen.
- Moreover, institutions should **document** the considerations for the chosen approach to calculating the observed average default rate and should apply an economic adjustment and an appropriate MoC.

Long-run average default rate

- Regarding the long run average default rate, the GL clarify that this should be calculated as the **average of observed one year default rates** if the historical observation period is representative of the likely range of **variability** of 1-year default rates and if the historical observation period contains a **downturn period**.
- If the 1 year default rates are not representative of the likely range of variability, then institutions should estimate the long run average default rate by estimating an **appropriate adjustment** to the average of observed 1 year default rates.
- To limit possible variability a **benchmark** is proposed, namely the maximum of the average of 1 year default rates over the most recent 5 years and the average of 1 year default rates over the observation period¹.

(1) Institutions may still estimate long-run average default rates below this benchmark but this should be duly justified and eventually trigger additional MoC.

Further, the GL include provisions on PD estimation methodologies, in particular regarding risk drivers and rating criteria, ratings in PD estimation...

PD estimation (3/4)

PD estimation methodologies

- The GL also contain policies for the use of third-party ratings in PD estimation, the design of grades and pools and for the process of assigning PD estimates to grades and pools.

Risk drivers and rating criteria

- Institution should:
 - Consider a **broad scope of information** in selecting risk drivers and rating criteria, including obligor characteristics (e.g. sector and geographic location for corporates, financial statements as well as trend and behavioral information).
 - Ensure that relevant **business experts** are consulted with respect to the business rationale and risk contribution of the considered risk drivers and rating criteria.
 - Ensure that the **loss of information value** over time for generally static information, is appropriately reflected. The model should estimate the proper level of risk with respect to all relevant, currently available and most up-to-date information and institutions should ensure that an appropriate MoC is applied where a higher degree of uncertainty is probable due to the lack of up-to-date information.
 - Ensure that the risk drivers and rating criteria are used **consistently**.

Ratings in PD estimation

- Institutions should have **clear policies** specifying the triggers resulting from the contractual relation between a third counterparty ('connected client') and the considered obligor.
- To incorporate internal or external rating of connected clients into a statistical model, the **rating should comply** will all of the following: i) it should fulfil all the requirements for relevant risk drivers; ii) the weighting in the statistical model should be purely statistically based; iii) other relevant obligor and transaction risk characteristics are properly reflected in the model and that no material biases are introduced.
- An internal IRB rating for a connected client may be incorporated in the non-statistical part of the PD model.
- A **rating transfer** should not change the assignment of exposures to exposure classes, rating systems or models, but should only affect the assignment to grades or pools.
- An institution's policy should prevent **inappropriate double counting** of a contractual relation to a connected client or group of connected clients.

Detail

PD estimation

...design of grades or pools, and calibration

PD estimation (4/4)

Design of grades or pools

- Depending on the methods and drivers used to assign exposures to risk grades or pools, **changes in the portfolio's default rate** caused by changes in economic conditions will be reflected by a combination of: i) **migrations across risk grades**; or ii) **changes in the yearly default rates** of each grade.
- Institutions should analyse the **appropriateness of the philosophy** underlying the grade or pool assignment in terms of how institutions assign exposures, obligors or facilities to 'risk buckets' according to appropriate risk drivers. The choice of ratings philosophy should be applied consistently over time, it must also be taken into account for back testing purposes, etc.

Calibration

- Institutions should have **sound and well-defined processes** in place to ensure that accurate and robust **PD estimates** are assigned to grades, pools of obligors or facilities.
- Institutions should conduct the calibration **before the application of MoC or PD-Floors**.
- For determining the **PD estimates by obligor grade or pool**, the long-run average default rates should be used as calibration target for each grade and pool in each calibration segment.
- Where institutions derive PD estimates from realised losses and appropriate estimates of LGDs they should use a reference data set (RDS) including **realised losses on all defaults** identified in observation period.
- When using the approach of using direct PD estimates for the calculation of capital, institutions may apply either of the following methods: i) calculate the **long-run averages of 1-year default rates** at a level other than obligor grade that is appropriate for the application of the probability model; ii) **aggregate all relevant default and non-default information** implicitly for the estimation of a model whose outcomes can be proven to be obligor PDs with sufficient certainty. Whichever of these methods are used, all requirements for the long-run averages of 1-year default rates should then apply to the long-run averages of 1-year default rates calculated explicitly at the respective level.
- Where institutions use **segmentation drivers** in the calibration process, they should apply some conditions (e.g. the model should be calibrated separately for each calibration segment, etc.).

