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Consultation paper

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

Contents

1. Executive Summary

The draft guidelines presented in this consultation are one of the initiatives undertaken by the EBA to reduce the unjustified variability and are part of a broader review of the IRB Approach that is carried out by the EBA in accordance with the plan outlined in the Report on the regulatory review of the IRB Approach published in February 2016[1]. These guidelines are focused on the definitions and modelling techniques used in the estimation of risk parameters for both non-defaulted and defaulted exposures, whereas other regulatory products developed in the review process will clarify other aspects related to the application of the IRB Approach. The EBA considers these clarifications and harmonisation necessary in order to achieve comparability of risk parameters estimated on the basis of internal models and to restore trust in these models by market participants while at the same time preserving risk sensitivity of capital requirements.

The EBA has in its previous work identified a clear need for these guidelines, including in five reports on the comparability and pro-cyclicality of capital requirements, developed in accordance with Article 502 of Regulation (EU) No 575/2013 and published by the EBA in December 2013[2]. These reports confirmed significant discrepancies in risk parameters and own funds requirements across institutions and jurisdictions that did not reflect differences in risk profiles but resulted from different underlying definitions and certain modelling choices. These discrepancies were in part a consequence of excessive flexibility incorporated in the IRB framework and are considered to be a main driver in the loss of trust of internal models by observers, investors and other market participants.

With regard to non-defaulted exposures the draft guidelines provide detailed clarifications on the estimation of PD and LGD parameters. In the case of defaulted exposures institutions are required to estimate LGD (so called LGD in-default) and expected loss best estimate (EL_{BE}). As these parameters are in fact part of LGD models the clarifications provided in the guidelines on the estimation of these parameters are largely based on the requirements specified for the estimation of LGD for non-defaulted exposures. In addition, the guidelines specify aspects common for all risk parameters such as the use of human judgement both in the development and in the application of the internal models, appropriate margin of conservatism that should be incorporated in risk parameters as well as regular reviews of the models in order to ensure timely implementation of necessary changes in case of deteriorated performance of the models. The aim of the guidelines is therefore to harmonise the concepts and methods used today.

As it is expected that these guidelines may lead to material changes in numerous rating systems used currently by institutions sufficient time has to be granted for their implementation. The proposed deadline for implementation is end-2020 as already specified in the Opinion on the implementation

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[1] https://www.eba.europa.eu/-/eba-sets-out-roadmap-for-the-implementation-of-the-regulatory-review-of-internal-models

[2] http://www.eba.europa.eu/-/eba-publishes-reports-on-comparability-of-risk-weighted-assets-rwas-and-pro-cyclicality

of the regulatory review of the IRB Approach published by the EBA in February 2016[3]. This opinion describes the envisaged phasing-in approach and the specified deadline refers to implementation of all changes stemming from the regulatory review of the IRB Approach.

Next steps

The draft guidelines are published for the 3 months consultation period. At the same time the EBA is planning to carry out a qualitative survey across institutions in order to assess the impact of the proposed requirements on the rating systems. The responses received during the consultation period and the results of the survey will be taken into account when specifying the final guidelines.

In addition, the EBA is planning to consult on the draft RTS on the nature, severity and duration of economic downturn developed in accordance with Article 181(3)(a) of Regulation (EU) 575/2013. As these RTS will be closely related to the estimation of downturn LGD some additional changes may be introduced in the final guidelines on the basis of the feedback received during these consultations.

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[3] https://www.eba.europa.eu/-/eba-sets-out-roadmap-for-the-implementation-of-the-regulatory-review-of-internal-models

2. Background and rationale

Introduction

The concept of the Internal Ratings Based Approach (IRB Approach) for credit risk was first introduced by the Directive 2006/48/EC of 14 June 2006 (part of what was known as the Capital Requirements Directive – CRD), later replaced by Regulation (EU) No 575/2013 (Capital Requirements Regulation – CRR). The CRR introduced a number of mandates for the EBA to develop technical standards and guidelines to supplement the primary legislation in order to ensure more harmonised application of the IRB requirements.

In this regard and in accordance with Article 502 of the CRR, EBA published in December 2013 a set of five reports on the comparability and pro-cyclicality of capital requirements, presenting the results of a study that EBA conducted on the comparability of the risk estimates and capital requirements including the analysis of the factors that contribute to the discrepancies among institutions. Based on the results, the EBA concluded that further guidance was needed, as current practices differed significantly across countries and institutions. Consequently, the EBA initiated work to provide further regulatory guidance and these draft Guidelines on PD estimation, LGD estimation and the treatment of defaulted assets (GL) are one of the initiatives and specifically target the identified significant discrepancies in the methodologies underlying risk estimates.

The sources of discrepancies identified in the area of modelling were mostly related to different definitions of the main concepts underlying the risk parameters and different modelling choices that were possible due to a large degree of flexibility incorporated in the IRB framework. In addition, different understanding of regulatory requirements was also observed.

These draft GL are therefore focused on aligning the terminology and definitions, in particular in relation to metrics such as default rate or realized LGD that are the basis for estimation of risk parameters. Furthermore, the draft GL provide clarification on the application of certain regulatory requirements that were until now interpreted in various ways and specify principles for the estimation of risk parameters, including those applicable to defaulted exposures. Although the draft GL may limit certain modeling choices they are focused on the elements that lead to non-risk based variability and intend to preserve sufficient flexibility to ensure risk sensitivity of the models. Therefore, the draft GL do not prescribe any specific estimation methodology where different approaches may be appropriate for different portfolios in order to reflect different risk profiles.

The main objective of the draft GL is to provide the rules that will lead to comparability of the model outcomes. Differences in risk parameters between institutions should ideally reflect differences in the underlying risk rather than different modelling choices. In addition, clearer rules in that regard will limit the possibility for regulatory arbitrage. Other aspects of the models that are not explicitly prescribed in the draft GL, such as the choice of risk drivers and estimation methodology, will have to be justified on the basis of the risk profile of the portfolio covered by the model as well as the credit and recovery policies and efficiency of these processes.

As the draft GL are part of a broader review of the IRB Approach carried out by the EBA they do not address all identified sources of RWA variability. The GL focus on aspects related to modelling of parameters such as PD, LGD, EL_{BE} and LGD in-default whereas other elements, including the definition of default that these parameters should be based on, rating processes, data quality processes and other aspects of the application of the IRB Approach are addressed in other regulatory products. The EBA's plan for the regulatory review of the IRB Approach has been outlined in the report published in February 2016[4]. The planned regulatory products will affect nearly all aspects of the IRB Approach and it is expected that as a consequence 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, where such specification is deemed necessary in order to achieve the objective of a Single Rulebook, as well as to regain public trust in the use of internal models.

It has to be stressed that these GL include numerous references to the RTS on IRB assessment methodology which set conditions for competent authorities to assess the rating systems of the institutions. Although the RTS is addressed to competent authorities it is binding also to institutions. Therefore, these GL and the mentioned RTS should be read together as many aspects related to modelling have already been clarified in the RTS and in these cases the provisions are not repeated in the GL. When implementing any changes in the rating systems stemming from the regulatory review of the IRB Approach, and also subsequently on a continuous basis, institutions should take into account not only these GL but also provisions included in other related regulatory products, in particular the RTS on IRB assessment methodology, the RTS on materiality threshold for past due exposures, the GL on the application of the definition of default and the RTS on the nature, severity and duration of economic downturn. The consultation paper on the latter RTS is planned to be published later this year. It will consult on the specification of the downturn period as well as other aspects related to the estimation of downturn LGD.

Neither these GL nor any other of the EBA's regulatory products address the issue of the scope of application of the IRB Approach and modellability of low default portfolios. These aspects are currently under consideration at the international level by the Basel Committee on Banking Supervision (BCBS) and may subsequently be incorporated in the European legal framework by relevant changes to the CRR. Regardless of these possible developments the provisions included in these GL and other related regulatory products will apply to these models and portfolios that remain within the scope of the IRB Approach.

This Consultation Paper seeks feedback from the industry on the proposed guidance on PD estimation, LGD estimation and the treatment of defaulted assets with respect to the suitability for lowering unjustified variability of risk parameters, but also with respect to operational issues which might arise when following the proposed GL. A more detailed rationale for the proposed provisions is presented in the subsequent sections.

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[4]

https://www.eba.europa.eu/documents/10180/1360107/EBA+Report+on+the+regulatory+review+of+the+IRB+Approach.pdf

Chapter 4: General estimation requirements

This section covers policy proposals for segmentation principles, data requirements, human judgement in model development and margin of conservatism.

Segmentation principles

The segmentation principles aim to provide guidance on the highest level of rating system design. These principles are particularly relevant in the case of changes in the scope of application of certain rating systems, for example where an existing rating system is rolled out to an acquired portfolio or a portfolio that is otherwise not yet treated under the IRB Approach. The draft GL require in this regard among others the fundamentally comparable availability of credit related information, meaning that with respect to the obligors or exposures to which the rating system is extended the relevant information has a similar nature and is available for the purpose of rating assignment or at least is possible to obtain. For instance, as the information available for business clients and for natural persons is fundamentally different, these should not be covered by the same rating system.

Data requirements

Good quality of data is a fundamental condition for developing a robust rating system. The data requirements in this general part apply to model development and application as well as risk parameter quantification for all risk parameters and contain clarifications regarding the assessment of accuracy, completeness and appropriateness of data. Data requirements specific to PD or LGD estimation (or LGD-in-default or EL_{BE} estimation) are described within the according sub-chapters of these draft GL.

Human judgement in model development

Development of a robust rating system cannot be a purely statistical process, but to some extent has to involve also human judgement in order to make sure that the models are appropriate for current and foreseeable portfolios and conditions and that the models are acceptable for business users. Expert judgement may be necessary in particular with respect to the verification of model assumptions and whether these are in line with economic expectations, the design of the model, the choice of risk drivers, etc. However, in order to ensure a high quality of the models the expert judgement has to be appropriately documented and justified. This way the judgmental elements of the model can be appropriately challenged and verified both by the validation function as well as by competent authorities. Therefore, this part of the draft GL clarifies the requirements regarding human judgment in model development and with respect to the documentation of human judgment in model development.

Margin of conservatism ('MoC')

The draft GL include principles to be followed by institutions in the identification, quantification, reporting and documentation of an adequate margin of conservatism. As a general concept institutions are required to address the identified deficiencies in data or methods via appropriate adjustments and margin of conservatism. An appropriate adjustment consists in rectifying the

identified errors, for instance missing data points are filled in with the most probable information or the inaccuracies in data are corrected. The objective of the appropriate adjustment is to achieve the possibly most accurate estimates. However, as the appropriate adjustment is an estimate due to data deficiency, additional MoC has to be added to address the uncertainty related to this estimation. Moreover, MoC aims at addressing all errors that cannot be rectified through appropriate adjustment and any other uncertainties related to the estimation of risk parameters.

Example for appropriate adjustment and margin of conservatism

Assume a change in regulatory requirements regarding the materiality threshold for detecting defaults triggered by the 90 days past due ('dpd')-criterion. Assume the considered institution has stored the information regarding outstanding exposure only monthly and not daily. Thus the date of default as well as the EAD cannot be recollected historically. Even though some calculations could be made based on the monthly data, the 90 days could have been reached during a month and the default could not be visible based on monthly data due to repayments. Therefore the institution decided to set up a parallel default detection according to the new trigger and estimate MoC starting from the difference of the amount of defaults detected according to the old trigger and the new trigger.

An appropriate adjustment could be derived as follows: Calculating the relative change in the number of defaults triggered according to the old 90dpd and the new 90dpd criterion compared to all defaults (i.e. taking into account all triggers) on a monthly basis. Thus an average correction factor can be estimated and applied backwards. As a result the number of defaults according to the new 90dpd trigger can be estimated for the available historical data.

The additional MoC could be derived for example from the 90% confidence interval around the average of the new default rates. A non-exhaustive and exemplary list of triggers for appropriate adjustments and MoC can be found in Annex I. However, the methods described in this annex are only examples, institutions may use other methods for deriving MoC if these are deemed more appropriate.

Chapter 5: PD estimation

The guidelines on PD estimation aim to provide among others more detailed guidance on the calculation of observed default rates and on the estimation of the long run average default rate. Moreover, it clarifies how risk drivers and rating criteria should be chosen and which requirements should be fulfilled in case ratings serve as input to the PD estimation. Other aspects touched upon are the rating philosophy and how the long run average default rates relate to the final PD estimation of a grade or pool.

General requirements specific to PD estimation

One of the main aspects addressed in the general part of the chapter on PD estimation is the requirement that each natural or legal person that has exposures within the scope of the IRB Approach should be rated including where there is unfunded credit protection. The rational for this is that for the purpose of model development, risk quantification and validation the assignment to a

pool or grade after the application of unfunded credit protection would bias risk differentiation and default rate calculation.

The other main policy proposal provides clarification on the updates of rating relevant information. In a situation where an institution receives relevant new information this update should be incorporated into the rating assignment of the according obligor as soon as possible. However, in case of specific data e.g. relevant balance sheet data, new information will be available for a major share of the obligors at the same time of the year due to common reporting dates and updating the relevant information and reviewing the according rating assignments for a major share of the portfolio requires a realistic time window. Therefore, it is required that a resulting review of the rating assignment should not be made later than 3 months after the new information becomes available. Moreover, for retail rating systems where information becomes available in other IT systems than the rating relevant IT systems, this information should be taken into account in the next rating review.

Data requirements specific to PD estimation

The data requirements specific to PD estimation are split in two sub-sections, namely data requirements for the purpose of default rate calculation and data requirements for the reference data set for model development. This split is motivated by the according structure of the CRR, where data requirements for risk quantification are treated in sub-section 2 and data requirements regarding models are treated in sub-section 1 of section 6 in Chapter 3 of Part Three, Title II of the CRR. In particular, institutions may, subject to certain requirements, use a definition of default other than the one specified in Article 178 of the CRR. The main difference between the data requirements for default rate calculation and those for model development is that non-comparability for the purpose of risk quantification should not lead to data exclusion, but trigger an adjustment. However, for the purpose of model development material observed differences in the key characteristics should be avoided, for example by using another sample.

Data requirements for default rate calculation

For the default rate calculation, the draft GL clarify among others that all data relevant for identifying the non-defaulted exposures at the beginning of a one-year observation period has to be available as well as all relevant default information as required in Articles 178 of the CRR. This clarification was considered necessary as the emphasis is often put on the data collection related to the defaulted exposure but for the purpose of default rate calculation the accurate and complete identification and data collection for non-defaulted exposures is equally important.

Data requirements for the reference data set for the purpose of model development

One of the aspects related to data used for model development that should be properly considered in the model development is the choice of reference points in time where risk drivers and rating criteria should be evaluated. The draft GL require the use of appropriate points in time, which may be different for different risk drivers.

Observed default rates

The section on the calculation of observed default rates clarifies in more detail which obligors should be taken into account in the nominator and denominator for the purpose of calculating a one-year default rate and requires certain analysis depending on the method an institution chooses for averaging over a series of one-year default rates.

Calculation of the one-year default rate

While the general calculation of a one-year default rate is already outlined in the CRR and the RTS on IRB assessment methodology, the draft GL clarify this calculation for a number of specific situations. In particular, the denominator should contain the obligors of the considered model or calibration segment with any credit obligation at the beginning of the observation period. Where obligors whose obligations stem solely from non-credit products fall under the scope of application of the considered model and are treated in accordance with the institution's internal default definition, then these should form a separate pool in the rating system not to bias the default rate of obligors with credit facilities. Similarly, with regard to obligors or facilities with just committed but undrawn credit lines these might have to be treated in a separate pool in the rating system to avoid lowering unduly the default rate of drawn credit lines. It has to be noted as well that an obligor can also default if there is no repayment obligation during the observation period, as for example a bankruptcy notice might occur at any time.

Calculation of the observed average default rate

The draft GL require institutions to justify their approach to calculating the average of one year default rates taking into account, in particular, analysis on the effect of short term contracts or specific reporting dates.

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 one-year default rates and, in particular, if the historical observation period contains a downturn period. If the one year default rates are not representative of the likely range of variability, in particular, if no downturn period is contained, then institutions should estimate the long run average default rate by estimating an appropriate adjustment to the average of observed one year default rates.

In order to limit possible variability stemming from the application of this concept a benchmark is proposed, namely the maximum of the average of one year default rates over the most recent five years and the average of one year default rates over the whole available observation period. Institutions may still estimate long-run average default rates below this benchmark, but this should be duly justified and eventually trigger additional margin of conservatism.

PD estimation methodologies

The last section in this chapter is concerned with PD estimation methodologies and contains in particular 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. One of the issues that were clarified is that the calibration sample, namely the sample which is used for the process of assigning long run average PD to grades or pools, should be comparable to the current portfolio in terms of obligor and transaction characteristics but should reflect at the same time the likely range of variability.

Chapter 6: LGD estimation

General requirements for LGD estimation

General requirements for LGD estimation outline the scope of methodologies that can be used for the purpose of LGD estimation. In this context workout LGD is considered to be the main, superior methodology that should be used by institutions. It is essential that LGD estimates are based on the institutions' own loss and recovery experience in order to make sure that the estimates are adequate for the institutions portfolios and policies and in particular that they are consistent with the recovery processes. Therefore, although internal experience may be supplemented with external data, institutions should not use methodologies that are based only on external data, such as so called market LGD and market implied LGD which are based on the market prices of financial instruments such as marketable loans, bonds or credit default instruments.

An alternative methodology that is available for retail exposures and purchased corporate receivables is deriving LGD estimates from realised losses and appropriate estimates of PD. However, also in this case institutions should ensure that the estimates are sufficiently robust. This is ensured where both realised losses and PD estimates meet all relevant requirements. In particular, in order to ensure comparability of LGD estimates based on this methodology with other LGD estimates the calculation of total losses has to be consistent with the concept of economic loss used for the purpose of workout LGD.

Data requirements for LGD estimation

Reference Data Set

As the LGD estimates should be based on the institution's own experience it is important that all relevant data is properly recorded and stored. 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 the model development.

One of the most important risk drivers in the LGD estimation is the existence of collaterals. As the observed and estimated recovery rates relate to the value of the collateral, the timing and type of valuation is a key aspect that may significantly influence the estimates. In order to ensure that the estimates are adequate for the existing portfolio it is essential that the information about the

valuation is used consistently in the LGD estimation and in the application of LGD estimates. Hence, as the LGD estimates are applied to non-defaulted exposures, institutions should use the valuation from before the moment of default in the estimation of LGD. Although a more up-to-date valuation may be available that was performed after default or in relation to default this information should not be used in the estimation of LGD because this valuation is not comparable to the valuation of collateral for non-defaulted exposures. Valuations performed after default are often more conservative and hence the use of such information could lead to overestimation of recovery rates.

Representativeness of data

Representativeness of data may influence the accuracy of the estimates; where the underlying historical data is less representative to the current portfolio the estimates may be less adequate. The dimensions of representativeness include the scope of application of the model, distribution of the relevant risk drivers, definition of default and lending standards and recovery policies. However, 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. This is also consistent with Article 181(1)(a) of the CRR which requires the use of all observed defaults.

Furthermore, in accordance with Article 179(1)(d) of the CRR the economic or market conditions that underlie the data should be relevant to current and foreseeable conditions. In this context it is considered that all market and economic conditions experienced in the past are within the scope of foreseeable conditions. As the purpose of the own funds requirements is to address the unexpected loss even if extreme events were observed in the past these should not be excluded from the estimation sample.

Calculation of economic loss and realised LGD

Definition of economic loss and realised LGD

The concepts of economic loss and realised LGD are the basis for LGD estimation and any differences in the calculation may lead to significantly different and non-comparable LGD estimates. Therefore, it was considered essential to specify these concepts in detail, including the treatment of unpaid late fees, interest and additional drawings after default, discounting rate and costs. The specification was based on the definitions included in the CRR but provides more detailed clarifications on the practical application of these definitions.

Treatment of unpaid late fees, interest and additional drawings after default

With regard to the treatment of unpaid late fees, interest and additional drawings after default it was considered that in order to reflect correctly the level of loss these should also be included in the calculation. Otherwise, if only recoveries related to these events were included but the measure of loss was not increased by increased credit obligation this could lead to underestimation of LGD and in some cases to negative realised LGDs. In this sense the treatment of fees and interests should be

consistent as the economic sense of these measures is similar and it may only depend on the institution's pricing policy whether the obligors in default are charged with interests or with fees.

Furthermore, in specifying the treatment of additional drawings, fees or interests after the moment of default it was considered that the resulting measure of realised LGD should be consistent with the exposure value that will be used for the purpose of calculation of capital requirements. Hence, where additional drawings after default are included in the conversion factors the outstanding amount in the denominator of the realised LGD should also include such drawings. However, in the case of retail exposures, where the conversion factors do not include any drawings after the moment of default the denominator of the realised LGD should also reflect only the outstanding amount at the moment of default. As a result, lower exposure value (based on lower conversion factors) will be compensated by higher LGD.

Similarly, in the case of additional fees or interests that are capitalised after the moment of default, as these are generally not included in the conversion factors they should not increase the outstanding amount at the moment of default in the denominator of realised LGD. It is proposed that such fees and interests should be treated similarly as costs, i.e. they should increase the measure of exposure and loss in the numerator of the realised LGD, just as all recoveries related to those fees or interests, adequately discounted, should be included in the calculation of economic loss. At the same time, where these additional fees cover costs that were incurred by the institution, these should not be calculated twice.

In order to keep consistency between the LGD and exposure value including conversion factors different calculation of the denominator of the realised LGD is proposed depending on whether additional drawings after default are included in the estimation of conversion factors or not. However, this optionality does not refer to the measure of economic loss, i.e. the numerator of the realised LGD, as this should be an objective value that adequately reflects the actual value of loss experienced by the institution.

Discounting rate

The EBA has considered various possibilities with regard to the discounting rate and analysed various practices in that regard. Differences in approaches used by institutions range from the use of discounting factors based on effective interest rates on the underlying loans, different add-ons in the range of 0 to 10% and even higher in some cases on top of different underlying internal and external interest rate benchmarks. As different approaches are currently adopted by institutions the discounting factor was recognised as one of the main drivers of non-risk based variability of the LGD estimates. The proposed solution of using interbank funding rates and a 5% add-on has the advantage of being simple and contributing to increased comparability of LGD estimates. It is considered appropriate that the discounting rate should not depend on the credit standing of the institution and hence the discounting rate does not reflect funding costs but is rather focused on the uncertainty inherent in the recovery processes and the time value of money.

Direct and indirect costs

With regard to costs to be included in the calculation of the economic loss the proposal follows the distinction into direct and indirect costs depending on whether they are directly attributable to a given exposure. It has been specified that all direct costs should be considered material whereas immaterial indirect costs may be excluded from the calculation.

In order to reflect the full level of loss it is proposed that institutions should look into costs not only after the moment of default but also before that date. If the costs incurred by the institution due to diminished credit quality of the exposures but before recognition of default are not included in the exposure value at the moment of default they should be taken into account in the calculation of economic loss. Otherwise these costs would not be accounted for in the estimation of risk parameters and LGD would be underestimated.

Long-run average LGD

Historical observation period

The specification of the historical observation period is based on the assumption that it should be as broad as possible and should contain data from various periods with differing economic circumstances. These differing economic circumstances refer not only to the moment of default but also to the moment of realising recoveries from different sources. In this context it was deemed inappropriate to allow elimination of any data that reflects an institution's internal experience as this would lead to a loss of valuable information. Hence, it was specified that all available internal data should be taken into account in the long-run average LGD. This internal experience may be additionally supplemented by external data where necessary.

Calculation of long-run average LGD

It has been clarified that the long run average should be calculated as an arithmetic average of realised LGDs on all observations from the specified historical observation period and that it should be weighted by the number of defaults. The only exemption from this rule under the CRR is specified in Article 181(2) of the CRR according to which institutions may use higher weights to more recent data in the case of retail exposures. However, the use of this exemption requires appropriate justification and evidence that it leads to better LGD estimates.

Treatment of incomplete recovery processes

In accordance with Article 181(1)(a) of the CRR all observed defaults have to be taken into account in the calculation of long-run average LGD; hence, also incomplete recovery processes should be included. These incomplete processes carry valuable information in particular about the most recent observations and the cases that are particularly difficult and therefore require longer recovery processes. Exclusion of this information would not only lead to loss of relevant, up-to-date information but could also lead to underestimation of LGD and therefore this was considered inappropriate.

However, in order to obtain a realistic value of long-run average LGD the incomplete recovery processes should be included with future recoveries that are expected to be realised. The value of future recoveries is not and an objective, observed measure but has to be estimated based on the recoveries factually observed on those cases that are already closed. As a result, the 'long-run average LGD' will also be a measure that is not fully objective as it contains components that are estimated.

In order to obtain a fully objective measure it is proposed that institutions should also calculate the 'observed average LGD' taking into account realised LGDs only on those defaults that are related to closed recovery processes and those that reached a certain threshold in terms of the time in default, i.e. maximum length of the recovery process during which additional recoveries can be reasonably expected. Although this objective measure will not include any elements of estimation it has to be kept in mind that it may not reflect the real experience correctly as the cure and high-recovery cases may be overrepresented. More difficult cases usually stay longer in recovery processes therefore they will more likely not be included in the 'observed average LGD'.

Therefore, the 'observed average LGD' has to be adjusted to account for the most recent experience based on the incomplete recovery processes. For this purpose institutions should estimate the most likely future recoveries on cases where the processes are not yet complete. As such estimates can only be provided where sufficient data exists to support them it is proposed that institutions should only estimate future recoveries until a certain point in time, i.e. maximum length of the recovery process during which recoveries are actually observed on similar cases.

Treatment of cases with no loss or positive outcome

Finally, it is also proposed that where the calculation of realised LGD results in a negative number, i.e. where profit has been realised on a defaulted exposure, this should be floored at zero. This floor should be applied at the level of individual observation as it would not be appropriate to allow any netting effects in that regard.

LGD estimation methodologies and risk drivers

The GL do not prescribe any specific methodology that should be used in the estimation or LGD. It has been recognised that various methodologies may be valid, depending on specific circumstances, portfolios and processes. However, it was considered appropriate to specify certain principles that should be adhered to regardless of the methodology that is chosen.

As part of these general principles it has been specified which types of potential risk drivers should be taken into account by institutions. These include factors related to transactions and obligors but also to institutions themselves, in particular in terms of the organisation of the recovery processes as well as external factors such as legal frameworks, especially where models apply to exposures in various countries. It is important that institutions duly analyse potential risk drivers and choose those that meaningfully differentiate risk of transactions. In addition, the risk drivers should be analysed at an appropriate reference date that is representative of the realisations of the given risk driver within a year before default. This has the purpose of ensuring consistency between the estimation and the application of LGD, where the estimates will apply to non-defaulted exposures.

Treatment of collaterals in LGD estimation

Eligibility of collaterals

Based on Article 108(2) of the CRR it has been clarified that for the purpose of LGD estimation institutions may take into account any type of collateral as long as requirement of Article 181(1)(f) of the CRR is met. It has been further clarified in the RTS on IRB assessment methodology that in order to meet this requirement the institution's internal policies should be at least fully consistent with the requirements of Section 3 of Chapter 4 of the CRR with regard to legal certainty and regular valuation of collateral. It is also envisaged that institutions may use for the purpose of LGD estimation specific types of collaterals that are not explicitly described in Chapter 4 of the CRR. In these cases the policies and procedures relating to internal requirements for valuation and legal certainty should be appropriate to the respective type of collateral.

Inclusion of collaterals in the LGD estimation

The existence of collateral is one of the main aspects that affects the recovery processes and their results. As in accordance with Article 179(1)(a) of the CRR institutions are required to incorporate in their LGD estimates all relevant data, information and methods it has been specified that information on at least the main types of collaterals used for a given type of exposures should be considered relevant and included in the LGD estimates. This means, however, that for the main types of collaterals the requirement of Article 181(1)(f) of the CRR will have to be met as specified above.

Furthermore, the draft GL specify general principles for reflecting the effect of collaterals in the LGD estimates without prescribing any specific methodology. These principles 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

It has been clarified that for the purpose of calculation or realised LGD and LGD estimation the recoveries realised with the use of collaterals have to be treated as such regardless of the form of the realisation of the collateral. This could include not only workout processes through court proceedings but also sale of the collateral by the obligor himself, normally with the consent of the institution, or the sale of the credit obligation where the collateral is reflected in the price.

Broader clarification has been provided for a specific case where the collateral is repossessed by the institution in exchange for decreasing the credit obligation. It is proposed that this event should be treated as recovery, as from the economic perspective such event is equivalent to receiving a cash payment and investing it in an asset. However, as the value of repossession does not always reflect accurately the market value of the asset, this uncertainty should be addressed by applying an appropriate haircut to the value of repossession. Although institutions may have different strategies with regard to the repossessed assets, and in particular in some cases they may decide to keep the asset on their balance sheet for speculative purposes, these different strategies should not influence the value of the recovery. Therefore it has been specified that the haircut should be estimated with the assumption that that the institution intends to sell the repossessed asset as soon as it is

reasonably possible. Wherever sufficient past experience with regard to repossession of collaterals exists the haircuts should be supported by historical observations and regularly backtested. In the absence of such experience the assessment will have to be performed on a case-by-case basis, but this will require more conservatism as such assessment will be less reliable.

Downturn adjustment

Clarification of the determination of downturn period based on its nature, severity and duration will be provided by the RTS developed on the basis of Article 181(3)(a) of the CRR. The currently proposed text of the draft GL refers to these RTS but does not provide any further clarification on how to calculate the downturn adjustment to LGD estimates. It is assumed that various methodologies may be relevant in different situations. It is however still under consideration whether more guidance in that regard should be provided in the draft GL.

Chapter 7: Estimation of risk parameters for defaulted exposures

General requirements specific to Elbe and LGD in-default

The treatment of defaulted assets was identified as one of the major drivers of variability of the own funds requirements across institutions. Clarification has already been already provided in the RTS on IRB assessment methodology, in particular Article 54(2)(c), that the direct estimation of LGD in-default should be consistent with the LGD for non-defaulted exposures in order to avoid potential cliff effects. Following this approach it has been further clarified in the draft GL that for the purpose of estimating EL_{BE} and LGD in-default institutions should use the same estimation methods used for estimating LGD on non-defaulted exposures as they are in fact part of the LGD model. Thus, Chapter 7 generally refers to the requirements on LGD estimation set out in Chapter 6 as well as general estimation requirements set out in Chapter 4 and the requirements on the application of risk parameters specified in Chapter 8 and provides guidance only on those specific aspects where different treatment for defaulted assets loss rate estimation is justified.

Data requirements specific to LGD in-default and Elbe

As for non-defaulted exposures, EL_{BE} and LGD in-default estimates should be based on the institutions' own experience. The scope of data necessary for proper EL_{BE} and LGD in-default estimation not only includes those required for LGD for non-defaulted exposures but also all relevant operational information obtained during the recovery process and, in particular, at each reference date used in the estimation. This implies that for the purpose of the treatment of defaulted assets institutions should additionally store relevant risk drivers, including those that become relevant after default, and outstanding exposure amounts at each reference date.

Reference dates

The difference between the LGD in-default and the EL_{BE} is used for computing the risk weight according to Article 153(1)(ii) of the CRR which is then applied to the current outstanding exposure amount in order to obtain the risk weighted exposure amount. Moreover, the EL_{BE} is compared to credit risk adjustments for IRB shortfall / excess purposes where credit risk adjustments are again

computed with respect to the current value of exposures. Thus, for the purpose of computing realised LGDs for defaulted exposures institutions should use reference points in time that will be relevant for the current outstanding obligations of defaulted exposures.

The concept of current outstanding exposure is clearly defined in Article 166(1) of the CRR and should be used also for defaulted exposures in the application of the EL_{BE} and LGD in-default. However, given data limitations, the continuous concept of current exposure amount may not be suited for estimation purposes. The draft GL therefore suggest that institutions should set discrete relevant reference dates at which the realised LGDs should be computed. This way it should be feasible to estimate the parameters for defaulted exposures that are appropriate for their current status. In order to ensure adequacy of the estimates institutions should set the reference dates according to the recovery pattern observed on a specific type of exposures , where such reference dates may be either event based, e.g. linked with the realisation of collateral, or may reflect certain time periods during which exposures have been in-default.

For the purpose of application of the estimated LGD in-default and EL_{BE} to a given defaulted exposure in the current portfolio institutions should first evaluate which reference date is relevant for the exposure under consideration. The risk parameters to be assigned to the defaulted exposure under consideration should be calculated as the product of the EL_{BE} (or the LGD in-default) relevant at the selected reference date in percentage terms and the current outstanding exposure amount.

Calculation of realised LGD and long-run average LGD for defaulted exposures.

One major difference between the calculation of realised LGDs on defaulted and non-defaulted exposures is that the former should be performed at each relevant reference date rather than at the date of default, as described above. Other than this, in order to calculate realised LGDs for defaulted exposures institutions should follow the same requirements as those set in Chapter 6. This implies that institutions should calculate for each defaulted exposure in the RDS the realised LGDs according to each reference dates relevant for estimation purposes.

Another important aspect clarified in this section concerns the treatment of incomplete recovery processes for the purposes of calculation of long-run average LGD for defaulted exposure. The approach to the long-run average LGD is aligned to the one prescribed in section 6.4 with the exception that incomplete recovery processes could be used only for those reference dates beyond which factual recoveries and costs are observed. The rationale for this exception is that to avoid a circular reference in the estimates. In fact, incomplete recoveries processes on which we are estimating EL_{BE} and LGD in-default should not take part in the estimation itself and will be therefore excluded if only those incomplete recovery processes are taken into account for which later reference dates are relevant.

Risk drivers

This section specifies which types of potential risk drivers should be taken into account in estimating EL_{BE} and LGD in-default on top of those used for non-defaulted exposures. Article 54(2) of RTS on IRB assessment methodology prescribes that the LGD in-default and EL_{BE} estimation methods take into account the information on the time in-default and recoveries realised so far. In this respect, the

draft GL clarify that the information on recoveries realised so far and on time in-default may be taken into account either directly, as risk drivers, or indirectly, in setting the reference dates for estimation purposes. Moreover, in order to ensure that the information after default is timely and efficiently taken into account, it is clarified that the relevance of risk drivers should be re-evaluated for the relevant periods after default until the date of termination of the recovery process. This implies, for example, that new risk drivers might become relevant after the date of default.

Specific requirements for EL$_{BE}$ estimation

In accordance with Article 181(1)(h) of the CRR the EL$_{BE}$ estimation methods should take into account all currently available and relevant information and, in particular, consider current economic circumstances and exposure status. Taking this into consideration the draft GL clarify that the EL$_{BE}$ should not include any MoC as this would not be in line with the best estimate concept. Adding conservativeness, in fact, does not increase the accuracy of the estimates but rather covers for the risk that the estimates might be too optimistic.

Current economic circumstances

For the purposes of considering current economic circumstances the draft GL clarify that institutions should take into account economic factors, including macroeconomic and credit factors, which are relevant for the type of exposures under consideration. In this context, it is specified in the GL that institutions should obtain their EL$_{BE}$ estimates through an adjustment to the long run average LGD for defaulted exposures, consistently with the estimation of LGD in-default, such that a meaningful application of the risk weight formula is ensured. The difference between LGD in-default and EL$_{BE}$ determines the level of unexpected loss as it is used for computing the risk weight. Therefore, the draft GL aim to ensure consistency of the estimation approaches used for the two risk parameters. The difference between the EL$_{BE}$ and LGD in-default should reflect different economic conditions considered, current economic circumstances for EL$_{BE}$ versus downturn conditions for LGD in-default, and the application of the MoC for LGD in-default.

Concerning the calibration of the adjustment to current economic conditions examples are provided of the approaches that could be used. This entails using risk drivers in the model that are sensitive to economic factors, including in such a way current economic circumstances in the application of the EL$_{BE}$ estimates, or including the economic factors directly in the model. Neither of these approaches is prescribed as different approaches may be appropriate to different circumstances. However, regardless of the approach used for the calibration of the adjustment to current economic circumstances institutions should document the split of their EL$_{BE}$ estimates into the long run average and the adjustment to current economic circumstances. This adjustment should be consistently applied across portfolios and over time and institutions should document its rationale and calculation.

Relations of EL$_{BE}$ with specific credit risk adjustments

The calculation of the IRB excess/shortfall in accordance with Article 159 of the CRR is based on a comparison between the expected losses and credit risk adjustments. In this context using provisions as EL$_{BE}$ estimates is very frequent practice observed within European institutions. However, this

approach is considered inappropriate as it does not ensure compliance with the CRR requirements. In order to ensure consistency between the EL_{BE} and LGD in-default estimates, the draft 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 draft 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. In these circumstances the information of the individual assessment could be used as a potential reason for an override of the EL_{BE} model outcomes where institutions are able to prove that this improves the accuracy of the estimation. For this purpose, individually assessed provisions should be adjusted in such a way to be consistent with the requirements on economic loss set in these draft GL.

Specific requirements for LGD in-default estimation.

According to Article 54(1) of the RTS on IRB assessment methodology institutions may estimate LGD in-default either directly or as a sum of EL_{BE} and an add-on that captures the unexpected loss that might occur during the recovery period. Irrespective of the approach it is expected that the method for the estimation of LGD for exposures in default should consider a possible adverse change in economic conditions during the expected length of the recovery process according to Article 54(2)(a) of the RTS on IRB assessment methodology. It is clarified in the draft GLs that in order to reflect the adverse change in economic conditions institutions should reflect in their LGD in-default estimates at least downturn conditions. This is in line with Article 181(1)(b) of the CRR as LGD in-default is in fact part of an LGD model. However, LGD in-default reflecting downturn conditions does not preclude the inclusion of additional sources of uncertainty that are not related to economic conditions during the recovery process. For the purpose of considering additional unexpected losses mentioned in Article 181(1)(h) of the CRR institutions may need to increase the LGD in-default over the downturn level. Finally, as for the LGD for non-defaulted exposures, also the LGD in-default should include appropriate MoC. In this context, irrespective of which of the approaches is used for LGD in-default estimation, institutions should always be able to document:

- the breakdown of the LGD in-default into its components: the EL_{BE} and the add-on; and

- the breakdown of the add-on into its components: the downturn adjustment, MoC, and, where relevant, any component covering for additional unexpected losses during the recovery period.

As the relation between EL_{BE} and LGD in-default is crucial for the adequate determination of risk weights, potential overrides have to be considered and applied consistently as well. It is therefore specified in the draft GL that to the extent that the reason for overriding the EL_{BE} also applies to the LGD in-default an override of the LGD in-default should be triggered.

Chapter 8: Application of risk parameters

Conservatism in the application of risk parameters

While the margin of conservatism described in Chapter 4 addresses any weaknesses in data or methods in the process of model development and risk quantification, additional conservatism referred to in Chapter 8 is meant to address any weaknesses in the implementation of the models and application of the risk estimates to the currently existing exposures. These weaknesses may include in particular missing or outdated information necessary for the rating assignment in accordance with the model. Institutions should be able to detect and monitor these situations in order to make sure that the risk is reflected correctly, including additional conservatism where necessary. Some examples of the triggers that should lead to increased conservatism in the application of risk parameters are included in Annex II.

Human judgement in the application of risk parameters

The proposed rules for the use of human judgement in the application of risk parameters are based on Article 172(3) of the CRR which allows overriding both inputs and outputs of the assignment process, both in the case of PD and LGD estimates, including EL_{BE} and LGD in-default. In any case, where institutions want to apply the overrides this should be based on an appropriate internal framework to make sure that the weaknesses are identified consistently, that the overrides are applied within certain limits and that they are appropriately justified, approved and monitored. As the large number of overrides may indicate certain weaknesses of the model, institutions should analyse these situations carefully, taking into account the reasons for overrides. Where necessary, such analysis should result in the improvement of the model, for instance by including additional risk drivers, increasing granularity of categorisation or changing the weights of risk drivers, or in the improvement of data collection or data quality management processes.

Chapter 9: Re-development, re-estimation and re-calibration of internal models

This Chapter is providing additional guidance for institutions to formulate triggers for re-development, re-estimation and re-calibration of risk parameters. In order to ensure that the deterioration of the model performance is detected and addressed in a timely manner the draft GL clarify what institutions should consider in their internal frameworks for annual reviews and what should be the minimum scope of analysis that institutions conduct during this annual review. Moreover, institutions are requested to define a cycle for a fundamental review of models depending on the materiality of the models considered.

These reviews should contain an update of the development data set and re-estimation of model components. An example framework specifying potential triggers for redevelopment and re-estimation including specification of follow-up actions can be found in Annex IV.

Chapter 10: Calculation of IRB shortfall or excess

Article 159 of the CRR requires institutions to calculate the difference between from one side credit risk adjustments, additional value adjustments and other own funds reductions and from the other side expected loss amounts for the purpose of own funds recognition. The GL refer to IRB excess where this calculation result in a positive amount, i.e. where provisions are in excess over expected loss, and to IRB shortfall where it results in a negative amount, i.e. there is a shortfall of provisions given the expected loss. It has been clarified in Article 73(h) of the RTS on assessment methodology that this difference should be calculated at an aggregate level separately for the portfolio of defaulted exposures and the portfolio of exposures that are not in default. This separation is necessary in order to ensure that the IRB excess resulting from the calculation performed for the defaulted portfolio are not used to offset IRB shortfall resulting from the calculation performed for the portfolio of exposures that are not in default as prescribed in Article 159 of the CRR. However, the IRB excess from the overall non-defaulted portfolio may be used to cover any IRB shortfall from the overall defaulted portfolio. It is furthermore clarified that if the calculation required by Article 159 of the CRR results in an IRB excess for both the defaulted and non-defaulted portfolio, the limit for adding the overall IRB excess to TIER 2 capital set out in Article 62(d) of the CRR, i.e. up to 0.06% of risk weighted exposure amounts, should be applied to the sum of the two IRB excess.