Detail

LGD estimation

The GL set general requirements outlining the scope of methodologies that can be used for the purposes of LGD estimation...

LGD estimation (1/7)

General requirements

- Institutions that have permission to use own estimates of LGD should **assign an LGD estimate to each non-defaulted exposure** and an **estimate of LGD in-default and EL_{BE} to each defaulted exposure** within the scope of the rating system subject to such permission. Furthermore, institutions should:
 - **Estimate LGDs for all facility grades** of the distinct facility rating scale or for all pools that are incorporated in the rating system.
 - **Treat each defaulted facility as a distinct** default observation¹.
 - Consider an exposure that after the return to non-defaulted status is classified as defaulted again as having been **constantly defaulted** from the first moment when the default occurred if the time between the moment of the return of the exposure to non-defaulted status and the subsequent classification as **default is shorter than 1 year** in any case².
 - Estimate their own LGDs based on their **own loss and recovery experience** that is reflected in historical data on defaulted exposures.
- Institutions may supplement their own historical data on defaulted exposures with **external data**. Institutions should not derive their LGD estimates only from market prices of financial instruments, but they may use this information to supplement their own historical data.
- Where in the case of **retail exposures** and **purchased corporate receivables** institutions derive LGD estimates from realised losses and appropriate estimates of PDs, they should ensure that:
 - The process for estimating total losses meet the overall requirements for estimation of the CRR and the outcome is consistent with the concept of LGD and with the concept of economic loss determined in these GL.
 - The process for estimating PD meets the specific and overall requirements to PD estimation of the CRR.

(1) Unless more than one independent defaults were recognised on a single facility that do not meet the conditions provided in these GL.

(2) Institutions may specify a longer period than 1 year for considering two subsequent defaults as one for the purpose of LGD estimation, if this is adequate to the specific type of exposures and reflects the economic meaning of the default experience.

Detail

LGD estimation

...as well as specific data requirements regarding the reference data set and representativeness of data

LGD estimation (2/7)

Specific data requirements

- Institutions should **use a RDS covering** all of the following items: i) all defaults identified during the historical observation period; ii) all necessary data for calculating realised LGDs; iii) relevant factors that can be used to group the defaulted exposures in meaningful ways; and iv) relevant drivers of loss.
- The RDS should include **information on the results of the recovery processes**, including recoveries and costs, related to each individual defaulted exposure. The scope of data necessary for proper LGD estimation is very broad and entails not only the date of default and all cash flows and events after default but also all relevant information about the obligors and transactions that could be used as risk drivers. In this regard, the EBA GL specify the information that the RDS should include.
- Institutions should collect and store in the RDS the information on the most recent evaluation of the collateral **before the moment of default**.
- Institutions should perform an appropriate analysis to ensure that the **data** used for the purpose of LGD estimation is **sufficiently representative** to the current portfolio covered by the relevant LGD model. In this regard, they should analyse the representativeness of the data in terms of the: i) scope of application; ii) definition of default; iii) distribution of the relevant risk drivers; iv) lending standards and recovery policies; v) current and foreseeable economic or market conditions. The EBA specifies which aspects should be analysed within each part.
- Nevertheless, even where historical observations are **not fully representative** they still contain valuable information. Therefore, non-representativeness should lead to **appropriate adjustments**, where possible, and additional MoC but should not be a justification for excluding the data from the estimation process.
- Furthermore, the **economic** or **market conditions** that underlie the data should be relevant to current and foreseeable conditions.

Detail

LGD estimation

Moreover, the GL specify the concepts of economic loss and realised LGD, including the treatment of unpaid late fees, interest and additional drawings after default...