Annex I – Example of list of triggers for appropriate adjustment and additional MoC

Triggers for appropriate adjustment and additional MoC	Potentially effected parameters	Category
Missing default trigger in historical observations	DR, CureRate, RecoveryRate (EAD),…	A
Estimated date of default (late detection default)	DR, CureRate, RecoveryRate (EAD),…	A
Length of historical default observations (adjustments and MoC according to Chapter 5.4.)	DR, CureRate, RecoveryRate (EAD),…	A
Changes in underwriting standards (Diminished representativeness of historical data to current exposure)	DR, CureRate, RecoveryRate (EAD),…	B
Changes in relevant processes (Diminished representativeness of historical data to current exposure)	DR, CureRate, RecoveryRate (EAD), average workout time, average internal and external intensive care and workout costs,…	B
Changes in legal environment (Diminished representativeness of historical data to current exposure)	All	B
Missing collateral flags in historical cash flows	RecoveryRate (EAD),…	B
Missing data in reference data set for model development (risk drivers and rating criteria)	DR per grade or pool, realized LGD per facility grade	B

Annex II – Example of list of triggers for conservatism in the application of models

Triggers for appropriate adjustment and additional MoC	Potentially effected parameter
Missing data in current portfolio (application)	Single PD-Estimations, RWA
Missing update of financial statement	Single PD-Estimations, RWA
Missing re-rating in current portfolio (application)	Single PD-Estimations, RWA
Missing ratings: Exposure wrongly without rating but in scope of a model	Single PD-Estimations, RWA

Annex III: List of economic indicators to be taken into account for determining the historical observation period for PD estimates for particular exposure classes

Supervisory (sub-) exposure classes		Economic indicators to be taken into account in order to determine the historical observation period for PD estimation
Corporate	SMEs	GDP growth, unemployment rate, interest rates, segmentation by industry sector, default rate, credit losses
	Other corporate	GDP growth, unemployment rate, interest rates, segmentation by industry sector, default rate, credit losses
Retail	SMEs	GDP growth, unemployment rate, industry index, interest rates, branch, default rate, credit losses
	residential mortgages	House prices, GDP growth, unemployment rate, interest rates, tax benefits, region, default rate, credit losses
	QRRE	GDP growth, unemployment rate, interest rates, default rate, credit losses
	other retail exposures	GDP growth, unemployment rate, consumer price index, interest rates, default rate, credit loss

Annex IV – Example of a list of triggers for re-development and re-estimation

Area	Indicator	Trigger	Parameter(s)	Action
Predictive Power	The number of pools or grades does not allow for a meaningful differentiation of risk	[Specification of "meaningful"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The boundaries of pools or grades do not allow for a meaningful differentiation of risk	[Specification of "meaningful"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The pools or grades are not composed of	[Specification of "not	PD where default identification is on	[Short description of action(s) to be taken with

	homogenous groups of obligors	homogenous"]	obligor level	reference to more detailed documentation]
	The pools or grades are not composed of homogenous groups of facilities	[Specification of "not homogenous"]	PD where default identification is on facility level and LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The inclusion of current data more recent than the last calibration would lead to materially different model outcomes	[Specification of "materially"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The realised default rates (either overall or per rating grade) materially differ from the expected ones	[Specification of "materially"]	PD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The realized LGDs (either overall or in a risk bucket) materially differ from the long run average expected one	[Specification of "materially"]	LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The realized LGDs (either overall or in a risk bucket) materially differ from the expected ones under downturn conditions	[Specification of "materially"]	LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	A more recent downturn period has been identified		LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	An undue concentration has been identified in a grade or pool	[Specification of "undue concentration"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
Representativeness & Comparability	The overall exposure rated by the model has significantly increased compared to the sample(s) used for development, estimation or calibration	[Specification of "significantly increased"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The size of the individual facilities (ticket sizes) has changed significantly compared to the sample(s) used for development, estimation	[Specification of "significantly changed"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]

	or calibration			
	The maturity of the individual facilities has changed significantly compared to the sample(s) used for development, estimation or calibration	[Specification of "significantly changed"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The number and/or exposure weighted average PD of the exposures has changed significantly over time	[Specification of "significantly changed"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The shape of the distributions of variables relevant to the model (design) has changed compared to the sample(s) used for development, estimation or calibration	[Specification of "changed"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	A new type of transaction, facility or obligor has been introduced in the scope of the model without requiring the competent authorities' approval		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	A new type of collateral has been introduced in the scope of the model without requiring the competent authorities' approval		LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	A change in default definition has taken place since the time from which the development sample stems from, which affects the obligors or facilities in the scope of the model		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The target portfolio/lending standards have changed for the application portfolio of the model compared to the last initial validation	[Specification of "changed"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The work-out/recovery process of defaulted exposures has changed materially compared to the initial validation	[Specification of "changed materially"]	LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	External market and economic conditions or	[Specification of	PD, LGD	[Short description of action(s) to be taken with

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	other relevant characteristics surrounding the model development have changed materially compared to the time from which the development sample stems from.	"changed materially"]		reference to more detailed documentation]
	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
Data Quality	Quality of data inputs is unsatisfactory	[Specification of "unsatisfactory"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Availability of data inputs is unsatisfactory	[Specification of "unsatisfactory"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Data available to the institution is not entered in the needed systems		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Data is no longer available to the institution		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Data is no longer available in general		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Outdated input data is used for the rating of obligors or facilities	[Specification of "outdated"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Not all defaults are properly recognized		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Not all defaults recognised are completely documented and registered in all appropriate and intended IT systems		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The number of technical defaults is unsatisfactory high	[Specification of "unsatisfactory"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]

	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
Discriminatory Power	The DP of a single risk factor has either fallen materially below the one in the initial validation, the last review or below a fixed threshold	[Specification of "fallen materially"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The DP of a scorecard has either fallen materially below the one in the initial validation, the last review or below a fixed threshold	[Specification of "fallen materially"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The DP of the overall model has either fallen materially below the one in the initial validation, the last review or below a fixed threshold	[Specification of "fallen materially"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	For application models, the DP over the tenor of the loan has either fallen materially below the one in the initial validation, the last review or below a fixed threshold	[Specification of "fallen materially"]	PD	[Short description of action(s) to be taken with reference to more detailed documentation]
	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
Stability	The mean, standard deviation, distribution or extreme values of the risk factors or other relevant input parameters of the model have changed materially over time	[Specification of "changed materially"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The distribution of reasons for obligor defaults has changed materially over time	[Specification of "changed materially"]	PD where default identification is on obligor level	[Short description of action(s) to be taken with reference to more detailed documentation]
	The distribution of reasons for facility defaults has changed materially over time	[Specification of "changed materially"]	PD where default identification is on facility level and LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The structure or number of migrations between grades or pools has changed materially over time	[Specification of "changed materially"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]

	The PIT and TTC characteristics of the assignment to rating grades or pools vary significantly over time	[Specification of "vary materially"]	PD	[Short description of action(s) to be taken with reference to more detailed documentation]
	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
Margin of Conservatism	A model issue identified which requires an MoC does not have one		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Part of the MoC is in place for a model issue deemed to be rectified by the body naming the original issue		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	All or part of the MoC calculation has not been updated		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The overall MoC is materially higher than the one at the time of model approval by the competent authority or than a fixed threshold	[Specification of "materially higher"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
Model Design	The model registry was not complete or lacking in quality		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Deficiencies in model documentation have been identified		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	A situation identified during model development under which the model was considered to perform below expectations or become inadequate has or is expected to occur		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Materially better modelling methods are used in recent developments	[Specification of "materially better"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]

	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
Use Test	The number of overrides is too high or there is a significant increase since the last review	[Specification of "too high" and "significant increase"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Overrides negatively affect the discriminatory power of the model		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The rating outputs are not used in the institution's internal processes		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The re-ratings of obligors or facilities are not performed in a timely manner	[Specification of "in a timely manner"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	There are obligors or facilities that are not rated in the application scope of the model		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
Benchmarking	There is a material difference between the external benchmarks and the internal model outputs	[Specification of "material difference"]	PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
IT Implementation	The IT implementation of the model is not in line with the documentation		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	The data sources and variables/risk factors used for the development are not properly documented with regard to their IT properties		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	Differences between the data used by the model development team and the review responsible		PD, LGD	[Short description of action(s) to be taken with reference to more detailed

	unit have been identified			documentation]
	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]
Compliance with Regulatory Requirements	The model is not compliant with a new or changed regulatory requirement		PD, LGD	[Short description of action(s) to be taken with reference to more detailed documentation]
	[Other indicator(s) identified]	[Specification(s) of trigger(s) for other indicator(s)]	[relevant parameter(s)]	[Short description of action(s) to be taken with reference to more detailed documentation]

3. Draft Guidelines

Draft Guidelines

on PD estimation, LGD estimation and the treatment of defaulted exposures

1. Compliance and reporting obligations

Status of these guidelines

1. This document contains guidelines issued pursuant to Article 16 of Regulation (EU) No 1093/2010[5]. In accordance with Article 16(3) of Regulation (EU) No 1093/2010, competent authorities and financial institutions must make every effort to comply with the guidelines.

2. Guidelines set the EBA view of appropriate supervisory practices within the European System of Financial Supervision or of how Union law should be applied in a particular area. Competent authorities as defined in Article 4(2) of Regulation (EU) No 1093/2010 to whom guidelines apply should comply by incorporating them into their practices as appropriate (e.g. by amending their legal framework or their supervisory processes), including where guidelines are directed primarily at institutions.

Reporting requirements

3. According to Article 16(3) of Regulation (EU) No 1093/2010, competent authorities must notify the EBA as to whether they comply or intend to comply with these guidelines, or otherwise with reasons for non-compliance, by ([dd.mm.yyyy]). In the absence of any notification by this deadline, competent authorities will be considered by the EBA to be non-compliant. Notifications should be sent by submitting the form available on the EBA website to compliance@eba.europa.eu with the reference 'EBA/GL/201x/xx'. Notifications should be submitted by persons with appropriate authority to report compliance on behalf of their competent authorities. Any change in the status of compliance must also be reported to EBA.

4. Notifications will be published on the EBA website, in line with Article 16(3).

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[5] Regulation (EU) No 1093/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Banking Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/78/EC, (OJ L 331, 15.12.2010, p.12).

2. Subject matter, scope and definitions

2.1 Subject matter

5. These guidelines specify the requirements for the estimation of Probability of Default (PD) and Loss Given Default (LGD), including LGD for defaulted exposures (LGD in-default) and Best Estimate of Expected Loss (EL_{BE}) in accordance with Part Three, Title II, Chapter 3, Section 6 of Regulation (EU) No 575/2013 as well as the application of Article 159 of that Regulation.

2.2 Scope of application

6. These guidelines apply in relation to the IRB Approach in accordance with Part Three, Title II, Chapter 3 of Regulation (EU) No 575/2013. Where, for exposures other than retail, an institution received permission to use the IRB Approach but has not received permission to use own estimates of LGD in accordance with Article 143 and 151(8) to (9) of that Regulation, the relevant parts of these guidelines apply, i.e. all parts excluding Chapters 6 and 7.

2.3 Addressees

7. These guidelines are addressed to competent authorities as defined in point (i) of Article 4(2) of Regulation (EU) No 1093/2010 and to financial institutions as defined in Article 4(1) of Regulation No 1093/2010.

2.4 Definitions

8. Unless otherwise specified, terms used and defined in Regulation (EU) No 575/2013 and Directive (EU) 36/2013 have the same meaning in these guidelines. In addition, for the purposes of these guidelines, the following definitions apply:

Risk parameters	One or all of the following: PD, LGD, EL_{BE} and LGD in-default
PD model	All data and methods used as part of a rating system within the meaning of Article 142(1) point (1) of Regulation (EU) No 575/2013, that relate to the differentiation and quantification of own estimates of PD and which are used to assess the default risk for each obligor covered by that model. A PD model can contain several different methods for ranking the obligors as well as different calibration segments.
Ranking method of a PD model	The method used to rank the obligors with respect to the risk of a default.

Scoring method of a PD model	The ranking method which assigns ordinal values ("scores") to rank obligors.
Calibration	For the purpose of quantifying the PD – the process of developing a function ("Calibration Function") that assigns PDs to rating grades or pools in a manner that ensures that these PD estimates correspond to the long run average default rates.
Calibration Segment	A subset of the range of application of the PD model which is uniquely identified via the subset of obligors that are treated with the same methods for the purpose of risk differentiation and that are jointly calibrated.
LGD model	All data and methods used as part of a rating system within the meaning of Article 142(1) point (1) of Regulation (EU) No 575/2013, that relate to the differentiation and quantification of own estimates of LGD, LGD in-default and EL_{BE} and which are used to assess the level of loss in the case of default for each facility covered by that model. An LGD model can contain several different methods, especially with respect to different types of collateral, which are combined to arrive at a LGD or LGD in-default and EL_{BE} for a given facility.
EL_{BE}	Expected loss best estimate for defaulted exposures as referred to in Article 153(1)(ii), Article 154(1)(i), Article 158(5) and Article 181 (1)(h) of Regulation (EU) No 575/2013.
LGD in-default	Loss given default for defaulted exposures as referred to in Article 153(1)(ii), Article 154(1)(i), Article 158(5) and Article 181 (1)(h) of Regulation (EU) No 575/2013.
IRB Shortfall	The difference, if negative, between, on the one hand, general and specific credit risk adjustments, additional value adjustments and other own funds reductions relating to these exposures and, on the other hand, expected loss amount in accordance with Article 159 of Regulation (EU) No 575/2013.
IRB Excess	The difference, if positive, between on the one hand, general and specific credit risk adjustments, additional value adjustments and other own funds reductions relating to these exposures and, on the other hand, expected loss amount in accordance with Article 159 of Regulation (EU) No 575/2013.

3. Implementation

3.1 Date of application

9. These guidelines apply from 1 January 2021. Institutions should incorporate the requirements of these guidelines in their rating systems by that time, but competent authorities may accelerate the timeline of this transition at their discretion.

3.2 First and ongoing application of the Guidelines

10. In order to apply these guidelines for the first time, and subsequently on a continuous basis, institutions should assess and accordingly adjust, where necessary, their rating systems so that the estimates of risk parameters reflect the requirements specified in these guidelines as well as those specified in Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology].

11. The changes referred to in paragraph 10, which are applied to the rating systems as a result of the application of these guidelines, are required to be verified by the internal validation function and classified according to Commission Delegated Regulation (EU) No 529/2014[6], and, depending on this classification, they are required to be notified or approved by the relevant competent authority.

12. Institutions which need to obtain prior permission from competent authorities in accordance with Article 143 of Regulation (EU) No 575/2013 and Regulation (EU) No 529/2014 in order to incorporate these guidelines for the first time by the deadline referred to in paragraph 9, should agree with their competent authorities the final deadline for submitting the application for the approval of changes in the rating systems.

3.3 Repeal

13. Sections [XXX] of the CEBS Guidelines on the implementation, validation and assessment of Advanced Measurement (AMA) and Internal Ratings Based (IRB) Approaches (GL10) published on 4 April 2006 are repealed with effect from 1 January 2021.

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[6] OJ L 148, 20.5.2014, p. 36.

4. General estimation requirements

4.1 Segmentation principles

14. A rating system as referred to in point (1) of Article 142 should cover exposures where the obligors or facilities show common characteristics of credit-worthiness and fundamentally comparable availability of credit related information.

15. Exposures covered by the same rating system should be treated similarly by the institution in terms of risk management, decision making and credit approval process and should be assigned to a common obligor rating scale in accordance with Article 170(1) point (b) of Regulation (EU) No 575/2013 where applicable.

16. For the purpose of estimation of different risk parameters within a rating system, institutions should ensure consistency with respect to the applicable definition of default and of the default observations considered.

4.2 Data requirements

17. In order for the data used as inputs into the model to be accurate as required by Article 174(b) of Regulation (EU) No 575/2013 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.

18. In order for the data used as inputs into the model to be complete as required by Article 174(b) of Regulation (EU) No 575/2013, these data 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.

19. In order for the data used as inputs into the model to be appropriate, as required by Article 174(b) of Regulation (EU) No 575/2013, data should not contain biases which make them unfit-for-purpose.

20. For the purpose of Article 76 of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology] 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 of the data where necessary.

21. The process for vetting data which includes an assessment of the accuracy, completeness and appropriateness of the data, as required by Article 40 of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology] should include in particular all of the following:

(a) 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;

(b) the data merging, where the model is fed with data from multiple data sources;

(c) the rationale and scale of data exclusions broken down by reason for exclusion, using statistics of the share of total data covered by each exclusion, where certain data were excluded from the model development sample;

(d) the procedures for dealing with erroneous and missing data and treatment of outliers and categorical data, and the procedures for ensuring that, where there has been a change in the type of categorization, this did not lead to decreased data quality or structural breaks in the data;

(e) the data transformation, including the standardization and other functional transformations and the procedures for ensuring the appropriateness of those transformations in terms of the risk of model overfitting.

4.3   Human judgement in model development

22. In order for institutions to complement their statistical models with human judgement, as referred to in Articles 172(3), 174(b), 174(e), 175(4), 179(1)(a), 180(1)(d) of Regulation (EU) No 575/2013, they should meet all of the following conditions:

(a) they should in particular assess the modelling assumptions and whether the selected risk drivers contribute to the risk assessment in line with their economic meaning;

(b) they should 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.;

(c) they should document the application of human judgement in the model , include at least the criteria for the assessment, rationale, assumptions, experts involved and description of the process.

4.4   Margin of conservatism ('MoC')

23. In relation to the requirement that institutions should add a margin of conservatism ('MoC') that is related to the expected range of estimation errors as required by Article 179(1) point (f) of Regulation (EU) No 575/2013 and Article 180(1) point (e), institutions should implement a framework, that consists of the phases specified in sections 4.4.1 to 4.4.4.

4.4.1   Identification of deficiencies

24. 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 the following categories:

(a) Category A: Expected range of estimation errors due to data deficiencies;

(b) Category B: Expected range of estimation errors due to diminished representativeness of historical observations;

(c) Category C: General estimation errors including errors stemming from methodological deficiencies;

(d) Category D: Other uncertainties.

25. For the purposes of applying the MoC during the phases of model development, estimation and calibration institutions should consider:

(a) for the errors classified under Category A as referred to in paragraph 24 at least the following triggers:

   (i) missing or materially changed default triggers in historical observations;

   (ii) missing estimated date of default, leading to late default detection;

   (iii) missing or outdated rating information used for the purpose of calculation of default rate per grade or pool;

   (iv) missing or inaccurate information on the source of cash flows;

   (v) missing, inaccurate or outdated data on risk drivers and rating criteria;

   (vi) missing or inaccurate data for the calculation of economic loss;

(b) for the errors classified under Category B as referred to in paragraph 24, at least the following triggers:

   (i) diminished representativeness of the historical observations due to the changes in the definition of default

   (ii) diminished representativeness of the historical observations due to the use of external data

   (iii) diminished representativeness of the historical observations due to changed underwriting standards or recovery policies;

   (iv) diminished representativeness of the historical observations to the current portfolio in terms of the distribution of risk drivers;

(c) for the errors classified under Category C as referred to in paragraph 24, methodological errors not yet rectified, including:

   (i) the rank order estimation error ;

(ii) estimation error in the calibration;

(d) for the errors classified under Category D as referred to in paragraph 24, at least the following triggers:

    (i) changes in the legal environment not covered by the errors included under Category B referred to in paragraph 24;

    (ii) changes in the relevant processes not covered by the errors included under Category B referred to in paragraph 24;

    (iii) estimation error in the long-run averages due to necessary adjustments to comply with Article 179(1)(d), Article 49(3) to (5) and Article 53 of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology];

4.4.2 Quantification of estimation errors

26. In order to overcome estimation errors in PD and LGD estimates stemming from the categories of deficiencies A, B or D, institutions should apply adequate methodologies for correcting the identified errors ('appropriate adjustment'). Institutions should ensure that the appropriate adjustment results in a more accurate estimate of the risk parameter, where this adjustment can have both positive and negative effect on the risk parameter.

27. Where such appropriate adjustments are used institutions should apply a MoC to account for the additional estimation error associated with these adjustments. The MoC related to the economic adjustment should be proportionate to the impact of the adjustment on the risk parameter.

28. Institutions should also apply a MoC to address any errors that have not been corrected via appropriate adjustment and any identified uncertainties. Institutions should ensure that the impact of the MoC does not ever result in lowering PDs or LGDs.

29. Institutions should assess the MoC at the level it is identified but they should reflect and report it with respect to the final risk parameter estimate used for own funds requirements.

30. Any occurrence of any of the triggers referred to in paragraph 25 should result in the application of a MoC. Where more than one trigger occurs, a higher aggregate MoC should be applied. The MoC related to each trigger should be proportionate to the estimation error in the estimated parameter that results from the identified deficiency. Institutions should quantify the estimation error that results from the identified deficiency in order to justify the level of MoC. Institutions should quantify the appropriate adjustment and MoC as defined in paragraphs 26 to 29 at least for every calibration segment.

31. Institutions should provide for a customable IT implementation solution, which ensures that MoC can be implemented in a timely manner.

32. Institutions should consider the overall impact of the identified deficiencies and the resulting MoC on the soundness of the model and ensure that capital requirements are not distorted due to the necessity for excessive adjustments.

4.4.3 Monitoring

33. Institutions should regularly monitor the levels of the appropriate adjustments and MoC. The adoption of a MoC by institutions should not replace the need to address the causes of errors or uncertainties and to correct the models to ensure their full compliance with the requirements of the Regulation (EU) No 575/2013. Following its assessment, institutions should develop a plan to rectify the data and methodological deficiencies and reduce the estimation errors within a reasonable timeline, taking into consideration the materiality of the estimation error and the materiality of the rating system.

34. When reviewing the levels of MoC institutions should ensure all of the following:

    (a) that the MoC stemming from Category A, B and D as referred to in paragraph 24 is reduced over time;

    (b) that the MoC stemming from Categories C as referred to in paragraph 24 is eliminated after the error is rectified in all parts of the rating system that were affected.