LGD estimation (3/7)

Economic loss and realised LGD

- Institutions should **calculate realised LGDs for each exposure as a ratio of the economic loss** to the outstanding amount of the credit obligation at the moment of default. In this regard, they should calculate the economic loss realised on an instrument (i.e. defaulted facility) as a difference between:
 - The **outstanding amount** of the credit obligation at the **moment of default**.
 - Any **recoveries realised after the moment of default** discounted to the moment of default.
- Where, relating to a default event, any **part of exposure has been forgiven or written off before or at the date of default** and the amount forgiven or written off is not included in the outstanding obligation at the moment of default the amount of the exposure that was forgiven or written off should be added to the outstanding obligation at the moment of default included in the **denominator of the realised LGD**.
- In the case of **exposures that return to non-defaulted status** institutions should calculate economic loss as for all other defaulted exposures with the only difference that additional recovery cash flow is added to the calculation at the date of the return to non-defaulted status in the amount that was outstanding at the date of the return to non-defaulted status. This additional recovery cash should not be discounted.
- The EBA GL specify the treatment of **unpaid late fees, interest and additional drawing after default**.

Unpaid late fees

- Institutions should correct the economic loss by including in its calculation any **fees capitalised** in its income statement after the moment of default and any recoveries realised thereof, and not correct the outstanding amount of the credit obligation at the moment of default in the denominator of the realised LGD.

Unpaid late interest

- Institutions should apply the same treatment of unpaid late fees to any **interest capitalised** in their income statement after the moment of default. In case of recovery of late interest or fees that have not been previously capitalised the moment of recovery should be considered a moment of capitalisation.

Additional drawings after default

- Institutions are required to reflect the possibility of **additional drawings** by the obligor up to and after the time of default in their estimates of conversion factors. In the case of retail exposures institutions may reflect future drawings either in their conversion factors or in their LGD estimates.

Detail

LGD estimation

...discounting rate as well as the treatment of direct and indirect costs

LGD estimation (4/7)

Discounting rate

- For calculating the **economic loss**, institutions should discount all recoveries and costs¹, using an annual discounting rate composed of a **primary interbank offered rate** applicable at the moment of default increased by [5%-points] **add-on**. For this purpose the primary interbank offered rate should be considered the **1-year EURIBOR** or a comparable interest rate in a currency of the exposure.

Direct and indirect costs

- For calculating the realised LGDs, institutions should take into account **all material direct and indirect cost** related to the **recovery process**. If any material direct or indirect costs relating to the collection on exposures and the default of the respective counterparty have been incurred before the moment of default institutions should include these costs in the LGD estimation unless **at least one condition** is met:
 - These costs are clearly included in the **exposure value**.
 - These costs are associated with the **previous default** of the same obligor that is not considered as a multiple default.
- Direct costs** should include the costs of outsourced collection services, legal costs, the cost of hedges and insurances and all other costs directly attributable to the collection on a specific exposure. Institutions should consider **all direct costs as material**.
- Indirect costs** should include all costs stemming from the running of the institution's recovery processes, overall costs of outsourced collection services, and all other costs related to the collection on defaulted exposures that cannot be directly attributed to collection on a specific exposure.
 - Other ongoing costs (e.g. institution's overheads related to the recovery processes) should be included in the estimation of indirect costs unless the institutions can demonstrate that these costs are **immaterial**.
- Institutions should demonstrate that they collect and store in **their databases** all information required to calculate direct and indirect costs.

Detail

LGD estimation

In accordance with these GL, institutions should calculate the long-run average LGD as a arithmetic average of realised LGDs taking into account a broad historical observation period and a conservative perspective regarding the consideration of incomplete recovery processes

LGD estimation (5/7)

Long-run average LGD

Calculation of long-run average LGD

Incomplete recovery process

Cases with no loss or positive outcome

- The **historical observation period** should be as broad as possible and should contain: i) a **minimum length** of 5 years for exposures to corporates, institutions, central governments, central banks, and retail exposures¹; ii) a sufficient number of **closed recovery processes**; iii) **consecutive periods**, including the most recent periods before the moment of LGD estimation; and iv) **all available internal data** considered relevant.
- Institutions should calculate the long-run average LGD as an **arithmetic average of realised LGDs** over an historical observation period **weighted by a number of defaults**, separately for each facility grade or pool, and at the level of portfolio. They should not use any averages of LGDs already calculated.
- **Where institutions do not give equal importance to all historical data** for retail exposures they should demonstrate in a documented manner that the use of higher weights to more recent data is **justified**.
- Institutions should:
 - Ensure that the **relevant information from incomplete recovery processes** is considered in a **conservative manner**. The LGD estimation should be based on the **long-run average LGD**.
 - Calculate the **observed average LGD for each facility grade or pool and at the level of portfolio covered by the LGD model** taking into account realised LGDs on all defaults observed in the historical observation period related to closed recovery processes, without including any expected future recovery. The observed average LGD should be weighted by the number of defaults included in the calculation.
 - Clearly specify in their internal policies **the moment of closing** the recovery processes which should be specified in such a way that ensures sufficient data for the estimation of the recoveries within this period.
 - Define the **maximum period of the recovery process** for a given type of exposures.
 - Adjust the **observed average LGD** to account for the most recent experience based on the incomplete recovery process and estimate the most likely future recoveries when the process are not yet complete.
- The **realised LGD** on these observations should **equal 0** for the purpose of calculation of observed average LGD and estimation of long-run average LGD. This floor should be applied at the level of individual exposure (no netting effects are permitted)

(1) For exposures to corporates, institutions, central governments and central banks, the historical observation period increases by 1 year each year after implementation of own LGD estimates until a minimum of 7 years is reached.

Detail

LGD estimation

These GL provide detailed guidance on LGD estimation methodologies and risk drivers, specifying principles that should be adhered to regardless of the methodology, on the downturn adjustment, and on the treatment of collaterals

LGD estimation (6/7)

Methodologies and risk drivers

- Institutions should:
 - Demonstrate that the **methodologies** for estimating the LGD are **appropriate** to their activities and the type of exposures to which the estimates apply and should justify the assumptions considered. In particular, these methodologies should be **consistent with the collection and recovery policies** adopted and should consider possible recovery scenarios and potential differences in the legal environment in relevant jurisdictions.
 - Adequate the **functional and structural form** of the estimation method to the **type of exposures**.
 - Identify and analyse **potential risk drivers** (e.g. transaction-related risk including type of product, geographical location, loan-to-value ratio (LTV), etc.) that are relevant to its specific circumstances and characteristics of the type of exposures covered by the rating system.
 - Analyse the risk drivers not only at the moment of default but also **at least within a year before default** and use a **reference date for a risk driver that is representative of the realisations** of the risk driver within a year before default, and take into account its **volatility** over time.

Downturn adjustment

- For the purpose of obtaining LGD estimates that are appropriate for an economic downturn, institutions should specify an **economic downturn** in accordance with the **EBA RTS¹**.
- In this regard, the downturn LGD should be computed according to the downturn scenario selected. The **panel of experts** should participate in the identification of its nature, perform a qualitative assessment of the dependency which should complement the quantitative analysis, and participate in the decision on the MoC to be applied to the final LGD estimates. The **20-years period** should be computed from the LGD estimation.

Collaterals in LGD estimation

- Institutions may take into account in their LGD estimations the existence of any types of **collaterals** for which they have established internal requirements in terms of **collateral management, legal certainty and risk management**.
- In this regard, the GL include provisions on the **inclusion of collaterals in the LGD estimation** as well as on the **cash flows from collaterals**.

Regarding the treatment of collaterals in LGD estimation, these GL specify the conditions for including collaterals in LGD estimation and for recognising cash flows from collaterals

LGD estimation (7/7)

Inclusion of collaterals in LGD estimation

- Institutions should:
 - Consider the **information on all main types of collaterals** that are used within the scope of application of the LGD model as a risk driver or segmentation criterion.
 - Clearly define in their **internal policies the main and other types of collaterals** used for the type of exposures covered by the rating system.
 - Ensure that the **policies regarding the management** of these types of collateral comply with the requirement set in the CRR (in relation to internal requirements for collateral management, legal certainty and risk management).
 - Specify the main types of collaterals in such a way that the cash flows from the remaining types of **collaterals will not significantly bias the estimation of recoveries** that are realised without the use of collaterals.
 - **Group** the types of collaterals that are **homogeneous** in terms of recovery patterns considering both the average time of collection process and the recovery rates on these types of collaterals.
- To include the effect of collateral in the LGD institutions should meet several **principles** which include avoiding bias in the LGD estimates that may stem from inappropriate treatment of cash flows realised with the use of collaterals as well as from inappropriate valuation of the collateral.