4.4.4 Documentation

35. For each rating system, the MoC applied should be documented in the relevant model documentation and methodology manuals. The documentation should at least contain:

    (a) a complete list of all potential and identified deficiencies and the potentially affected model components or risk parameters,

    (b) a description of the methods used to apply appropriate adjustments to rectify the data and methodological errors, where relevant;

    (c) a description of the methods of addressing the deficiencies, including errors and uncertainties, via the application of an MoC;

    (d) the category under which these errors and uncertainties are classified, as referred to in paragraph 24.

Explanatory Box for consultation purposes:

The proposed requirements are based on the assumption that the identified deficiencies in data or methods should be addressed via appropriate adjustment (where applicable) and margin of conservatism:

- Appropriate adjustment consists in rectifying the identified errors, for instance missing data points are filled in with the most probable information or the inaccuracies in data are corrected. The objective of the appropriate adjustment is to achieve the possibly most accurate estimates. The impact of the appropriate adjustment may be either positive or negative depending on the character of the specified deficiency.

- Margin of conservatism aims at addressing all errors that cannot be rectified through appropriate adjustment and any other uncertainties related to the estimation of risk parameters. In addition to that, additional MoC has to address the additional uncertainty related to the application of appropriate adjustment, as the adjustment is only an approximation of the actual events or characteristics. MoC cannot lead to decrease in the estimates

It is required by Article 179(1)(f) of Regulation (EU) 575/2013 that margin of conservatism, related to the expected range of estimation errors, shall be added to the estimates of risk parameters. It is therefore clarified in the draft Guidelines that institutions should be able to calculate and report the exact impact of the MoC at the level of risk parameters even if it is identified at earlier stages of the estimation.

The Guidelines do not prescribe any specific method for the quantification of MoC as the appropriate approach will depend on the character of the deficiency and the available data. However, institutions should keep in mind that model aspects that appear conservative in one model may not be truly conservative compared with alternative methods. For example, simply picking an extreme point on a given modelled distribution may not be conservative if the distribution was misestimated or misspecified in the first place. Furthermore, initially conservative assumptions may not remain conservative over time. Therefore, it is expected that the methods applied to derive the MoC will be regularly revised in order to ensure that the effect on the risk parameters is adequate and proportionate to the estimation error related to the identified deficiencies.

Question 4.1: Do you agree with the proposed requirement with regard to the application of appropriate adjustments and margin of conservatism? Do you have any operational concern with respect to the proposed categorization?

5. PD estimation

5.1 General requirements specific to PD estimation

36. In order for the input variables into a PD-Model to form a reasonable and effective basis for the resulting predictions, in accordance with Article 174(a) of Regulation (EU) No 575/2013, the PD-Model should cover exposures where the obligors show common drivers of risk and fundamentally comparable availability of credit-related information.

37. Exposures covered by one PD Model should be managed homogeneously by the institution in terms of risk management, decision making and credit approval process.

38. For the purpose of assigning obligors to an obligor grade as part of the credit approval process in accordance with Article 172(1)(a) of Regulation (EU) 575/2013 as well as for the purpose of annual review of those assignments, in accordance with Article 173(1)(b) and (2) of that Regulation, 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 and fitting to the single original obligor, including where there is unfunded credit protection as referred to in Article 161(3) of that Regulation.

39. In the application of the rating model for PD, institutions should ensure that where an institution receives new information with respect to a relevant risk driver or rating criterion, this information is taken into account in the rating calculation in a timely manner. In particular,

    (a) if this information has to be updated in the relevant IT systems, a resulting review of the rating assignment should not be made later than 3 months after the information becomes available.

    (b) in case of retail exposures where the new information is available in other IT-Systems, these should be taken into account in the next rating review.

    (c) in case of a default of an obligor the PD of the obligor should be set to 1 in a timely manner in all relevant IT-Systems;

5.2 Data requirements specific to PD estimation

5.2.1 Data requirements for default rate calculation

40. For the purpose of calculating the default rate defined in Article 4(78) of Regulation (EU) No 575/2013, institutions should ensure the completeness of the quantitative and qualitative data and other information in relation to the denominator and numerator as outlined in paragraph 48 and 49 used for the calculation of the observed average default rate, and more

in particular that at least the following data is properly stored and available for the relevant observation period referred to in paragraphs 59 to 61:

(a) the criteria for identifying the relevant type of exposures covered by the PD model under consideration;

(b) the risk drivers used for risk differentiation according to the rating method considered for the purpose of calculating the long-run average default rate per grade or pool. Where a newly relevant risk driver has been included into the model for which no historical data is available, an appropriate adjustment and MoC should be applied. As outlined in paragraph 34(a) institutions should make efforts to minimise, over time, the share of ratings where a considered risk driver is missing;

(c) all identification numbers ('IDs') relevant for default rate calculation, in particular where the ID has changed due to a restructuring.

41. Exclusion of observations from the default rate calculation should be done exclusively in the following two situations:

(a) obligors wrongly included in the data set of defaults and which did not default with the meaning of default as specified in the Guidelines on the definition of default of an obligor as referred to in Article 178 (7) of Regulation (EU) No 575/2013 should not be included in the numerator;

(b) obligors wrongly assigned to the considered rating model , because they are not falling in the range of application of that rating model, should be excluded from the numerator and the denominator.

42. Institutions should document all data cleansing in accordance with Article 32 (3) (b) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology], with respect to the default rate calculation and in particular include:

(d) for non-retail rating models, a list of all observations that were excluded according to the previous paragraph, with a case by case justification;

(e) for retail rating models, information on the reasons and quantity of exclusions of observations made in accordance with the previous paragraph.

43. Institutions should ensure consistency between the data sets deriving from different data sources used for the calculation of the observed average default rate, particularly with regard to the default definition and the treatment of multiple defaults.

5.2.2 Data requirements for the reference data set for the purpose of model development

44. Institutions should provide for sound processes and sophisticated methods so as to either take into account or compensate with the addition of MoC, of all of the following when constructing the reference data set for the purpose of model development:

(a) unsatisfactory quality of data;

(b) lack of homogeneous pools of exposures;

(c) changes in business processes, the economic or legal environment;

(d) other factors relating to the quality of data that may affect the performance of the PD-model.

45. With regard to the representativeness requirement of Article 174 point (c) of Regulation (EU) No 575/2013 institutions should ensure all of the following:

(a) that representativeness applies to both statistical models and other mechanical methods used to assign exposures to grades or pools, and to statistical default prediction models generating default probability estimates for individual obligors or facilities;

(b) that the same approach with regard to representativeness in the sense of Article 174 point (c) of Regulation (EU) No 575/2013   applies regardless of whether the data is internal, external, or consists of pooled data sets, or a combination of the above;

(c) that, for the purpose of analysing the representativeness of the sample with respect to the current population covered by the considered model, all quantitative and qualitative obligor and facility characteristics that could relate to default for PD estimation should be anaysed, and more in particular all of the following:

   (i) the comparability of the underwriting and recovery standards with the ones applied at the time of the reference data set used for the modelling;

   (ii) where there are more than one sets of the same obligor or facility characteristic, a mapping from one set of characteristics to the other should be applied.

   (iii) the distribution of the current population and the sample according to the key characteristics and the level and range of these key characteristics. Material observed differences in the key characteristics should be avoided, for example by using another sample;

(d) that where applicable, statistical methodologies such as cluster analysis or related techniques should be used to demonstrate representativeness;

(e) that the definition of default is consistent over time in the data used for the modelling, and more in particular:

   (i) that adjustments have been made to achieve consistency with the current default definition where the default definition has been changed during the observation period;

(ii) that adequate measures have been adopted by the institution, where the model covers exposures in several jurisdictions having or having had different default definitions;

(iii) that the default definition used for the purposes of model development does not have a negative impact on the structure and performance of the rating model, in terms of risk differentiation and predictive power, where this definition is different from the definition of default used by the institution in accordance with Article 178 of Regulation (EU) 575/2013;

(f) that external data or data pooled across institutions for the institution's exposures, products and risk profile are relevant and adequate, where such data is used in the model development.

46. Representativeness for the assignment of obligors or facilities does not require that the proportion of defaulted and non-defaulted exposures in the development data set be equal to the proportion of defaulted and non-defaulted exposures in the institution's respective portfolio.

47. It should be ensured that the reference data set contains the values of the risk drivers for appropriate points in time. These points in time may vary between different risk drivers. In the selection of appropriate points in time the institution should take into account the dynamics of the risk drivers throughout the whole period in which an obligor was in the portfolio and, in the case of a default, especially throughout the year prior default. For example an institution may base its reference data set on monthly snapshots of the portfolio considered over the whole historical observation period.

5.3 Observed default rates

5.3.1 Calculation of the one-year default rate

48. For the purpose of calculating the one-year default rate as referred to in Article 4 (1) point (78) of Regulation (EU) No 575/2013, both of the following should apply:

(a) the denominator should consist of the number of non-defaulted obligors observed at the beginning of the one-year observation period with any credit obligation. In this context a credit obligation refers to any amount of principal, interest and fees as well as to any off-balance sheet items including guarantees.

(b) the numerator should include all obligors considered in the denominator with at least one default event during the one-year observation period.

49. Where the one-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, taking into account overrides, but excluding any substitution effects due to credit risk mitigation, as well as any ex-post conservative adjustments.

50. Institutions should calculate the one-year default rate 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'). Obligors whose ratings are based on missing or partly missing information or where the rating is outdated but still deemed valid by the institution should not be considered as missing ratings.

51. For the avoidance of doubt with regard to paragraphs 48 to 50 an obligor has to be included into the denominator, and numerator as well, if relevant, also in case of a migration to a different rating grade, pool or rating model, rating system or approach to calculation of capital requirements within the observation period or where the corresponding credit obligations were sold during the observation period. Institutions should analyse whether such migrations bias the default rate and if so reflect this in an appropriate adjustment and consider such bias in their determination of an appropriate margin of conservatism.

52. In cases where there is a significant proportion of customers carrying multiple facilities within a considered Retail rating system and the institution identifies defaults at the level of an individual credit facility institutions should ensure that the estimates are not biased due to the multiple facilities.

53. In order to monitor the appropriateness of the PD estimates, institutions should calculate the one-year default rates at least quarterly.

Question 5.1: Do you see any operational limitations with respect to the monitoring requirement proposed in paragraph 53?

5.3.2   Calculation of the observed average default rate

54. The observed average of one-year default rates ('observed average default rate') should be calculated per rating grade or pool and should additionally be calculated for the portfolio covered with the according PD Model as well as for any relevant calibration segment.

55. Institutions should document the considerations for the chosen approach to calculating the observed average default rate. This documentation should include :

    (a) for institutions using overlapping one-year time windows, an analysis of a potentially significant bias that occurs due to implicit down weighting of defaults that occurred in the first and last time slice;

    (b) for institutions using non-overlapping one-year time windows, an analysis of a potentially significant bias due to seasonal effect related to the chosen calculation date.

56. For the purpose of choosing an appropriate approach for calculating the observed average default rate institutions should analyse among others at least both of the following:

(a) the share of short term and terminated contracts that cannot be observed during the whole observation period, which might bias the default rate;

(b) the possible bias due to specific reporting dates chosen.

57. For the purpose of paragraphs 55 and 56, institutions should apply an economic adjustment and an appropriate MoC, where applicable.

58. For the purpose of calculating the observed average default rate the defaults are not to be weighted but each to be counted as 1.

Explanatory box for consultation purposes:

Observed average default rate:

1)   Non-overlapping windows

Let M be the set of relevant years for calculating the observed average default rate and let DR(i) denote the one-year default rate in year i. The observed average default rate ODR when calculated via an arithmetic average is given as

$ODR = \frac{1}{N}\sum_{i=1}^{N} DR(i)$, *where $i = 1, ..., N$ denote the elements of M, which are usually assumed to be consecutive, non-overlapping years. Thus the default rates $DR(1), ..., DR(N)$ are calculated yearly with respect to a certain reference date T_i.*

The observed average default rate which is calculated according to this method could be biased due to the choice of fixed reference dates T_i. This means in particular that the representativeness of these default rates could be questioned since choosing certain dates could lower the observed average default rate und thus lead to lower capital requirements.

2)   Overlapping windows

Assume that an institution calculates the one-year default rate with a monthly frequency. Now for calculating the observed average default rate using overlapping windows the following applies:

$ODR = \frac{1}{j}\sum_{i=1}^{j} DR(i)$, *where $i = 1 ... j = 12N$ denote the $12N$ month of N considered consecutive years.*

The observed average default rate which is calculated according to this method could be biased due to the implicit down weighting of the defaults in the initial and latest one-year time windows of the historical observation period, i.e. defaults which occur in the middle of the observation period are counted 12 times whereas defaults which occur in the first or last year are counted only 1-11 times.

Question 5.2: Do you agree with the proposed policy for calculating observed average default rates? How do you treat short term contracts in this regard?

5.4   Long-run average default rate

59. For the purpose of determining the historical observation period referred to in Article 180(1)(h) and 180(2)(e) of Regulation (EU) No 575/2013, additional observations to the most

recent 5 years, at the time of model calibration, should be considered as relevant when these observations are representative of the likely range of variability of default rates of that type of exposures as referred to in Article 49(3) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology].

60. When the historical observation period as referred to in paragraph 59 is representative of the likely range of variability of default rates, then the long-run average default rate should be computed as the observed average of the one-year default rates in that period.

61. For the purpose of assessing the representativeness of historical observation period as referred to in paragraph 59 for the likely range of variability of one-year-default rates, institutions should take into account all of the following:

(a) the variability of all observed one-year-default rates;

(b) the existence or lack of one-year default rates relating to downturn periods as reflected by economic indicators that are relevant for the considered type of exposure within the historical observation period;

(c) significant changes in the economic, legal or business environment within the historical observation period.

62. In case the historical observation period is not representative of the likely range of variability of one year default rates in order to comply with Article 49(4) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology] the average of observed one year default rates should be adjusted in order to estimate a long-run average default rate, in particular where no downturn period is included in the historical observation period.

63. In case that the long-run average default rate does not equal the average of all observed one year default rates, institutions should compare their adjusted long-run average default rates to the maximum between:

(a) the observed average of the one-year default rates of the most recent 5 years and

(b) the observed average of all available one-year default rates

and where the adjusted long-run average default rate is lower than that maximum institutions should justify the direction and magnitude of the adjustment, including the adequacy of the considered margin of conservatism, where applicable.

Explanatory box for consultation purposes:

Relevant observation period:

The current approach requires that institutions analyse, for the purpose of determining the relevant historical observation period, whether a downturn period is included in the available observation period or not. For this purpose institutions should analyse the sensitivity of the level

and volatility of observed defaults within a rating system to economic indicators, considering economy as a whole, as well as addressing more specific (e.g., industry) cycles. A non-exhaustive list of economic indicators that should be taken into account for this purpose is attached in Annex III of the background and rationale section.

Moreover, in case a downturn period is contained in the available observation period, institutions may in order to estimate the long-run average default rate estimate an adjustment to the observed average default rate if it does not reflect an appropriate mix of favorable and unfavorable economic conditions, which would be the case for example if the available observation period would cover mainly downturn or mainly good years. Institutions should in any case adjust the observed average default rate if the default rates are sensitive to the economic indicators and no downturn is contained in the available observation period.

Other adjustments may, however in specific cases, be necessary in order to comply with Article 179(1)(d) of Regulation (EU) No 575/2013. It should be noted that the benchmark also applies in this cases. Including such specific cases into the GL has been discussed as well, in particular where downward adjustments to the average of observed one-year default rates would be justified. In this regard, sustained tightening of underwriting standards, changed relevant legislation, changed business environment, mergers & acquisitions and changes of internal processes have been mentioned.

Question 5.3: Are the requirements on determining the relevant historical observation periods sufficiently clear? Which adjustments (downward or upward), and due to which reasons, are currently applied to the average of observed default rates in order to estimate the long-run average default rate? If possible, please order those adjustments by materiality in terms of RWA.

5.5 PD estimation methodologies

5.5.1 Risk drivers and rating criteria

64. In the process of selecting risk drivers and rating criteria, institution should consider a broad scope of information, including obligor characteristics, for example sector and geographic location for corporates, financial statements as well as trend and behavioral information. Relevant trend information could for example include growing or shrinking sales or profit margin and relevant behavioural information could for example include the use of overdrafts if applicable.

65. Institutions should ensure that for the purpose of selecting risk drivers and rating criteria the relevant business experts are consulted with respect to the business rationale and risk contribution of the considered risk drivers and rating criteria.

66. Institutions should ensure that the loss of information value over time for generally static information, for instance the information on obligor characteristics at the time of the loan application, is appropriately reflected. It has to be ensured that the model estimates the

proper level of risk with respect to all relevant, currently available and most up-to-date information and that an appropriate MoC is applied where a higher degree of uncertainty is probable due to the lack of up-to-date information. In particular the model or the assignment process should provide adequate and conservative adjustment in both of the following situations:

(a) in accordance with Article 24(1)(g) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology], in case of financial statements older than 24 months where information stemming from these financial statements are relevant risk drivers

(b) in case of credit bureau information older than 24 month, if still relevant at that point in time, where credit bureau information is a relevant risk driver.

67. Institutions should ensure that the risk drivers and rating criteria are used consistently, in particular with respect to the considered time horizon, in model development, model calibration and model application.

5.5.2 Ratings in PD estimation

68. Institutions should have clear policies specifying the triggers resulting from the contractual relation between a third counterparty ('connected client') and the considered obligor that lead to each of the following outcomes:

(a) triggers resulting in the rating of that connected client being transferred to a considered obligor due to CRM substitution ('rating transfer'), according to Article 161(3) of Regulation (EU) No 575/2013;

(b) triggers resulting in a rating of a connected client being taken into account either as indication for an override of the individual PD estimate of the considered obligor;

(c) triggers resulting in a rating of a connected client serving as input to the PD model ('a support').

69. In the course of establishing the policies referred to in the previous sub-paragraph, institutions should take into account paragraphs 70 to 74.

70. In order for an internal or external rating of connected clients to be incorporated into a statistical model, the rating should comply with all of the following:

(a) it should fulfil all the requirements for relevant risk drivers laid down in section 5.5.1;

(b) the weighting in the statistical model should be purely statistically based;

(c) institutions should ensure that other relevant obligor and transaction risk characteristics are properly reflected in the model in accordance with Article 170(1) point (a) and Article

170(3) point (a) of Regulation (EU) No 575/2013 and that no material biases are introduced by a high weighting of the internal or external rating information.

71. An internal IRB rating for a connected client may be incorporated in the non-statistical part of the PD model or through the use of overrides, if not already incorporated in the statistical part.

72. 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. Rating transfers should be set up in such a way that any changes to a rating of a connected obligor which is material information on the obligor or exposure with regard to Article 173(1) point (b) of Regulation (EU) No 575/2013 is reflected in all influenced ratings in a timely manner.

73. An institution's policy should prevent inappropriate double counting of a contractual relation to a connected client or group of connected clients.

74. The possible support of one obligor to another should be seen as diminishing the free financial strength of the supporting obligor, including the strength to repay all obligations to the institution in full without recourse, irrespective of the rating transfer method chosen. This should be reflected in the rating of the supporting obligor.

5.5.3 Design of grades or pools

75. 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 through a combination of:

(a) migrations across risk grades;

(b) changes in the yearly default rates of each grade.

76. Where the rating assignment process is highly sensitive to the economic conditions, grades assignment will change significantly, while default rates of each grade will re-main relatively stable. In contrast, when the assignment is less sensitive to the economic conditions, the yearly default rates per grade component will capture the cyclicality of the global default rate.

77. 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;

78. Institutions should decide the philosophy underlying the grade or pool assignment, and specifically the risk drivers. However,

(a) the choice of rating philosophy should be applied consistently over time;

(b) Institutions should assess whether the method used to quantify the risk parameter is adequate for the philosophy underlying the grade or pool assignment and understand the characteristics and dynamics, of the ratings and of the risk parameter estimates that result from the method used.

(c) Institutions should assess the adequacy of the resulting characteristics and dynamics, of the ratings and risk parameter estimates that result from the method used, with regard to their different uses and should understand their impact on the dynamics and volatility of capital requirements.

(d) The rating philosophy must also be taken into account for back testing purposes. Sensitive philosophies tend to estimate PDs which are better predictors of each year's DR. On the other hand, more insensitive philosophies tend to estimate PDs which are closer to the average PD across the different states of the economy, but that differ from observed DRs in years where the state of the economy is above or below its average. Deviations between observed default rates and the average will hence be more frequent in rating system less sensitive to the cycle. On the contrary, migrations among grades will be more frequent in rating system more sensitive to the cycle. These patterns have to be taken into account when analysing back-testing results. They shall also be accounted for in benchmarking analysis.

79. When an institution uses different rating systems characterised by different philosophies, care should be taken in the use of information, either for rating assignments or estimates, from another, internal or external, rating system that has a different rating philosophy. An example is the use of rating information or default experience obtained from rating agencies. When an institution uses different rating systems with different characteristics, for example different philosophies, levels of objectivity, accuracy, stability, or conservatism, it should ensure that they have an appropriate level of consistency and/or that the differences between them are well understood. This understanding should at least enable the institution to define an appropriate way to combine/aggregate the information produced by the different rating systems when this is necessary. The assumptions and potential inaccuracies arising from such a combination/aggregation should be fully understood.