Cash flows from collaterals

- Institutions should **recognise the recoveries as stemming from collaterals** in all of the following situations:
 - i) the collateral is sold by the obligor and the obtained price has been used to cover the defaulted exposure;
 - ii) the collateral is repossessed or sold by the institution, the parent undertaking or any of its subsidiaries;
 - iii) the collateral is sold in the court or bailiff procedure;
 - iv) the credit obligation is sold and the price for the obligation included the existing collateral; and
 - v) any other method of realising the collateral possible of the legal framework.
- Institutions should consider the **value of repossession** the value by which the credit obligation of the obligor has been diminished as a result of the repossession of the collateral, and which the repossessed collateral was recorded as an asset on the balance sheet of the institution. As this value does not always reflect accurately the market value of the asset, an **appropriate haircut** should be applied and estimated with the assumption that the institution intends to sell the repossessed asset as soon as it is reasonably possible.

Detail

Estimation of risk parameters for defaulted exposures

The GL include also requirements regarding the estimates of EL_{BE} and LGD in-default to each defaulted exposure. Nonetheless, the GL on the estimation of these parameters are largely based on the requirements for the estimation of LGD for non-defaulted exposures

Estimation of risk parameters for defaulted exposures (1/3)

General requirements

- Institutions that have obtained permission to **use own estimates of LGD**, should assign an **EL_{BE} estimate and a LGD in-default estimate** to each defaulted exposure within the scope of the rating system.
- In this regard, institutions should:
 - Estimate **EL_{BE} and LGD in-default for each of the facility grades** of the distinct facility rating scale or for each of the pools that are incorporated in the rating system.
 - Use the **same estimation methods** used for estimating LGD on non-defaulted exposures.
 - Timely consider all relevant **post-default information** in their EL_{BE} and LGD in-default estimates.
 - Assess and duly justify situations where there are **systematic deviations** of the LGD in-default estimates.
 - Perform **back-testing** and **benchmarking** of their EL_{BE} and LGD in-default estimates.

Data requirements¹

- Institutions should use the **same RDS** as for the **LGD estimation for non-defaulted exposures**, complemented to reflect any relevant information observed during the recovery process and at each reference date, and in particular at least the following **additional information**:
 - All relevant factors that can be used to group defaulted exposures¹.
 - All relevant drivers of loss¹.
 - The amount outstanding at each reference date.
 - The values of collateral associated with the exposures and the dates of valuation after the date of default.

Reference dates

- Institutions should set the **reference dates** that can be used to group defaulted exposures in a significant manner in terms of the recovery pattern observed. In this regard, they should **use only closed recovery processes** and factually observed costs and recoveries from incomplete recovery processes.
- Institutions should set the reference dates according to the **recovery pattern observed on a specific type of exposures**.
- The **same defaulted exposure in the RDS should be used in all relevant grades or pools** of exposures according to each different reference date.
- Furthermore, institutions should **monitor on a regular basis potential changes** in the recovery patterns and in the relevant recovery policies which may affect the estimation of EL_{BE} and LGD in-default.

(1) Including those that may become relevant after the date of default and at each reference date.

Detail

Estimation of risk parameters for defaulted exposures

In addition to general requirements and specific data requirements, the GL cover the following aspects on EL_{BE} and LGD in-default: calculation of realised LGD and long-run average LGD for defaulted exposures, risk drivers, requirements for EL_{BE} estimation...

Estimation of risk parameters for defaulted exposures (2/3)

Realised LGD and long-run average LGD

- For the purposes of EL_{BE} and LGD in default, institutions should calculate:
 - The **realised LGDs for defaulted exposures**, as specified above for LGD estimation for non-defaulted exposures, with the only **difference** that this should be done **with regards to the reference date**, rather than the date of default.
 - The **long run average LGD of the realised LGDs for defaulted exposures**, following the requirements set out for LGD estimation with the only exception that **incomplete recovery processes** should be used only for those reference dates beyond which factual recovery and costs are observed.