Explanatory box for consultation purposes:

RWA variability stemming from different rating philosophies

Different rating philosophies is listed as a potential driver of unjustified RWA variability across institutions in several analysis conducted e.g. by the IIF and EBA. It is, however due to a lack in common terminology and measures to specify different rating methodologies up to now not possible to prove or disprove that the differences in rating philosophy necessarily lead to RWA variability.

The analysis of migration matrices is probably the most straightforward tool in order to observe the dynamics of a rating system. The migration matrix of a model which is insensitive to economic

conditions would tend to be symmetrical independently of the state of the economy, while that of a sensitive model will tend to be biased toward upgrades or downgrades depending on the state of the economy.

The evolution of default rates at grade level and portfolio level can also be used in order to analyse rating dynamics: sensitive ratings would show significantly less dynamics due to the economic environment at grades' DRs than would show at portfolio level, while insensitive ratings would tend to show similar dynamics both at portfolio and grade level. Thus the qualitative survey aims to gather information on this topic and asks a number of related questions.

Question 5.4: **How do you take economic conditions into account in the design of your rating systems, in particular in terms of:**

a. **definition of risk drivers,**
b. **definition of the number of grades**
c. **definition of the long-run average of default rates?**

Question 5.5: Do you have processes in place to monitor the rating philosophy over time? If yes, please describe them.

Question 5.6: Do you have different rating philosophy approaches to different types of exposures? If yes, please describe them.

Question 5.7: Would you expect that benchmarks for number of pools and grades and maximum PD levels (e.g. for exposures that are not sensitive to the economic cycle) could reduce unjustified variability?

5.5.4 Calibration

80. Institutions should have sound and well-defined processes in place to ensure that accurate and robust PD estimates are assigned to grades or pools of obligors or facilities. Institutions should ensure a sound calibration by including the following in their calibration process:

(a) quantitative calibration tests by rating grade or pool;

(b) where applicable, quantitative calibration tests on calibration segment level;

(c) supplementary qualitative analyses such as expert judgements on the shape of the resulting obligor distribution, minimum obligor numbers per grade and avoidance of undue concentration in the different grades or pools.

(d) institutions should describe and store the calibration sample associated with each calibration segment. The calibration sample should be comparable to the current portfolio in terms of obligor and transaction characteristics but should reflect at the same time the likely range of variability as referred to in section 5.4 in order to ensure compliance with Article 180(1) point (a) of Regulation (EU) No 575/2013.

81. Institutions should conduct the calibration before the application of MoC or PD-Floors.

82. For the purpose of determining the PD estimates by obligor grade or pool as referred to in Article 180(1) point (a) and (2) point (a) of Regulation (EU) No 575/2013

the long-run average default rates estimated according to Chapter 4 should be used as calibration target for each grade and pool in each calibration segment;

Explanatory box for consultation purposes:

Example for multiple calibration segments

An example for a calibration segment that doesn't coincide with the range of application of a rating system is briefly given in the following:

Consider a scoring rating system for large and international companies. This rating system aggregates is the combination of a quantitative scorecard and a qualitative scorecard. Whereas the data for the quantitative scorecard is coming from the balance of the company, the input for the qualitative data is based on the analyst's assessment of the company in question. The aggregated scores of these scorecards is finally calibrated to a PD applying the function $PD(\text{Score}) = \frac{1}{1+e^{-(\alpha*\text{Score}+\beta)}}$ for model parameters α and β.

Whereas these quantitative and qualitative risk drivers may apply universally for all institutions in the world, it could be argued that companies located in emerging markets could have a different level of default rates in comparison with companies in Europe or North America.

Following this argumentation, it is in principle possible to apply a different calibration (in this example: different values for α and β) to companies in emerging markets. This would result in two different calibration segments: "Companies from Emerging Markets" and "Companies from Developed Markets". Clearly these two calibration segments form a partition of the range of application of the rating system.

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83. Where institutions derive PD estimates from realised losses and appropriate estimates of LGDs in accordance with Article 161(2) and 180(2)(b) of Regulation (EU) No 575/2013 they should use a RDS that includes realised losses on all defaults identified during the historical observation period specified in accordance with section 6.4.1 and relevant drivers of loss.

84. In order to use direct PD estimates for the calculation of capital requirements in accordance with Article 169(3) of Regulation (EU) No 575/2013, institutions should demonstrate that the theoretical assumptions of the probability model underlying the estimation methodology are satisfied to a sufficient extent in practice.

85. When using the approach of using direct PD estimates for the calculation of capital requirements in accordance with Article 169(3) of Regulation (EU) No 575/2013, institutions may apply either of the following methods:

(a) calculate the long-run averages of one-year default rates required in Article 180(1) point (a), (2) point (a) of Regulation (EU) No 575/2013 at a level other than obligor grade that is appropriate for the application of the probability model;

(b) instead of explicitly calculating default rates, they 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.

86. Whichever of the methods referred to in paragraph 85 an institution uses, all requirements for the long-run averages of one-year default rates should then apply to the long-run averages of one-year default rates calculated explicitly at the respective level, or, *mutatis mutandis*, to the implicit incorporation of long-run one-year default information in the model estimation. In particular, all data and representativeness requirements, including those in accordance with Article 174 point (c) of Regulation (EU) No 575/2013, have to be met, and the default definition in accordance with Article 178 of Regulation (EU) No 575/2013 has to be used at the level at which the long-run one-year default information is incorporated for PD estimation purposes. Under no circumstances can the use of continuous PDs or any default rates smoothening be performed in order to overcome lack of data, low discriminatory capacity or any other deficiencies in the rating or PD estimation process, or in order to reduce the capital requirements.

87. Where institutions use segmentation drivers in the calibration process that define subsets of the range of application of a given rating model where the same ranking model is applied as in other subsets but each subset carries a significantly different level of risk from them, all of the following should apply:

(a) more than one calibration in a given rating system should be used, where appropriate;

(b) the range of application of a PD model should be partitioned by as many calibration segments as needed to obtain homogeneous calibration segments;

(c) the model should be calibrated separately for each calibration segment;

(d) the use of several calibration segments should be well documented.

88. Where scoring models are used, institutions should ensure that:

(a) where there is a change in the models used, the institutions consider whether it is necessary to recalculate scores of obligors or facilities based on the original data set instead of using scores that were calculated based on previous versions of the rating system, and, where this is not possible, that institutions assess potential effects and consider those effects by an appropriate increase of the MOC to their PD estimates;

(b) in the course of model adjustment the rank ordering is done in the score assignment and that the calibration does not change that rank order;

(c) where Article 180(2) point (g) or Article 180(1) point (g) of Regulation (EU) No 575/2013 apply, that PD estimates are adequate for grades which were derived as a simple average of individual PD estimates, by applying calibration tests to this estimates on the basis of one-year-default rates representative of the likely range of variability.

6. LGD estimation

6.1 General requirements for LGD estimation

89. Institutions that have obtained permission to use own estimates of LGD in accordance with Article 143(2) of Regulation (EU) No 575/2013 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. 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. For the purpose of LGD estimation institutions should treat each defaulted facility as a distinct default observation, unless more than one independent defaults were recognised on a single facility that do not meet the conditions of paragraph 90.

90. For the purpose of LGD estimation institutions should 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 case. Institutions may specify a longer period than one year for the purpose of 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.

91. Institutions should 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. In particular, institutions should not derive their LGD estimates only from the market prices of financial instruments, including, but not limited to, marketable loans, bonds or credit default instruments, but they may use this information to supplement their own historical data.

92. Where in the case of retail exposures and purchased corporate receivables institutions derive LGD estimates from realised losses and appropriate estimates of PDs in accordance with Articles 161(2) and 181(2)(a) of Regulation (EU) 575/2013 they should ensure that:

   (a) the process for estimating total losses meet the requirements of Article 179 of Regulation (EU) 575/2013 and the outcome is consistent with the concept of LGD as set out in Article 181(1)(a) of this Regulation as well as with the requirements specified in Chapter 6, in particular with the concept of economic loss as specified in section 6.3;

   (b) the process for estimating PD meets the requirements of Articles 179 and 180 of Regulation (EU) 575/2013 as well as the requirements specified in Chapter 5.

6.2 Data requirements for LGD estimation

6.2.1 Reference Data Set

93. For the purpose of LGD estimation institutions should use a Reference Data Set (RDS) covering all of the following items:

    (a) all defaults identified during the historical observation period specified in accordance with section 6.4.1;

    (b) all necessary data for calculating realised LGDs in accordance with paragraphs 112 to126;

    (c) relevant factors that can be used to group the defaulted exposures in meaningful ways, including their values at the moment of default and at least within the year before default when available;

    (d) relevant drivers of loss, including their values at the moment of default and at least within the year before default when available.

94. Institutions should include in the RDS information on the results of the recovery processes, including recoveries and costs, related to each individual defaulted exposure. To this end institutions should include:

    (a) information on the results of incomplete recovery processes until the reference date for the LGD estimation.

    (b) information on the results of recovery processes at portfolio level, where such aggregation of the information is justified in particular in the case of indirect costs and sale of a portfolio of credit obligations. When aggregated information is collected and stored, institutions should develop an appropriate methodology for the allocation of recoveries and costs to individual defaulted exposures and should apply this methodology consistently across exposures and over time, ensuring, to the satisfaction of the competent authority, that the methodology does not lead to biased LGD estimates.

    (c) Information on external or pooled data used in the estimation of LGDs.

95. The RDS should contain at least the following information:

    (a) obligor-related, transaction-related and institution-related risk characteristics as well as external factors as referred to in paragraph 142 that are potential risk drivers at the relevant reference dates as specified in paragraph 143;

    (b) moment (date) of default;

    (c) all default triggers that have occurred, including past due events and unlikeness to pay events, even after the identification of default; in the case of exposures subject to

distressed restructuring the amount by which the financial obligation has diminished calculated in accordance with the EBA Guidelines on the definition of default;

(d) the outstanding amount of the exposure at the moment of default including principal, interest and fees;

(e) the amounts and timing of interest and fees capitalised after the moment of default;

(f) the amounts and timing of the additional drawings after default;

(g) the amounts and timing of write-offs;

(h) the values of collaterals associated with the exposure and, where applicable, the type of valuation (such as market value or mortgage lending value as defined in points (74) and (76) of Article 4(1) of Regulation (EU) 575/2013), date of valuation, a flag whether the collateral has been sold and the sale price;

(i) information on any dependence between the risk of the obligor and the risk of the collateral or collateral provider;

(j) the types, amounts and maturities of unfunded credit protection including the specification and credit quality of the protection provider;

(k) the amounts, timing and sources of recoveries;

(l) the amounts, timing and sources of direct costs associated with recovery processes;

(m) a clear identification of the type of termination of the recovery process;

(n) where applicable, currency mismatches between two or more of the following elements: the currency unit used by the institution for financial statements, the underlying obligation and the funded or unfunded credit protection;

(o) amount of realised loss.

96. Institutions should collect and store in the RDS the information on the most recent evaluation of the collateral before the moment of default except where the most recent evaluation was performed shortly before default and was triggered by the decreased credit quality of the obligation. In that case the previous evaluation from before the decrease of credit quality of the obligation should be collected and stored in the RDS and used for the purpose of LGD estimation in accordance with section 6.6.2.

97. In accordance with Article 229(1) of Regulation (EU) 575/2013 institutions may use various methods for the valuation of the collateral in the form of immovable property including in particular market value or mortgage lending value as defined in points (74) and (76) of Article 4(1) of that Regulation. Where institutions use various valuation approaches with regard to

immovable properties that secure exposures included in the scope of application of the relevant rating system, they should collect and store in the RDS the information on the type of valuation and use this information consistently in the LGD estimation and in the use of LGD estimates.

98. Where institutions derive LGD estimates from realised losses and appropriate estimates of PDs in accordance with Articles 161(2) and 181(2)(a) of Regulation (EU) 575/2013 they should use a RDS that includes realised losses on all defaults identified during the historical observation period specified in accordance with section 6.4.1 and relevant drivers of loss.

6.2.2   Representativeness of data

99. 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. Such analysis should be performed separately for internal and external data as well as for data from different sources.

100.   Institutions should analyse the representativeness of the data referred to in Article 179(1)(d) of Regulation (EU) No 575/2013 in all of the following manners:

(a) in terms of the scope of application;

(b) in terms of the definition of default;

(c) in terms of the distribution of the relevant risk drivers;

(d) in terms of lending standards and recovery policies;

(e) in terms of current and foreseeable economic or market conditions.

101.   For the purpose of paragraph 100(a) institutions should analyse the segmentation of exposures into rating systems and should in particular consider whether there were any changes to the scope of application of the LGD model over the historical observation period. Where such changes were observed institutions should compare the distribution of the characteristics of the relevant risk drivers in the RDS before and after the change.

102.   For the purpose of paragraph 100(b) institutions should analyse the definition of default applied by the institution to the rating system currently and over the historical observation period. In the case the definition of default has changed during the historical observation period institutions should assess the representativeness of historical data included in the RDS in the same way as specified for external data in Chapter 6 of EBA Guidelines on the application of the definition of default under Article 178 of Regulation (EU) No 575/2013. In the case the definition of default has changed during the historical observation period more than once institutions should perform the analysis of each of the past definitions of default separately.

103.	For the purpose of paragraph 100(c) institutions should analyse the distribution of the characteristics of the relevant risk drivers in the RDS in comparison to the distribution of such characteristics in the current portfolio of exposures that are within the scope of the rating system. Institutions should perform such analysis separately for non-defaulted and defaulted exposures in accordance with the following principles:

(a) In analysing representativeness of the RDS to the current portfolio of non-defaulted exposures institutions should take into account the current characteristics of the risk drivers at the moment of LGD estimation;

(b) In analysing representativeness of the RDS to the current portfolio of defaulted exposures institutions should take into account the characteristics of the risk drivers at the relevant reference date for each risk driver as specified in paragraph 143.

104.	Institutions should specify in their internal policies the statistical tests and metrics that are used for the purpose of assessment of the representativeness of the data in terms of the structure of the portfolio by relevant risk drivers. Where the application of statistical tests is not possible institutions should at least carry out a qualitative analysis on the basis of the descriptive statistics of the structure of the portfolio and present it in a graphic form. In the analysis institutions should take into account possible seasoning effects of the relevant risk drivers. When considering the results of the analysis institutions should take into account the sensitivity of the risk drivers to economic conditions and the composition of portfolios of defaulted and non-defaulted exposures.

105.	For the purpose of paragraph 100(d) institutions should analyse whether there were significant changes in the lending standards or recovery policies over the historical observation period that may influence the average loss rates or the distribution of the characteristics of relevant risk drivers in the portfolio covered by the rating system. Where institutions observe such changes they should compare the data included in the RDS before and after the change of the policy with regard to average duration of the recovery processes, frequency of use of certain recovery scenarios as well the loss severity distribution.

106.	Where during the historical observation period there were significant changes in the relevant legal environment, such as changes in bankruptcy law or legal foreclosure procedures, institutions should perform similar analysis to the one described in paragraph 105.

107.	Where external or pooled data are used institutions should obtain from the vendors sufficient information about the lending and recovery policies of the data contributors in order to assess representativeness of such external or pooled data to the institutions' own portfolios and processes.

108.	For the purpose of paragraph 100(e) institutions should consider all economic and market conditions experienced in the past and reflected in historical observations as part of foreseeable economic and market conditions.

109.   In the analysis of the representativeness of data institutions should take into account not only the current characteristics of the portfolio but also, where relevant, the changes to the structure of the portfolio that are expected to happen in the foreseeable future due to specific actions or decisions that have already been taken. Adjustments made on the basis on the changes expected to happen in the foreseeable future should not lead to decrease in LGD estimates.

110.   Institutions should document the performed analysis and the measures taken to ensure representativeness of the estimation sample to the current portfolio with respect to the elements listed in paragraph 100 as well as changes to the respective practices. This documentation should include the criteria and triggers established by the institution in order to decide whether the data is sufficiently representative.

111.   In accordance with Article 181(1)(a) of Regulation (EU) 575/2013 institutions are required to use all defaults observed in the historical observation period for the purpose of LGD estimation that fall within the scope of the LGD model. Where historical data is not sufficiently representative of a current portfolio institutions should provide, to the extent possible, appropriate adjustments. In addition to these appropriate adjustments institutions should increase the margin of conservatism applied to their LGD estimates in accordance with Article 179(1)(a) and (f) of Regulation (EU) No 575/2013 as further specified in section 4.4.

Explanatory box for consultation purposes

The representativeness of historical observations to the current portfolio and situation can be considered from various dimensions and the main dimensions have been specified in the draft Guidelines. As non-representativeness in any of these dimensions may lead to a bias in LGD estimates these have to be duly analysed and addressed. As in accordance with Article 181(1)(a) of Regulation (EU) 575/2013 institutions are required to use all observed defaults it is not possible to remove the observations that are not fully representative from the estimation sample. However, in this case institutions should apply adequate margin of conservatism to account for the weaknesses in data and, if possible, adjust the data to ensure greater representativeness.

The historical observations that are the basis for estimation of risk parameters should be sufficiently representative to the whole portfolio that the estimates will apply to. Where different portfolios are merged under one rating system institutions should analyse whether the rating system is adequate for all parts of the portfolio that is within the scope of rating system. Where the sample of historical observations is extended by additional data from a different source the representativeness of these data from different sources should be assessed separately and where necessary adequately adjusted.

Question 6.1: Do you agree with the proposed principles for the assessment of the representativeness of data?

6.3 Calculation of economic loss and realised LGD

6.3.1 Definition of economic loss and realised LGD

112. For the purpose of LGD estimation as referred to in Article 181(1)(a) of Regulation (EU) No 575/2013, institutions should calculate realised LGDs for each exposure, as referred to in point (55) of Article 4(1) of that Regulation, as a ratio of the economic loss to the outstanding amount of the credit obligation at the moment of default, including any amount of principal, interest or fee.

113. For the purpose of paragraph 112, institutions should calculate the economic loss realised on an instrument (i.e. defaulted facility), as referred to in point (2) of Article 5 of Regulation (EU) No 575/2013 as a difference between, from one side, the outstanding amount of the credit obligation at the moment of default, without prejudice to paragraph 119, including any amount of principal, interest or fee, increased by material direct and indirect costs associated with collecting on that instrument discounted to the moment of default and, from the other side, any recoveries realised after the moment of default discounted to the moment of default.

114. 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.

115. Without prejudice to paragraph 90, 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.

6.3.2 Treatment of unpaid late fees, interest and additional drawings after default

116. For the purpose of letter (i) of Article 181(1) of Regulation (EU) No 575/2013, institutions should correct the economic loss by including in its calculation any fees that have been capitalised in the institution's income statement after the moment of default and any recoveries realised thereof. Institutions should not correct the outstanding amount of the credit obligation at the moment of default in the denominator of the realised LGD. Where the fees are extended to the obligor in order to recover direct costs already incurred by the institution and these costs are already included in the calculation of the economic loss, institutions should not add these amounts to the economic loss again.

117. Institutions should apply the same treatment as specified in paragraph 116 to any interest capitalised in the institution's 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.

118.   In accordance with Article 182(1)(c) of Regulation (EU) No 575/2013 institutions that obtained permission to use own estimates of LGD and conversion 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, in accordance with Article 181(2)(b) and Article 182(3) of this Regulation institutions may reflect future drawings either in their conversion factors or in their LGD estimates. These future drawings should be understood as additional drawings by the obligor after the moment of default.

119.   Where institutions include additional drawings by the obligor after the moment of default in their conversion factors they should calculate realised LGD as a ratio of the economic loss to the outstanding amount of the credit obligation at the moment of default increased by the value of additional drawings by the obligor after the moment of default.

120.   For retail exposures, where institutions do not include additional drawings by the obligor after the moment of default in their conversion factors they should calculate realised LGD as a ratio of the economic loss to the outstanding amount of the credit obligation at the moment of default and they should not increase the denominator of the ratio by the value of additional drawings by the obligor after the moment of default.

121.   In any case institutions should calculate the economic loss used in the numerator of the realised LGD including the additional drawings after the moment of default and all realised recoveries.

Explanatory box for consultation purposes

As the concept of economic loss as well as realised LGDs are the basis for LGD estimation it is considered necessary to specify these aspects clearly in the guidelines. The proposals in that regard are based on the definitions included in point (55) of Article 4(1) of Regulation (EU) No 575/2013 and Article 5(2) of that Regulation. In order to reflect correctly the level of loss these measures should also include events that occur after the moment of default such as additional drawings, fees or interest.

For this purpose it has been specified that in accordance with Article 182(1)(c) of Regulation (EU) No 575/2013 'additional drawings' should be understood as drawings by the obligor up to and after the moment of default. Where however this Regulation refers to 'future drawings' this means only drawings after the moment of default. Hence the choice for the institutions specified for retail exposures to reflect future drawings either in conversion factors or LGD estimates only refers to additional drawings after the moment of default while all additional drawings up to the moment of default have to be reflected in the conversion factors.

In specifying the treatment of additional drawings or fees after the moment of default it was considered that the resulting measure of realised LGD should be consistent with the exposure

value that will be used for the purpose of calculation of capital requirements. Hence, where additional drawings after default are included in the conversion factors the outstanding amount in the denominator of the realised LGD should also include such drawings. However, in the case of retail exposures, where the conversion factors do not include any drawings after the moment of default the denominator of the realised LGD should also reflect only the outstanding amount at the moment of default. As a result, lower exposure value (based on lower conversion factors) will be compensated by higher LGD.