Risk drivers

- For the purposes of taking into account the **information on the time in-default and recoveries realised** so far, institutions may take into account this information **either directly as risk drivers or indirectly**.
- For the purpose of EL_{BE} and LGD in-default estimation institutions should analyse the **potential risk drivers** not only until the moment of default but also after the date of default and until the date of termination of the recovery process. They should analyse also other potential risk drivers that might become relevant after the date of default, including in particular the expected length of the recovery process and the status of the recovery process.

Requirements for EL_{BE} estimation

- The EL_{BE} **should not include any MoC** as this would not be in line with the best estimate concept.

Current economic circumstances

- Institutions should consider current economic factors, including **macroeconomic and credit factors**. Where the realised LGD for defaulted exposures, is not sensitive to the economic factors the EL_{BE} should be calculated on the basis of the long-run average LGD, whereas where it is sensitive, the institution should adjust the long run average LGD for defaulted exposures.
- Whichever of the approaches is used institutions should **document separately** the long-run average LGD for defaulted assets and the adjustment to current economic circumstances.

Estimation of risk parameters for defaulted exposures

...and requirements for LGD in-default estimation

Credit risk adjustment

- Where the model used for **credit risk adjustments** satisfies or can be adjusted to satisfy the requirements for own-LGD estimates institutions may use specific credit risk adjustments as EL_{BE} estimates.
- In order to ensure consistency between the EL_{BE} and LGD in-default estimates, the GL **constrain the use of provisions as EL_{BE}** to two specific circumstances.
 - The first refers to those cases where a provisions model respects all the requirements for own LGD estimates set in the CRR and in these GL or when they can be adjusted to meet those requirements, in particular those related to the **concept of economic loss**.
 - The second possibility refers to those cases where provisions are **individually assessed**, and so there is no model behind them. Individually assessed provisions should be adjusted in such a way to be consistent with the requirements on economic loss.

Requirements LGD in-default estimation

- For the purpose of considering the **possible adverse change in economic conditions** during the expected length of the recovery processes the LGD should reflect at least **downturn conditions**¹.
- However, the LGD in-default may need to be increased in order to ensure that the difference between the LGD in-default and the EL_{BE} **covers for any increase of loss rate** caused by possible additional unexpected losses.
- For **ensuring that LGD in-default is higher than the EL_{BE}** , or is equal to in limited cases for individual exposures institutions should analyse and correct the LGD in-default in those situation where the EL_{BE} obtained using specific credit risk adjustments, is above the LGD in-default obtained through direct estimation.
- For the purpose of considering additional unexpected losses institutions may need to increase the **LGD in-default over the downturn level**.
- Further, as for the LGD for non-defaulted exposures, the LGD in-default should include **appropriate MoC**. In this regard, institutions should **document** the breakdown of the LGD in-defaults and of the add-on.

(1) Whichever of the approaches is used institutions should document separately the long-run average LGD for defaulted assets, and the adjustment to current economic circumstances.

The GL provide guidance on the application of additional conservatism to the outcomes of the process of assignment of exposures to grades and on those cases where institutions should use human judgement

Application of risk parameters

Conservatism

- Institutions should apply **additional conservatism** to the outcomes of the process of assigning exposures to grades or pools. They should do so by establishing a framework consisting in the following phases:
 - **Identification of deficiencies of implementation or application of risk parameters.** Institutions should have a robust process for identifying these deficiencies and should consider at least the following triggers for additional conservatism: i) missing data in the current portfolio; ii) missing updates of financial statements; iii) outdated ratings in the current portfolio; and iv) missing ratings¹.
 - **Specification of the form of conservatism and quantification of the appropriate level of conservatism.** Institutions should consider the overall impact of the identified deficiencies and the resulting conservatism on the soundness of assignments to grades or pools.
 - **Monitoring of the deficiencies and correcting them.** Institutions should regularly monitor the implementation and application deficiencies and the levels of additional conservatism applied in relation to them. In this regard, they should develop a plan to rectify the deficiencies within a reasonable timeline.
 - **Documentation.** Institutions should specify adequate manuals and procedure for applying additional conservatism and should document the process applied in addressing implementation and application deficiencies.