Similarly in the case of additional fees or interests that are capitalised after the moment of default, as these are generally not included in the conversion factors they should not increase the outstanding amount at the moment of default in the denominator of realised LGD. It is proposed that such fees or interests should be treated similarly as costs, i.e. they should increase the measure of exposure and loss in the numerator of the realised LGD, just as all recoveries related to those fees, adequately discounted, should be included in the calculation of economic loss.

In any case, regardless of the choice of the institution regarding the estimation of conversion factors, the measure of economic loss should be an objective value that adequately reflects the actual loss experienced by the institution. Hence, the measure of economic loss should always include all additional drawings, interest and fees capitalised after the moment of default as well as all recoveries realised on a given exposure.

An alternative approach that was taken into account in specifying the draft guidelines was not increasing the economic loss by the amount of fees or interests after default. In this case any recoveries of these amounts would compensate the discounting effect that reflects the value of money in time. As a result similar cases characterised by similar cash flows would lead to equal results in terms of the realised LGD regardless of the pricing policy of the institution. However, due to differences between the discounting rate and the interest rate applicable after default the value of money in time and the recoveries related the amount outstanding at the moment of default would not be reflected correctly. As the amount of additional interests calculated after default would be discounted with a different discounting rate this would result in either a positive or a negative correction of loss at the moment of default. In some cases this approach would lead to negative realised LGD even if the outstanding amount was not fully recovered. Therefore this approach was deemed not sufficiently prudent.

Question 6.2: Do you agree with the proposed treatment of additional drawings after default and interest and fees capitalised after the moment of default in the calculation of realised LGDs?

6.3.3   Discounting rate

122.   For the purpose of the calculation of economic loss, in accordance with point (2) of Article 5 of Regulation (EU) No 575/2013, institutions should discount all recoveries and costs, including capitalised late fees and interest and additional drawings after the moment of default 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.

Explanatory box for consultation purposes

Discounting rate has been identified as one of the main drivers of non-risk based variability of the LGD estimates. As various practices in that regard are observed several possibilities were considered when specifying the draft Guidelines. The potential solutions taken into account included in particular the following:

- original effective interest rate – despite the advantage of the consistency with international accounting standards the use of the interest from the moment of origination of the loan was considered not appropriate as this interest rate might not be adequate to the market and economic conditions at the moment of default;

- current effective interest rate – although this interest is adequate to the moment of default it still leads to lack of comparability of losses within and across institutions as the interest may depend on various institutions pricing strategies and the rates may vary significantly between the types of obligor and types of products; In addition to that in both cases the specification of discounting rate based on effective interest rate would introduce substantial complexity as it would be specified individually for each exposure;

- funding cost + add-on – the discounting rate reflecting the funding costs of the institution and an appropriate risk premium reflecting the uncertainties associated with the receipt of recoveries with respect to a defaulted exposure would be more consistent with the currently existing guidance expressed by CEBS and BCBS however it was considered that it should not reflect the own credit standing of the institution as this would lead to non-comparability across institutions and jurisdictions; in addition, the discounting factor would be dependent on the funding structure of a given institution;

- risk-free rate + add-on – this approach is independent from the funding structure and credit standing of the institution and is in line with the currently existing guidance on the application of the discounting factor that has been specified in GL10 and BCBS guidelines; However, the specification of the add-on could still lead to significant variability across institutions and jurisdictions.

Taking into account the above considerations it is proposed that the discounting rate should follow the formula of risk-free rate + ad-on in accordance with the current guidance in that regard. However, in order to ensure simplicity and comparability of the approach it is proposed that the risk-free rate should be based on EURIBOR (or a comparable rate in non-Eurozone countries) as a proxy of risk-free rate and the add-on should be a specified fixed percentage value that reflects the average level of a risk premium.

Although more granular approaches were considered for simplicity reasons the proposed fixed value of the add-on is not differentiated between the exposure classes. In principle, it could be possible to specify the discounting rate more granularly by implementing different predefined add-on categories. Possible dimensions of this add-on slotting could include not only exposure classes but also collateral types or types of products addressing different risk of the workout processes. It was however deemed not practical due to different categorization of collaterals and products across institutions.

Question 6.3: Do you agree with the proposed specification of discounting rate? Do you agree with the proposed level of the add-on over risk-free rate? Do you think that the value of the add-on could be differentiated by predefined categories? If so, which categories would you suggest?

6.3.4   Direct and indirect costs

123.   For the purpose of the calculation of the realised LGDs, institutions should take into account all material direct and indirect cost related to the recovery process. In the case 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 of the following conditions is met:

(a) these costs are clearly included in the exposure value;

(b) these costs are associated with the previous default of the same obligor that is not considered a multiple default in accordance with paragraph 90.

124.   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.

125.   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. Institutions should include in their estimation of indirect costs an appropriate percentage of other ongoing costs such as institution's overheads related to the recovery processes, unless they can demonstrate that these costs are immaterial.

126.   Institutions should demonstrate that they collect and store in their databases all information required to calculate direct and indirect costs. All material indirect costs should be allocated to respective exposures. This cost allocation process should be based on the same principles and techniques that institutions use in their own cost accounting systems.

127.   For the purpose of indirect cost allocation institutions may use methods based on exposure weighted averages, or statistical methods based on a representative sample within

the population of defaulted obligors. In any case institutions should demonstrate that the indirect costs allocation process is effective and that it does not lead to biased LGD estimates.

6.4   Long-run average LGD

6.4.1   Historical observation period

128.   The historical observation period should be as broad as possible and should contain data from various periods with differing economic circumstances. For this purpose institutions should at a minimum select a historical observation period in such a way that:

(a) the length of the historical observation period, i.e. the timespan between the oldest default considered in the RDS and the moment of the LGD estimation, covers at least the minimum length specified in Article 181(1)(j) of Regulation (EU) No 575/2013 for exposures to corporates, institutions, central governments and central banks and, for retail exposure, the period specified in Article 181(2) subparagraph 2 of that Regulation and, where applicable, Commission Delegated Regulation adopting technical standards laid down in Article 181(3)(b) of that Regulation;

(b) it ensures that the estimation sample includes a sufficient number of closed recovery processes in order to provide robust LGD estimates;

(c) it is composed of consecutive periods and includes the most recent periods before the moment of LGD estimation;

(d) all available internal data is considered 'relevant', as referred to in Articles 181(1)(j) and 181(2) subparagraph 2 of Regulation (EU) No 575/2013 and is included in the historical observation period.

129.   In assessing whether the estimation sample includes a sufficient number of closed recovery processes in accordance with paragraph 128(b) institutions should take into account both the absolute number of closed recovery processes as well as relative share of closed recovery processes in the total number of observations.

Explanatory box for consultation purposes

The specification of the historical observation period is based on the assumption that it should be as broad as possible and should contain data from various periods with differing economic circumstances. These differing economic circumstances refer not only to the moment of default but also to the moment of realising recoveries from different sources. In this context it was considered that elimination of any data that reflects an institution's internal experience would lead to a loss of valuable information and hence it was specified that all available internal data should be taken into account in the long-run average LGD.

An alternative approach to the historical observation period that was considered in developing these Guidelines is on economic indicators, including either macroeconomic or credit factors. In this approach the observation period would be specified in such a way that it would reflect the likely range of variability of loss rates. Such observation period could be either longer or shorter that the available data series. In the case the available data series do not cover the full range of variability of loss rates institutions would have to perform appropriate adjustments to the long-run average LGD.

Eventually the simpler approach was chosen as more appropriate as in the estimation of LGD the sufficiently broad sample of data is considered more important than the exact specification of the historical observation period that reflects an economic cycle. This is because institutions are in any case required to estimate LGDs that reflect economic downturn conditions if this is more conservative than long-run average.

Question 6.4: Do you agree with the proposed approach with regard to the specification of historical observation period for LGD estimation?

6.4.2 Calculation of long-run average LGD

130. In accordance with letter (a) of Article 181(1) of Regulation (EU) No 575/2013 institutions are required to calculate the long-run average LGD separately for each facility grade or pool. In this context institutions should calculate the long-run average LGD also at the level of portfolio covered by the LGD model.

131. Without prejudice to Article 181(2) of Regulation (EU) No 575/2013 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. Institutions should not use for that purpose any averages of LGDs calculated on a subset of observations, in particular any yearly average LGDs, unless they use this method to reflect higher weights of more recent data on retail exposures in accordance with Article 181(2) of Regulation (EU) No 575/2013.

132. Where institutions do not give equal importance to all historical data for retail exposures in accordance with Article 181(2) of Regulation (EU) No 575/2013 they should be able to demonstrate in a documented manner that the use of higher weights to more recent data is justified by better prediction of loss rates. In particular where a zero or very small weights are applied to specific periods this should be duly justified or lead to more conservative estimates.

133. In specifying the weights in accordance with paragraph 132 institutions should take into account the representativeness of data assessed in accordance with section 6.2.2 as well as the economic and market conditions that are represented by the data.

6.4.3 Treatment of incomplete recovery processes

134.   For the purposes of letter (a) of Article 181(1) of Regulation (EU) No 575/2013, in relation to the use of all defaults observed during the historical observation period within the data sources for LGD estimation, institutions should ensure that the relevant information from incomplete recovery processes is taken into account in a conservative manner. The LGD estimation should be based on the long-run average LGD.

135.   Institutions should 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 in accordance with paragraphs 136 and 137 without including any expected future recoveries. The observed average LGD should be weighted by the number of defaults included in the calculation.

136.   Institutions should clearly specify in their internal policies the moment of closing the recovery processes. All recovery process that have been closed should be treated as such for the purpose of the calculation of the observed average LGD. The observations where the institution does not expect to take any further recovery actions should be recognised as closed recovery processes without undue delay.

137.   Institutions should define the maximum period of the recovery process for a given type of exposures from the moment of default that reflects the expected period of time observed on the closed recovery processes during which the institution realises the most of the recoveries, without taking into account the outlier observations with significantly longer recovery processes. The maximum period of the recovery processes should be specified in such a way that ensures sufficient data for the estimation of the recoveries within this period for the incomplete recovery processes. The length of the maximum period of the recovery processes may be different for different types of exposures. This specification of the maximum period of the recovery process should be clearly documented and supported by evidence of the observed recovery patterns, and should be coherent with the nature of the transactions and the type of exposures. All exposures that remain in defaulted status for a period of time longer than the maximum period of the recovery process specified for this type of exposures should be treated as closed recovery process for the purpose of calculation of the observed average LGD, considering only the recoveries realised so far.

138.   Institutions should obtain the long-run average LGD by adjusting the observed average LGD taking into account the information related to incomplete recovery processes and the estimated future costs and recoveries on these exposures in accordance with the following conditions:

(a) where the time from the moment of default until the moment of estimation is longer than the maximum period of the recovery process specified for this type of exposures institutions:

    i.   should take into account all actually observed recoveries realized before or after the maximum period of the recovery process;

    ii.   should not estimate any future recoveries.

(b) where the time from the moment of default until the moment of estimation is shorter than the maximum period of the recovery process specified for this type of exposures they may estimate future recoveries both those stemming from the realisation of the existing collaterals and those to be realised without the use of collaterals;

(c) for the purpose of estimation of the future costs and recoveries institutions should analyse the costs and recoveries realised on these exposures until the moment of estimation in comparison to the average costs and recoveries realised during similar period of time on similar exposures; for this purpose institutions should analyse the recovery patterns observed on both closed and incomplete recovery processes taking into account only factually observed costs and recoveries;

(d) the assumptions that underlying the expected future costs and recoveries as well as the adjustment to the observed average LGD should be:

    i.   proven accurate through backtesting;

    ii.   based on a reasonable economic rationale;

    iii.   proportionate, taking into consideration that LGD estimates should be based on the long-run average LGD that reflects the average LGDs weighted by the number of defaults using all defaults observed during an historical observation period.

(e) in estimating the future recoveries institutions should take into account the potential bias stemming from incomplete recovery processes being characterised by longer average recovery processes and lower average recoveries in comparison to closed recovery processes;

(f) in estimating the future recoveries stemming from the realisation of the existing collaterals institutions should take into account the legal certainty of the collateral and realistic assumptions regarding the possibility of its realisation;

(g) the adjustment of observed average LGD may be estimated at the level of individual exposure, at the level of grade or pool or at the level of portfolio covered by the LGD model;

(h) any uncertainty related to the estimation of the future recoveries on incomplete recovery processes should be reflected in appropriate MoC applied in accordance with section 4.4.

Explanatory box for consultation purposes

The specification of the treatment of incomplete recovery processes takes into account the requirement of Article 181(1)(a) of Regulation (EU) No 575/2013 that the long-run average LGD has to take into account all observed defaults. Hence, the long-run average LGD should also include incomplete recovery processes. However, in order to obtain a realistic value of long-run average LGD these incomplete recovery processes should be included with future recoveries that are expected to be realised. The value of future recoveries has to be estimated based on the observed closed cases. As a result, the 'long-run average LGD' will be a measure that is not fully objective as it is already partly estimated.

In order to obtain a fully objective measure it is proposed that institutions should also calculate the 'observed average LGD' taking into account realised LGDs only on those defaults that are related to closed recovery processes. Although this objective measure will not include any elements of estimation it has to be kept in mind that it may not reflect the real experience correctly as the cure and high-recovery cases may be overrepresented. More difficult cases usually stay longer in recovery processes therefore they will more likely not be included in the 'observed average LGD'.

Therefore the 'observed average LGD' has to be adjusted to account for the most recent experience based on the incomplete recovery processes. It may also be noted that where the share of incomplete recovery processes in the sample is higher the measure of 'observed average LGD' may be less reliable.

Question 6.5: Do you agree with the proposed treatment of incomplete recovery processes in obtaining the long-run average LGD?

6.4.4 Treatment of cases with no loss or positive outcome

139. Where institutions observe that they realised profit on their observations of defaults 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.

6.5 LGD estimation methodologies and risk drivers

140. Institutions should be able to demonstrate that the methodologies that they choose for the purpose of LGD estimation are appropriate to their activities and the type of exposures to which the estimates apply and they should be able to justify the theoretical assumptions of those methodologies. The LGD estimation methodologies should in particular be consistent with the collection and recovery policies adopted by the institution and should take into account possible recovery scenarios as well as potential differences in the legal environment in relevant jurisdictions.

141. The functional and structural form of the estimation method used by the institution in the LGD estimation, the assumptions regarding this method, its downturn effect, the length of

data series used, the margin of conservatism, the human judgement and, where applicable, the choice of risk drivers, should be adequate to the type of exposures to which they are applied.

142.   Institutions should identify and analyse potential risk drivers that are relevant to its specific circumstances and to the specific characteristics of the type of exposures covered by the rating system. Potential risk drivers analysed by institutions should include in particular the following:

(a) Transaction-related risk characteristics, including type of product, type of collateral, geographical location of the collateral, unfunded credit protection, seniority, Loan-to-Value ratio (LTV), exposure size, seasoning, and recovery procedures;

(b) Obligor-related risk characteristics, including, where applicable, size, capital structure, geographic region, industrial sector, and line of business;

(c) Institution-related factors, including internal organisation and internal governance, relevant events such as mergers, and existence of specific entities within the group dedicated to recoveries such as 'bad credit institutions';

(d) External factors, including interest rates, legal framework and other factors influencing expected length of the recovery process;

143.   Institutions should analyse the risk drivers not only at the moment of default but also at least within a year before default. Institutions should use a reference date for a risk driver that is representative of the realisations of the risk driver within a year before default. When choosing the appropriate reference date for a risk driver institutions should take into account its volatility over time.

144.   Institutions should specify or calculate the risk drivers in the same way in the application of LGD estimates as they are specified or calculated in the estimation of LGD.

6.6   Treatment of collaterals in LGD estimation

6.6.1   Eligibility of collaterals

145.   In accordance with Article 181(1)(f) of Regulation (EU) No 575/2013 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 that are generally consistent with those set out in Section 3 of Chapter 4 of Title II in Part Three of that Regulation. In the case of the types of collateral that are not specified in Chapter 4 of Title II in Part Three of that Regulation institutions may use them in their LGD estimations where their policies and procedures relating to internal requirements for valuation and legal certainty of these collaterals are appropriate to this type of collateral.

146.   To the extent the LGD estimates take into account the existence of unfunded credit protection institutions should specify the criteria and methodology for recognising and including in their LGD estimates the protection in the form of guarantees and credit derivatives that meet the criteria specified in Article 60 of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology].

6.6.2   Inclusion of collaterals in the LGD estimation

147.   Institutions should take into account as a risk driver or segmentation criterion information on all main types of collaterals that are used within the scope of application of the LGD model. Institutions should clearly define in their internal policies the main and other types of collaterals used for the type of exposures covered by the rating system and should ensure that, to the extent that LGD estimates take into account the existence of collateral, the policies regarding the management of these types of collateral comply with the requirement of Article 181(1)(f) of Regulation (EU) No 575/2013. Institutions should 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.

148.   For the purpose of LGD estimation institutions may group the types of collaterals that are homogeneous in terms of recovery patterns taking into account both the average time of collection process and the recovery rates on these types of collaterals.

149.   The approach developed by the institutions to include the effect of collaterals in the LGD estimation should meet all of the following conditions:

(a) Institutions should avoid the bias that may stem from including the cash flows related to realisation of collateral in the estimation of recoveries that are realised without the use of collaterals and the other way round.

(b) In estimating the recovery rates related to specific types of collaterals institutions should avoid a bias that may stem from including in the estimation sample the observations where the exposure was secured by only a part of the value of the collateral; in these cases the estimation should be based on the total value of the collateral and total sale price of the collateral.

(c) Where institutions estimate separately recovery rates related to specific types of collaterals they should recognise and include in this estimation direct costs related to the collection on these types of collaterals.

(d) Where institutions estimate separately recovery rates related to specific types of collaterals they should include in this estimation all recoveries realised from a respective type of collateral including those realised on exposures where the realisation of the collateral has been completed but the overall recovery process in not yet closed.

(e) The estimates should not be based solely on the estimated market value of the collateral but they should also take into account the realised recoveries from past liquidations and the potential inability of an institution to gain control and liquidate the collateral. In estimating the recovery rates related to specific types of collaterals institutions should take into account the time between the moment of default and the time of cash flows related to the collection on these types of collaterals.

(f) The estimates should take into account the potential decreases in collateral value from the point of LGD estimation to the eventual recovery, in particular those resulting from the changes in the market conditions, state and age of the collateral and, where relevant, currency fluctuations. The estimates should not take into account any potential increases in collateral value from the point of LGD estimation to the eventual recovery.

(g) The estimates should take into account in a conservative manner the degree of dependence between the risk of the obligor and collateral as well as the cost of liquidating the collateral.

Explanatory box for consultation purposes

In accordance with Article 179(1)(a) of Regulation (EU) No 575/2013 institutions are required to incorporate in their LGD estimates all relevant data, information and methods. As the existence of collaterals significantly influences the level and timing of recoveries information on at least the main types of collaterals used for a given type of exposures should be considered relevant and included in the LGD estimates.

In addition to that, in accordance with Article 181(1)(f) of Regulation (EU) No 575/2013, to the extent that LGD estimates take into account the existence of collateral, institutions shall establish adequate internal requirements for collateral management, legal certainty and risk management. It has been further clarified in the RTS on IRB assessment methodology that these internal requirements should be at least fully consistent with the requirements of Section 3 of Chapter 4 of Regulation (EU) No 575/2013 with regard to legal certainty and regular valuation of collateral. Therefore, such adequate policies should be implemented for all main types of collaterals as well as all other collaterals that are incorporated in the LGD estimates.

Question 6.6: Do you agree with the proposed principles on the treatment of collaterals in the LGD estimation?

6.6.3 Cash flows from collaterals

150. Institutions should recognise the recoveries as stemming from collaterals in all of the following situations:

(a) the collateral is sold by the obligor and the obtained price has been used to cover the defaulted exposure;

(b) the collateral is repossessed or sold by the institution, the parent undertaking or any of its subsidiaries;

(c) the collateral is sold in the court or bailiff procedure;

(d) the credit obligation is sold and the price for the obligation included the existing collateral – in this case it may be necessary to specify an allocation methodology in order to determine which part of the price received for the sold obligations was related to the existing collateral;

(e) any other method of realising the collateral possible in the legal framework in a relevant jurisdiction.

151.   For the purpose of point (b) of paragraph 150 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. Where these values are different institutions should consider as a value of repossession the lower of them. The value of repossession should be considered a value of recovery at the date of repossession and should be included in the calculation of the economic loss and realised LGD in accordance with section 6.3.

152.   Institutions should consider whether the value of repossession adequately reflects the value of the repossessed collateral, consistently with any established internal requirements for collateral management, legal certainty and risk management. In the case there is significant uncertainty whether the value of repossession adequately reflects the value of the repossessed collateral, institutions should apply an appropriate haircut to this value and include in the calculation of economic loss a recovery as a value of repossession after the haircut. Institutions should estimate this haircut taking into account all of the following conditions:

(a) the haircut should reflect the possible errors in the valuation of the collateral at the moment of repossession taking into account the type of the valuation available at the moment of repossession, the date it was performed and the liquidity of the market for this type of asset;

(b) the haircut should be estimated with the assumption that the institution intends to sell the repossessed collateral to an independent third party and should reflect the potential price that could be achieved from such sale, the costs of the sale and the discounting effect to the moment of repossession taking into account the liquidity of the market for this type of assets;

(c) where there are observations available regarding the repossessions and subsequent sales of similar types of collaterals the estimation of the haircut should be based on these

observations and regularly backtested; for this purpose institutions should take into account all of the following:

(i) difference between the value of repossession and the sale price;

(ii) any income and costs related to this asset that were observed between the date of repossession and the moment of the sale;

(iii) discounting effects;

(iv) whether the institution repossessed the collateral with the intension of immediate sale or whether another strategy was adopted.

(d) where the historical observations regarding the repossessions and subsequent sales of similar types of collaterals are not available the estimation of the haircut should be based on a case-by-case assessment, including the analysis of the current market and economic conditions;

(e) the less data an institution has on the previous repossessions and the less liquid is the market for the given type of assets the more uncertainty is attached to the resulting estimates, which should be adequately reflected in MoC in accordance with section 4.4..

153. In any case the repossession of collateral should be recognised at the moment of repossession and should not prevent the institution from closing the recovery process in accordance with paragraph 136.

154. Institutions should make every effort to recognise the sources of the cash flows and allocate them adequately to the specific collateral or unfunded credit protection that has been realised. Institutions should specify clear policies for the treatment of cash flows where the source cannot be identified. The methodology of allocation of these cash flows should not lead to a bias in LGD estimation.

155. For the purpose of calculation of the economic loss realised on an exposure in accordance with paragraph 113 institutions should take into account all realised recoveries including the recoveries from unknown sources and recoveries related to collaterals that do not meet the requirement of Article 181(1)(f) of Regulation (EU) No 575/2013.

Explanatory box for consultation purposes

When developing these Guidelines the EBA considered whether the repossession of collateral by an institution should be treated as a recovery. On the one hand at the moment of repossession the credit obligation is decreased by the value of repossessed collateral and a new asset is registered on the institution's balance sheet that is separately risk-weighted. On the other hand the institution has not realised any cash flows yet and additional loss may be realised at the

moment of the sale of this asset. Moreover, the time between the repossession and the final sale of the repossessed collateral may be significantly long.

In order to address all of these considerations it is proposed that the repossession should be treated as a recovery at the moment of repossession. As a result, the recovery processes may be recognised as closed before the final sale of the asset that may take place much later. However, where there is uncertainty about the true value of the repossessed collateral and there are concerns that additional loss may be incurred as a result of the sale of this asset, institutions should apply an adequate haircut to the value of recovery to reflect this uncertainty.

It is assumed under the approach taken that the lower of (i) the value by which the credit obligation of the obligor has been diminished as a result of the repossession of the collateral and (ii) the value of the repossessed collateral as recorded as an asset on the balance sheet of the institution reflects the market value at the date of repossession, if necessary after application of an appropriate haircut.

According to the proposed approach the value of repossession, subject to a haircut where necessary, is treated as a recovery. The haircut does not capture the potential future fluctuations of the prices for a certain type of assets. Hence, if the institution subsequently to the repossession keeps the asset on its balance sheet the risk related to this asset is considered investment risk not related to the original credit obligation of the obligor.

The alternative solution that was taken into consideration in the process of developing these guidelines was that to measure the risk up to the sale of the asset. According to this approach the haircut would reflect not only the uncertainty around the value of the asset at the moment of repossession but also any potential future changes in market prices. Consequently the final recovery would be considered at the moment of the sale of the asset and the default observation in the RDS would have to be modified at this point in time to reflect the sale of the asset as a recovery instead of the value of repossession. The modified recoveries would have to reflect the sale price as well as any income and costs related to this asset that were observed between the date of repossession and the moment of the sale.

Question 6.7: Do you agree with the proposed treatment of repossessions of collaterals? Do you think that the value of recovery should be updated in the RDS after the final sale of the repossessed collateral?

6.7   Downturn adjustment

156.   For the purpose of obtaining LGD estimates that are appropriate for an economic downturn in accordance with Article 181(1)(b) of Regulation (EU) No 575/2013 and Article 52 of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology] institutions should specify an economic downturn in accordance with the RTS on the nature, severity and duration of an economic downturn developed on the basis of Article 181(3)(a) of Regulation (EU) No 575/2013.

Explanatory box for consultation purposes

The EBA intends to publish the RTS on the basis of Article 181(3)(a) of Regulation (EU) No 575/2013 that will specify the common understanding of the nature, severity and duration of an economic downturn. Institutions are required to estimate LGDs that are appropriate for such an economic downturn. This could be performed, in particular, by specifying a downturn adjustment to the long-run average LGD.

It could be considered whether the calibration of LGDs to downturn conditions should be based on defaults identified in the downturn period or recoveries realised during this period. In the case of the LGD methodology that is based on certain model components, whether downturn adjustment should be estimated with relation to LGD or rather to an individual model component? These choices have been left to institutions as different approaches may be appropriate to different possible circumstances.

It has already been specified in Article 53(d) of the RTS on IRB assessment methodology that any adverse dependencies between economic factors and recovery rates should be reflected in LGD estimates. Hence, institutions should analyse such dependencies in various dimensions and with various economic factors, including both macroeconomic and credit factors. These various dimensions should include in particular total recoveries, recoveries realised from specific sources, specific model components where appropriate and total losses, losses specified in terms of the year of default and based on the time of recovery etc. The resulting downturn adjustment should be specified appropriately depending on the level and character on the identified dependencies with relevant economic factors.

Question 6.8: Do you think that additional guidance is necessary with regard to specification of the downturn adjustment? If yes, what would be your proposed approach?

7. Estimation of risk parameters for defaulted exposures

7.1 General requirements specific to EL$_{BE}$ and LGD in-default estimation

157.	Institutions that have obtained permission to use own estimates of LGD in accordance with Article 143(2) of Regulation (EU) No 575/2013, should assign an EL$_{BE}$ estimate and a LGD in-default estimate to each defaulted exposure within the scope of the rating system subject to such permission.

158.	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.

159.	For the purposes of EL$_{BE}$ and LGD in-default estimation, and unless otherwise specified in this Chapter, institutions should use the same estimation methods used for estimating LGD on non-defaulted exposures, as set out in Chapter 6.

Explanatory box for consultation purposes

It has already been specified in Article 54(2)(c) of the RTS on IRB assessment methodology that the direct estimation of LGD in-default should be consistent with the methodology set for LGD for non-defaulted exposures in order to avoid potential cliff effects. Following this approach, for the purpose of both EL$_{BE}$ and LGD in-default estimation the Guidelines refer to the requirements on LGD estimation of Chapter 6 including the same general estimation requirements of Chapter 4 and the requirements on the application of risk parameters of Chapter 8. This chapter should then provide guidance only on those specific aspects where different treatment for defaulted assets is justified. This implies, for example, that:

▪	When estimating EL$_{BE}$ and LGD in-default, institutions should use their loss and recovery experience (and may supplement this own experience with external data) and should not derive their EL$_{BE}$ and LGD in-default from the market prices of financial instruments such as marketable loans, bonds or credit default instruments;

▪	When estimating EL$_{BE}$ and LGD in-default, institutions should use the same RDS and the same methods for computing the long-run average LGD including, for example, the treatment of incomplete recovery processes and the historical observation period.

▪	LGD in-default estimates should include the appropriate margin of conservatism following the same approach presented in section 4.4.

Question 7.1: Do you agree with the proposed approach to the EL$_{BE}$ and LGD in-default specification? Do you have any operational concerns with respect to these requirements? Do you think there are any further specificities of EL$_{BE}$ and LGD in-default that are not covered in this chapter?

160.   Institutions should take into consideration all relevant post-default information in their EL$_{BE}$ and LGD in-default estimates in a timely manner. In particular, where events from the recovery process invalidate the recovery expected by the most recent EL$_{BE}$ estimation, institutions should update immediately their EL$_{BE}$ and LGD in-default estimates.

161.   Institutions should assess and duly justify situations where there are systematic deviations of the LGD in-default estimates just after the date of default from the LGD estimates just before the date of default at the facility grade or pool, which are not stemming from the use of risk drivers that are applicable from the date of default onwards.

162.   Institutions should perform back-testing and benchmarking of their EL$_{BE}$ and LGD in-default estimates according to points (b) and (c) respectively, of Article 185 of Regulation (EU) No 575/2013.

7.2 Data requirements specific to LGD in-default and EL$_{BE}$ estimation

163.   For the purposes of EL$_{BE}$ and LGD in-default estimation, institutions should use the same Reference Data Set (RDS) as referred to in section 6.2.1, complemented to reflect any relevant information observed during the recovery process and at each reference date, specified in accordance with paragraphs 164 to 167 and, in particular at least the following additional information:

   (a) all relevant factors that can be used to group defaulted exposures, including those that may become relevant after the date of default and at each reference date;

   (b) all relevant drivers of loss, including those that may become relevant after the date of default and at each reference date;

   (c) the amount outstanding at each reference date;

   (d) the values of collateral associated with the exposures and their dates of valuation after the date of default.

7.3 Reference dates

164.   For the purposes of EL$_{BE}$ and LGD in-default estimation, 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. For the purposes of setting the reference dates institutions should use only closed recovery processes and those recovery processes that are

treated as closed in accordance with paragraph 137 and factually observed costs and recoveries from incomplete recovery processes.

165.   Each of the reference dates referred to in paragraph 164 could be any of the following:

(a) a specific number of days since the date of default, which would be appropriate in case the estimation refers to a portfolio of exposures that have a stable recovery pattern through time and so reference date could be time in-default related;

(b) a relevant date associated with a specific event at which significant breaks in the recovery profile are observed, which would be appropriate in case the estimation refers to a portfolio of exposures that have significant changes of recovery pattern associated to some specific events, for instance at the realisation of collateral;

(c) any combination of the cases referred to in points (a) and (b) that better reflects the recovery pattern, which would be appropriate in case the estimation refers to a portfolio of exposures that have a stable recovery pattern through time but on which a recovery break-in is observed around certain specific events, for instance at collection, and where the reference dates following those events are defined as specific number of days since the recovery event rather than since the date of default;

(d) where appropriate, the reference date can have any value between zero and the maximum number of days a recovery process on a defaulted exposure remains incomplete.

166.   For the purposes of EL_{BE} and LGD in-default estimation the same defaulted exposure in the RDS should be used in all relevant grades or pools of exposures according to each different reference date.

167.   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 at each reference date.

Explanatory box for consultation purposes

The difference between the LGD in-default and the EL_{BE} (the unexpected loss) is used for computing the risk weight which according to Article 153 (1)(ii) of Regulation (EU) No 575/2013 which applies to the current outstanding exposure amount (i.e. net of recovery from the date of the default to the current time of evaluation). Moreover, the EL_{BE} is compared to credit risk adjustments for IRB shortfall purposes where credit risk adjustments are again computed with respect to the current exposure amount. This forms the rationale for using a reference point for the evaluation of the outstanding obligation that is close to the current time of evaluation rather than the date of default for the purposes of computing realised losses used to estimate EL_{BE} and LGD in-default.

The concept of current outstanding exposure amount is clearly defined in Article 166(1) of Regulation (EU) No 575/2013 and is used for the purposes of the application of the EL_{BE} and LGD in-default estimates. The Guidelines complement this by setting a definition of outstanding exposure amount at each reference date for LGD and EL_{BE} estimation purposes. Institutions should set discrete relevant reference dates at which the realised LGDs could be computed on each pool of exposures. These reference dates should be set according to the recovery patterns observed on homogenous portfolios of exposures and will be used as basis for differentiating grades or pools of exposures within this portfolio. This will imply that:

A.   For the purpose of estimating LGD in-default and EL_{BE}: Institutions should calculate the realised LGDs and related economic losses on all the defaulted exposures in the reference data set and at each of the reference dates relevant for the pool to which the defaulted exposure belong.

B.   For the purpose of application of the estimated LGD in-default and EL_{BE} to a given defaulted exposure in the current portfolio: Institutions should first evaluate which is the relevant reference date for the exposure under consideration (e.g. if the exposure under consideration pre or post collection from collateral). The EL_{BE} (or LGD in-default) to be assigned to the exposure under consideration should then be calculated as the product of the EL_{BE} (or LGD in-default) estimate at the relevant reference date (in % terms) and the current outstanding exposure value. Similarly the risk weight to be applied to the current outstanding exposure is calculated according to the difference between the LGD in-default and EL_{BE} at the relevant reference date. Therefore it is important that the same reference dates are used for the purpose of both the LGD in-default and EL_{BE}.

The expected loss on an exposure can change a lot from one reference date to the next, and therefore the approach to setting the reference dates should fit the observed recovery patterns and should be specified by institutions for specific types of exposures. Take as an example the case of a portfolio of mortgage loans. The reference date for estimation will be most likely based on the realisation of collateral event, such that to have an estimation of EL_{BE} and LGD in-default before and after the realisation of collateral, as paragraph 165(b) suggests. Otherwise it could be based on a combination of reference dates set as function of time since default before the realisation of collateral event and as a function of time since the realisation of collateral after the realisation of the collateral. A reference date simply based on number of days in-default rather than on the date of collateral realisation could in fact bias the ELBE estimates since the timing of collateral realisation could be exposure specific. On the contrary take the example of a consumer loan portfolio where all exposures are uncollateralised and characterised by a stable recovery process through time. This recovery patterns justifies the use of reference dates defined as days since default (e.g. quarterly frequency) as considered in paragraph 165.

Institutions should also monitor on a regular basis potential changes in the recovery patterns and relevant policies (e.g. write off policies) which may affect the estimation of LGD in-default and EL_{BE} at each reference date.

Question 7.2: Do you agree with the proposed reference date definition? Do you currently use the reference date approach in your EL$_{BE}$ and LGD in-default estimation?

7.4 Calculation of realised LGD and long-run average LGD for defaulted exposures

168.   For the purposes of EL$_{BE}$ and LGD in-default estimation institutions should calculate the realised LGDs for defaulted exposures, in accordance with section 6.3 with the only difference that this should be done with regards to the reference date, specified in accordance with paragraphs 164 to 167, rather than the date of default.

169.   For the purposes of EL$_{BE}$ and LGD in-default estimation institutions should calculate the long run average LGD of the realised LGDs for defaulted exposures, referred to in paragraph 168, following the requirements set out in section 6.4 with the only exception that incomplete recovery processes should be used only for those reference dates beyond which factual recovery and costs are observed.

Explanatory box for consultation purposes

It is proposed that for the purpose of estimating LGD in-default and EL$_{BE}$ institutions should compute the realised LGD for defaulted exposures following the approach described in section 6.3 for non-defaulted exposures but with the difference that the calculation should be performed with respect to the reference dates, as defined in paragraph 164 rather than the date of default. This implies that institutions should calculate for each defaulted exposure the realised LGD according to each reference date. This will be the ratio between the economic loss and the amount of the credit obligation outstanding at the reference date where the economic loss is computed as the difference between, on the one hand, the amount of the credit obligation outstanding at the reference date (including any amount of principal, interests or fees) increased by any direct and indirect costs associated with collecting on that instrument and discounted to the reference date and, on the other hand, any recoveries realised after the reference date discounted to the reference date. As a result for each defaulted exposure in the RDS institution should compute as many realised LGDs as the number of relevant reference dates for estimation purposes.

As specified in paragraph 169 in calculating the long run average LGD for defaulted exposures institutions should follow the requirements specified in section 6.4 for non-defaulted exposures, including the treatment of incomplete recovery processes (section 6.4.3). The only exception envisaged in paragraph 169 with respect to the inclusion of incomplete recovery processes in the EL$_{BE}$ and long run average LGD for defaulted exposures is that those can be included only with respect to reference dates beyond which factual recovery and costs have been already observed. This was put in place to avoid a circular reference of an estimation within the estimation. The estimation of the future costs and recoveries on incomplete recovery processes should be consistent between defaulted and non-defaulted exposures and should be based, as suggested in paragraph 138(c), on a comparison of the costs and recoveries realised on these exposures until

the moment of estimation to the average costs and recoveries realised during similar period of time on similar exposures. For this purpose institutions should analyse the recovery patterns observed on both closed and incomplete recovery processes taking into account only observed costs and recoveries.

An alternative approach to the treatment of incomplete recovery processes that was considered in developing the Guidelines is that of using only closed recovery processes for the purposes of estimating LGD in-default and EL_{BE}. This approach has the advantage of simplicity in which it avoids any estimation on future recoveries and costs for incomplete recovery processes. This would come at the cost of disregarding the potential valuable information coming from incomplete recovery processes and creating potential cliff effects between the LGD for defaulted and non-defaulted exposures which are not due to additional information and risk drivers available for non-defaulted exposures. Moreover, this approach may be less consistent with Article 181(1)(a) of Regulation (EU) No 575/2013 where all observed default should be used for the purposes of LGD estimation.

The specification of incomplete recovery processes of section 6.4.3 for non-defaulted exposures takes into account the requirement of Article 181(1)(a) of Regulation (EU) No 575/2013. In consideration to the fact that this Article should apply also for the purposes of LGD in-default and EL_{BE} estimation the approach of being consistent with the treatment of incomplete recovery processes specified for non-defaulted exposures was chosen as more appropriate.

Question 7.3: Do you agree with the proposed approach with regard to the treatment of incomplete recovery processes for the purpose of estimating LGD in-default and EL_{BE}?

7.5   Risk drivers

170.   For the purposes of taking into account the information on the time in-default and recoveries realised so far, in accordance with Article 54(2)(b) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology] institutions may take into account this information either directly as risk drivers or indirectly, for instance by setting the reference date for estimation, as referred to in paragraphs 164 to 167.

171.   For the purpose of EL_{BE} and LGD in-default estimation institutions should analyse the potential risk drivers referred to in paragraph 142 not only until the moment of default but also after the date of default and until the date of termination of the recovery process. Institutions 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.

7.6   Specific requirements for EL_{BE} estimation

172.   For the purpose of Article 181(1)(h) of Regulation (EU) No 575/2013 the EL_{BE} should not include any of the MoC referred to in section 4.4.

7.6.1 Current economic circumstances

173.   For the purposes of considering current economic circumstances in their EL$_{BE}$ estimates, as required by Article 181(1)(h) of Regulation (EU) No 575/2013, institutions should take into account economic factors, including macroeconomic and credit factors, relevant for the type of exposures under consideration.

174.   Where the realised LGD for defaulted exposures, referred to in paragraph 168, is not sensitive to the economic factors relevant for the type of exposures under consideration the EL$_{BE}$ should be calculated on the basis of the long-run average LGD, as referred to in paragraph 169.

175.   Where the realised LGD for defaulted exposures, referred to into in paragraph 168, is sensitive to the economic factors relevant for the type of exposures under consideration, the institutions should adjust the long run average LGD for defaulted exposures such that to reflect current economic circumstances. For this purposes institutions could use different approaches, for example, including the relevant economic and credit factors for the exposure under consideration in the estimation or considering risk drivers that are sensitive to those economic and credit factors.

176.   Whichever of the approaches is used for the adjustment to current economic circumstances institutions should document separately the long-run average LGD for defaulted assets, referred to in paragraph 169, and the adjustment to current economic circumstances, referred to in paragraph 175.

Explanatory box for consultation purposes:

Institutions are required to obtain EL$_{BE}$ estimates that are appropriate for current economic circumstance. This should be performed, in particular, by specifying an adjustment to the long-run average LGD for defaulted exposures.

Changes in economic conditions can be seen through changes in the values of risk drivers, e.g. deviations of the observed loan to value (LTV) of each individual defaulted file from the long-run average LTV of the exposure's pool or grade, or directly through variation of the recovery rate, e.g. deviation of the realised LGD for a defaulted exposure from the long-run average LGD for the exposure's pool or grade. In both cases the deviations observed are partly idiosyncratic but related also to the current economic conditions. An increase in LTV due to specific investment strategies (i.e. due to change in risk appetite) of the mortgage owner has a clearly idiosyncratic nature while an increase in LTV caused by the burst of a house bubble has a clear link with economic conditions. On the other hand taking the example of shipping finance, a default caused by the sinking of a ship is clearly idiosyncratic and will generate a lower-than-average recovery, whereas a default caused by a global drop in maritime freight tariffs is influenced by economic conditions. In the latter case, in fact, positive economic conditions during the recovery process may lead to better than average recoveries.

The calibration of the EL_{BE} estimates to current economic circumstance could be performed by institutions using different approaches, for example:

- considering risk drivers in the model that are sensitive to macro-economic and credit factors relevant for the exposure under consideration. In this way economic conditions will be taken into account in the application of the EL_{BE} by considering the current value of risk drivers for the defaulted file under consideration

- including the relevant macro-economic and credit factors relevant for the exposure under consideration directly in the model.

These choices have been left to institutions as different approaches may be appropriate to different circumstances. Anyway the analysis of the relevant economic and credit factors and their dependence with loss rates should follow the general guidance that will be provided by EBA in the context of the RTS specifying the nature, severity and duration of an economic downturn under the mandate set out in Articles 181(3)(a) and 182(4)(a) of the CRR.

Question 7.4: Which approach do you use to reflect current economic circumstances for EL_{BE} estimation purposes?

7.6.2   Relation of EL_{BE} to specific credit risk adjustments

177.   Where the model used for credit risk adjustments satisfies or can be adjusted to satisfy the requirements for own-LGD estimates set out in Part Three, Title II, Chapter 3, Section 6 of Regulation (EU) No 575/2013, institutions may use specific credit risk adjustments as EL_{BE} estimates.

178.   Where specific credit risk adjustments are assessed individually for a single exposure or a single obligor, institutions may override the EL_{BE} estimates based on specific credit risk adjustments, where they are able to prove that this would improve the accuracy of the EL_{BE} estimates and, moreover, that the specific credit risk adjustments are revised in accordance with the requirements set in section 6.3 on the calculation of economic loss.