Human judgement

- Institutions may use **human judgement** in the application of the model in the following cases: i) application of the qualitative variables, ii) via overrides of the inputs to the model; and iii) via overrides of the model outputs.
- They should specify **clear criteria** for the use of qualitative model inputs
- Institutions should specify the **policies** and **criteria** for the use of overrides in the application of the models.
- Institutions should **document** the scale and rationale of each override.
- They should **regularly monitor** the level and justifications for those overrides of inputs and outputs of the models, specifying the maximum acceptable rate of overrides for each model.
- Furthermore, they should analyse the **performance of exposures** in relation to which an override of input or output has been performed and regularly assess the model's performance before and after the overrides.

(1) The occurrence of any other triggers results in the adding of additional conservatism to the risk parameter for the purpose of the calculation of RWAs.

Detail

Other aspects

Institutions should specify internal policies for re-development, re-estimation, and re-calibration of internal models. Moreover, they should have a framework for the purpose of performing annual reviews of estimates of risk parameters

Re-development, re-estimation and re-calibration of internal models

General provisions

- Institutions should specify **internal policies** for re-development, re-estimation, and re-calibration of internal models, which consider at least these potential sources for triggers: i) results of regular review of estimates; ii) changes in the legal environment; and iii) deficiencies identified by internal audit or the CA.
- In case **material deficiencies** are identified by one of the sources, depending on the severity, a re-calibration, re-estimation or re-development should be triggered and an appropriate MoC should be applied¹.

Regular review of estimates of risk parameters

- For the purpose of performing **annual reviews of estimates**, institutions should have a framework which includes at least the following elements:
 - A **minimum scope of analyses**, including predefined metrics to test model performance and predictions.
 - A representativeness analysis of potential differences between the reference dataset used to estimate the risk parameter and the current portfolio to which the estimates are applied, including the analysis of any changes in the portfolio or structural breaks (e.g. relevant risk drivers and segmentation drivers used in the rating system, etc.).
 - Analysis of the performance of the model and its stability over time, identifying potential deterioration across portfolios, among others.
 - Analysis of the predictive power of the model (e.g. analysis of the dataset, backtesting, etc.)
 - **Predefined standards**, including predefined thresholds and significance levels for the relevant metrics.
 - **Predefined actions** to be taken in case of adverse results in any of the analyses.
- Institutions should **investigate** and decide on the adequate steps in order to remediate identified deficiencies.
- Regarding these analyses, institutions should specify several **conditions** when the analyses should be performed more frequently than annually (including the specification of events that trigger the analyses such as major changes in the risk profile, credit policies or relevant IT systems).
- They should also define a **regular cycle for full review of the rating systems**, taking into consideration their materiality.
- For the regular review, institutions should use **consistent rules for data adjustments and exclusions** and ensure that any difference between the relevant datasets is justified and does not distort the results.

(1) At a minimum, the institution should describe the applied metrics, thresholds and accepted deviations for representativeness, discriminatory power, predictive power and stability analysis.

Detail

Other aspects

Finally, the GL allow IRB institutions to use the excess of credit risk adjustments over the expected loss amounts for the non-defaulted portfolio to cover for any shortfall from the overall defaulted portfolio

Calculation of IRB shortfall or excess

Non-defaulted portfolio calculation

- Where the calculation for the difference between credit risk adjustments and the expected loss amounts for the overall non-defaulted portfolio¹ results in an **excess**, institutions may use this excess to cover for any shortfall from the overall defaulted portfolio.
- Where calculation results in an excess of credit risk adjustments for both the defaulted and the non-defaulted portfolio, the sum of those two excesses should be considered and **added to Tier 2** (up to a limit of 0.06% of RWAs).
- Institutions should not include **partial write-offs** in the calculation of general and specific credit risk adjustments. However, the calculation of the expected loss amount should be based on the exposure value **gross of value adjustments but net of write-offs**.

(1) According to article 159 CRR and the EBA RTS on assessment methodology, the amount of shortfall or excess of provisions should be calculated on an aggregate level for IRB exposures, separately for defaulted and non-defaulted exposures.

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Next steps

The proposed deadline for implementation on these GL is end-2020

Next steps



- The proposed deadline for implementation is **end-2020**, as already specified by the EBA.
- Moreover, the EBA launched **qualitative survey** across institutions in order to assess the impact of the proposed requirements on the rating systems, which should had been sent by institutions by **27 January**.