179.   For the purposes of the requirement to duly justify situations where the specific credit risk adjustments exceed the EL_{BE} estimates in accordance with Article 54(2)(f) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology], institutions should ensure consistency with the economic loss components described in section 6.3 as well as with the definition of default set out in Article 178 of Regulation (EU) No 575/2013. In particular, institutions should take into account, the possible differences in the discounting rate, the presence of collateral that is not eligible under Article 181 (1)(f) of Regulation (EU) No 575/2013, different treatments of costs and the application of different definitions of default.

Explanatory box for consultation purposes

It is proposed that the use of specific credit risk adjustments as EL_{BE} estimates should be limited to those cases where provisions models meet, or could be adjusted to meet (e.g. by modifying the discounting rate in use), the prudential requirements for own LGD estimates and the requirements specified in these Guidelines. An exception to this rule is made allowing institutions to use individually assessed provisions as a possible reason for override where they are able to prove that they provide a more accurate estimation than the EL_{BE} estimated by facility grade or pool. Moreover the evaluation of this accuracy should be made independently of the discounting rate in use. In fact, the individually assessed provisions should be recalculated in such a way that all projected cash flows are discounted using the discounting rate prescribed in paragraph 122.

Question 7.5: Do you currently use specific credit risk adjustments as EL_{BE} estimate or as a possible reason for overriding the EL_{BE} estimates? If so how?

7.7 Specific requirements for LGD in-default estimation

180. For the purpose of considering the possible adverse change in economic conditions during the expected length of the recovery processes referred to in Article 54(2)(a) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology] the LGD should reflect at least downturn conditions, such that the LGD in-default is consistent with the long-run average LGD for defaulted assets, referred to in paragraph 169, adjusted for downturn conditions in accordance with section 6.7.

181. For the purpose of Article 181(1)(h) of Regulation (EU) No 575/2013 the LGD in-default may need to be increased above the level referred to in paragraph 180 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 during the recovery period.

182. For the purpose of ensuring that LGD in-default is higher than the EL_{BE}, or is equal to in limited cases for individual exposures, in accordance with Article 54(2)(d) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology] institutions should analyse and correct the LGD in-default in those situation where the EL_{BE} obtained using specific credit risk adjustments, in accordance with paragraph 177, is above the LGD in-default obtained through direct estimation in accordance with Article 54(1)(a) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology].

183. To the extent that the reasons for overriding the EL_{BE} estimates are relevant also to LGD in-default a consistent override should be applied also to the LGD in-default in such a way that the add-on to the EL_{BE} covers for any increase of loss rate caused by possible additional unexpected losses during the recovery period as in accordance with Article 181(1)(h) of Regulation (EU) No 575/2013.

184. Irrespective of which of the two approaches referred to in point (a) and (b) of Article 54(1)(a) of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology] is used for the purposes of estimating LGD in-default institutions should document separately all of the following:

(a) the break-down of the LGD in-default into its components: the EL_{BE} and the add-on;

(b) the break-down of the add-on into its components:

   (i) the downturn conditions component calibrated on the downturn adjustment to the long-run average LGD as specified in paragraph 180,

   (ii) the MoC component, referred to in section 4.4,

   (iii) and any component covering for potential additional unexpected losses during the recovery period referred to in Article 181 (1)(h) of Regulation (EU) No 575/2013.

Explanatory box for consultation purposes

It is proposed that in order to reflect adverse change in economic conditions mentioned in Article 54(2)(a) of the RTS on IRB assessment methodology institutions should reflect at least downturn conditions in their LGD in-default estimates. This implies that the add-on to the EL_{BE} should include a component covering for downturn conditions (A component in figure 1) in such a way to obtain an LGD in-default which is consistent with the long-run average LGD for defaulted assets adjusted to reflect downturn conditions, i.e. $[EL_{BE} + A] = [LRA\ LGD + C]$. In other words, irrespective of which of the approaches is used for LGD in-default estimation (direct estimation or EL_{BE} + Add-on) institutions should first compute the downturn adjustment to the long-run average LGD for defaulted exposures (C component in figure 1) and then calibrate the add-on downturn conditions component to the EL_{BE} (A in figure 1) accordingly. The LGD in-default is then obtained either:

- directly, increasing the LRA LGD adjusted for downturn conditions (LGD downturn in figure 1, or LRA LGD + C) by the MoC and additional potential unexpected losses (B component in figure 1);

- or as the sum of the EL_{BE} and the add-on, where the add-on is given by summing up the downturn conditions component (A component in figure 1) to the MoC and the additional potential unexpected losses if any (B components in figure 1 respectively).

Figure 1: LGD in-default estimation, direct estimation or EL$_{BE}$ + Add-on*
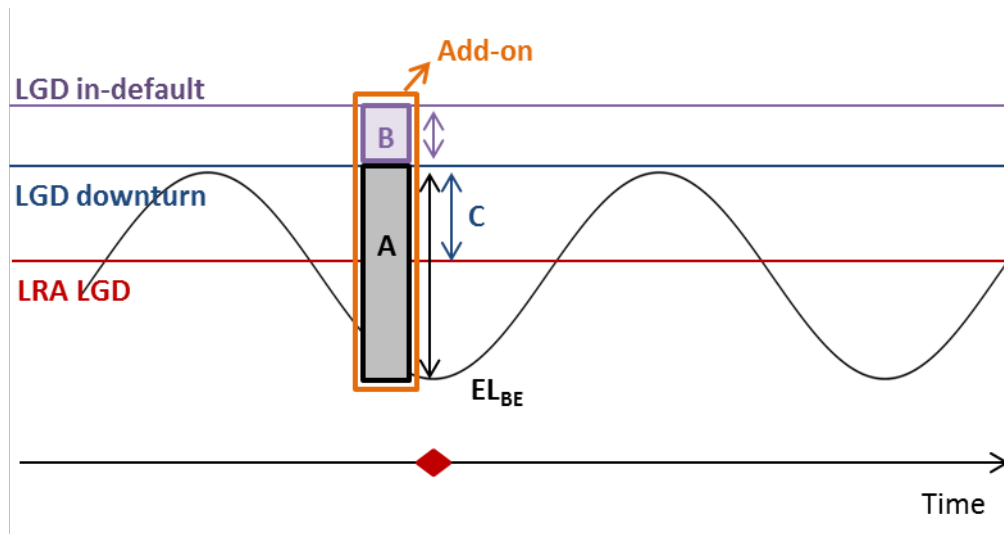
*Where the add-on components to the EL$_{BE}$ include:

A. downturn conditions, where C is the downturn adjustment to the long run average LGD for defaulted assets and A is the Add-on component to the EL$_{BE}$ to obtain the LGD downturn.

B. MoC + potential additional unexpected losses to the EL$_{BE}$

8. Application of risk parameters

8.1 Conservatism in the application of risk parameters

185. For the purpose of Article 171(2) of Regulation (EU) No 575/2013 institutions should apply additional conservatism to the outcomes of the process of assignment of exposures to grades or pools in case of any identified deficiencies related to implementation or application of risk parameters, especially when those deficiencies relate to data used in the assignment process. They should do so by establishing a framework that consists of the following phases:

   (a) Identification of deficiencies of implementation or application of risk parameters;

   (b) Specification of the form of conservatism to be applied and quantification of the appropriate level of conservatism;

   (c) Monitoring of the deficiencies and correcting them;

   (d) Documentation.

186. For the purpose of paragraph 185(a) institutions should have a robust process for identifying all implementation and application deficiencies in the assignment process, whereby each deficiency leads to additional conservative treatment in the affected assignment to a grade or pool. Institutions should consider at least the following triggers for additional conservatism:

   (a) missing data in the current portfolio;

   (b) missing updates of financial statements or credit bureau data as referred to in paragraph 66(h);

   (c) outdated ratings in the current portfolio; where outdated rating should be understood as specified in Article 25(2)(b) of Regulation (EU) No xxx/xxxx [RTS on IRB methodology];

   (d) missing ratings, whereby an exposure is considered as being within the scope of application of the IRB model but is not rated by it.

187. For the purpose of paragraph 185(b) institutions should ensure that the occurrence of any of the triggers referred to in paragraph 186 results in the adding of additional conservatism to the risk parameter for the purpose of the calculation of risk weighted assets. Where more than one triggers occur, the estimate should be more conservative. The additional conservatism related to each trigger should to the extent possible be proportionate to the uncertainty in the estimated risk parameter introduced by the trigger.

188.   Institutions should consider the overall impact of the identified deficiencies and the resulting conservatism at the level of portfolio covered with the considered model on the soundness of the assignments to grades or pools and ensure that the own funds requirements are not distorted due to the necessity for excessive adjustments.

189.   For the purpose of paragraph 185(c) institutions should regularly monitor the implementation and application deficiencies and the levels of additional conservatism applied in relation to them. Whenever possible, institutions should take steps to address the identified deficiencies. Following its assessment, the institution should develop a plan to rectify the deficiencies within a reasonable timeline, taking into consideration the magnitude of the impact on the own funds requirements.

190.   For the purpose of paragraph 185(d) institutions should specify adequate manuals and procedure for applying additional conservatism and should document the process applied in addressing implementation and application deficiencies. Such documentation should contain at least the triggers considered and the effects the activation of such a trigger had on the final assignment to a grade or pool and on the own funds requirements.

> **Question 8.1: Do you see operational issues with respect to the proposed requirements for additional conservatism in the application of risk parameter estimates?**

8.2   Human judgement in the application of risk parameters

191.   Institutions may use human judgement in the application of the model in the following cases:

(a) in the application of the qualitative variables in the model;

(b) via overrides of the inputs to the model;

(c) via overrides of the model outputs.

192.   Institutions should specify clear criteria for the use of qualitative model inputs. They should ensure consistent application of such inputs by all relevant personnel and a consistent assignment of obligors or facilities posing similar risk to the same grade or pool as required by Article 171(1)(a) of Regulation (EU) No 575/2013.

193.   For the purpose of Article 172(3) of Regulation (EU) No 575/2013 institutions should specify the policies and criteria for the use of overrides in the application of the models. These policies should refer both to possible overrides of inputs and outputs of the models and should be specified in a conservative manner such that the scale of the conservative override should not be limited whereas the possibility to decrease the estimate resulting from the model, either by overriding the inputs or outputs of the model should be limited. In applying the overrides institutions should take into account all relevant and up-to-date information.

194.   Institutions should document the scale and rationale of each override. Wherever possible institutions should specify a predefined list of possible justifications of the overrides to choose from. Institutions should also store information on the date of override and the person that performed and approved it.

195.   Institutions should regularly monitor the level and justifications for overrides of inputs and outputs of the models. They should specify in their policies the maximum acceptable rate of overrides for each model. Where those maximum levels are breached, adequate measures should be taken by the institution. The rates of overrides should be specified and monitored at the level of calibration segment. Where there is a high number of overrides institutions should adopt adequate measures to improve the model.

196.   Institutions should regularly analyse the performance of exposures in relation to which an override of input or output of the model has been performed in accordance with Article 172(3) of Regulation (EU) No 575/2013.

197.   Institutions should regularly assess the performance of the model before and after the overrides of model outputs. Where the assessment concludes that the use of overrides significantly decreased the model capability to accurately quantify the risk parameters ('predictive power of the model'), institutions should adopt adequate measures to ensure the correct application of overrides.

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

198.   Institutions should specify internal policies for re-development, re-estimation, and re-calibration of internal models, which consider at least the following potential sources for triggers:

(a) results of regular review of estimates;

(b) changes in the legal environment;

(c) deficiencies identified by internal audit or the competent authority.

199.   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 applied in accordance with section 4.4. At a minimum, for the purpose of compliance with Article 43 of Commission Delegated Regulation xxx/xxxx [RTS on IRB assessment methodology] the institution should describe the applied metrics, thresholds and accepted deviations for representativeness analysis, discriminatory power analysis, predictive power analysis and stability analysis.

9.1   Components of regular review of estimates of risk parameters

200.   For the purpose of performing annual reviews of estimates in accordance with Article 179(1)(c) of Regulation (EU) No 575/2013 institutions should have a framework in place which includes at least the following elements:

(a) a minimum scope of analyses to be performed, including predefined metrics chosen by the institution to test model performance and its predictive power;

(b) predefined standards, including predefined thresholds and significance levels for the relevant metrics;

(c) predefined actions to be taken in case of adverse results in any of the analyses.

201.   For the purpose of paragraph 200(c), institutions should investigate and decide on the adequate steps in order to remediate identified deficiencies. This may require in particular re-development of the model, re-estimation of risk parameters or re-estimation of any model components.

202.   The analyses referred to in paragraph 200(a) should at least comprise the following elements:

(a) a representativeness analysis in order to identify potential differences between the reference dataset used to estimate the risk parameter and the current portfolio to which the estimates are applied; this analysis should include the following analyses of any changes in the portfolio or any structural breaks:

(i)   along relevant risk drivers and segmentation drivers used in the rating system;

(ii) due to changes in the underwriting, recovery or default identification process as well as relevant technical advances;

(iii) due to changes in the scope of application of the model;

(iv) due to structural changes in market and economic conditions.

Where institutions identify significant deficiencies in terms of the representativeness of the dataset used to estimate risk parameters or where the model's discriminatory power, as referred to in point (b), is deteriorating, they should perform the representativeness analysis as described in the first subparagraph also for the dataset used in model development.

(b) analysis of the performance of the model and its stability over time; this analysis should:

(i)   identify any potential deterioration of the model performance (in particular discriminatory power) through the comparison of its performance at the time of the development against its performance on each subsequent observation period of the extended data set as well as against the predefined thresholds; in particular should this analysis be performed on relevant subsets, for instance with and without delinquency days;

(ii) be performed with regard to the whole application portfolio, without any data adjustments or exclusions; for comparison purposes, the performance at the time of development must be obtained also for the whole portfolio, prior to any data adjustments or exclusions;

(iii) be performed according to metrics and standards defined by the institution in accordance with paragraph 200 and applied consistently over time.

(c) analysis of the predictive power of the model, including at least:

(i)   an analysis of whether the inclusion of the most recent data in the dataset used to estimate risk parameters leads to materially different risk estimates and in particular:

- for PD, whether including the most recent data leads to a significant change in the long-run average default rate; this analysis should take into account the appropriate redefinition of the period of likely range of variability of default rates and of the mix of good and bad years, if necessary;

- for LGD, whether including the most recent data leads to a significant change in the long-run average LGD or downturn LGD;

(ii) a backtesting analysis, which should include a comparison of the estimates used for the calculation of own funds requirements against observed outcomes for each grade or pool.

203.   Institutions should specify conditions when the analyses referred to in paragraph 202 should be performed more frequently than annually. These conditions should include the specification of events that trigger the analyses such as major changes in the risk profile, credit policies or relevant IT systems.

204.   For the purpose of performing the tasks referred to in Article 190(2) of Regulation (EU) No 575/2013 institutions should define a regular cycle for full review of the rating systems, taking into consideration their materiality, covering all aspects in development, estimation of risk parameters and, where applicable, of model components. This review should include a review of the selection of the existing and potential risk drivers and assess their significance based on the predefined standards. The review should also include an assessment of the modelling approach, its conceptual soundness, fulfilment of modelling assumptions and alternative approaches. Where the results of this review recommend changes to model design, a respective re-development of the model should be carried out.

205.   For the purpose of the review specified in paragraphs 200 to 204 institutions should use consistent rules for data adjustments and exclusions and ensure that any difference in these processes between the relevant datasets is justified and does not distort the results of the analysis.

> **Question 9.1: Do you agree with the proposed principles for the annual review of risk parameters?**

10.   Calculation of IRB shortfall or excess

206.   Where the calculation for the overall non-defaulted portfolio of Article 159 of Regulation (EU) No 575/2013 results in an IRB excess, institutions may use this excess to cover for any IRB shortfall from the overall defaulted portfolio.

Explanatory box for consultation purposes

Article 159 of Regulation (EU) No 575/2013 requires the institutions under the IRB approach to calculate the difference between expected loss amounts and credit risk adjustments, additional value adjustments and other own funds reductions for the purpose of own funds recognition. Article 159 specifies, moreover, that SCRAs on exposures in-default shall not be used to cover expected loss amounts on other (i.e. non-defaulted) exposures. It has been clarified in Article 73(h) of the RTS on IRB assessment methodology that this in practice means that 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.

Article 159 specifies that the excess of provisions for defaulted exposures cannot be used to cover the shortfall of provisions for non-defaulted exposures. However, there is no provision Regulation (EU) No 575/2013 which prevents the excess of provisions for non-defaulted exposures being used to cover the shortfall of provisions on defaulted exposures.

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207.   For the purposes of adding any IRB excess to Tier 2 in accordance with Article 62 (d) of Regulation (EU) No 575/2013, where the calculation referred to in Article 159 of Regulation (EU) No 575/2013 results in an IRB excess for both the defaulted and the non-defaulted portfolio, the sum of those two IRB excesses should be considered and added to Tier 2 in accordance with the limit referred to in Article 62(d) of Regulation (EU) No 575/2013.

208.   For the purposes of Article 159 of Regulation (EU) No 575/2013 institutions should not include partial write-offs in the calculation of general and specific credit risk adjustments. However, as per Article 166(1) of Regulation (EU) No 575/2013, the calculation of the expected loss amount for the application of Articles 158 and 159 of Regulation (EU) No 575/2013 should be based on the exposure value gross of value adjustments but net of write-offs.

Explanatory box for consultation purposes

This has been clarified in the Q&A Question ID 2014_1064. Annex V, Part 2 paragraphs 49 and 50 of Regulation (EU) No 680/2014 (ITS on Supervisory Reporting) clarifies that write-offs are the amount of principal and past due interest of any debt instrument that an institution is no longer recognising because they are considered uncollectible, and that they can be caused both by reductions of the carrying amount of financial assets recognised directly in profit or loss as well as

by reductions in the amounts of the allowance accounts for credit losses taken against the carrying amount of financial assets. Such partial write-offs do not constitute impairment, irrespective of the method (specific loan loss provision or direct reduction of the carrying amount) chosen to book impairment in the financial statements of the asset, because any amounts written-back following a derecognition will not impact the carrying amount of the financial asset (unlike a reversal of impairment losses). For that reasons a partial write off would not be included in the calculation of general and specifics CRAs.

Question 10.1: Do you agree with the clarifications proposed in the draft GL with regard to the calculation of IRB shortfall or excess?

Question 11.1: How material would be in your view the impact of the proposed guidelines on your rating systems? How many of your models do you expect to require material changes that will have to be approved by the competent authority?

4. Accompanying documents

4.1 Draft cost-benefit analysis / impact assessment

The EBA considers it adequate to provide an Impact Assessment (IA) which analyses 'the potential related costs and benefits' of the policy provided in the draft guidelines. This analysis shall provide the reader with an overview of the findings as regards the problem identification, the options identified to remove the problem and their potential impacts.

The following analysis consists basically of three parts, where the baseline scenario in terms of current practices and supervisory expectations starts from the analysis performed for the purpose of the reports on comparability and pro-cyclicality of capital requirements published by the EBA in December 2013. In terms of the regulatory environment the baseline scenario is set out by the guidelines specified by CEBS in 2006 (GL 10) under the assumption that this guidance has been followed by institutions when developing their risk parameter estimation methodologies. The second part contains the options considered with respect to the major policy decisions included in the consultation paper. Finally, the draft cost-benefit analysis is based on the main policy changes in comparison with the currently applicable GL 10. However, the EBA is aiming to gather more information on the current practices directly from institutions via a qualitative survey which will be issued during the consultation phase. The objective of this survey will be the assessment of the scope and severity of potential model changes that will have to take place in the implementation of these guidelines.

A. Problem identification

The EBA reports on comparability and pro-cyclicality of risk weighted assets (RWA) have identified significant non-risk based variability of capital requirements calculated in accordance with the IRB Approach and provided recommendations on regulatory measures that should be taken in order to achieve greater comparability of risk parameters. All issues that have been considered while developing these guidelines refer to the identification and/or limitation of drivers of unjustified RWA variability in the context of PD and LGD estimation and the treatment of defaulted assets for IRB institutions.

B. Policy objectives

The objective of the guidelines is to establish convergence of institutions' and supervisory definitions related to PD and LGD estimation and the treatment of defaulted assets as well as the convergence of institutions' methodological choices in developing PD and LGD models where these choices are considered to be drivers of unjustified RWA variability. The guidelines are complementary to the RTS on assessment methodology (EBA/RTS/2016/03) where some technical choices related to PD and LGD estimation as well as to the treatment of defaulted assets

are already regulated. In particular, provisions related to data requirements, the estimation of the long-run average PD and the calculation of the long-run average LGD as simple average with respect to the number of defaults refer to the RTS on assessment methodology as a starting point.

The guidelines aim to define common notions and criteria in the major policy fields including:

a) A framework for the margin of conservatism

b) PD: One-year-default rates (frequency of motoring)

c) PD: Long-run average default rates

d) LGD: Additional drawings after default and interest and fees capitalised after the moment of default

e) LGD: Discount rate

f) LGD: Incomplete recovery processes

C. Baseline scenario

The baseline scenario is specified on the basis of data collected from competent authorities in 2013 for the purpose of the report on comparability of supervisory practices that are summarised in the table below.

Paragraphs in the CP	Subject	Findings from Report on the comparability of supervisory rules and practices
PD estimation		
23-35	Margin of conservatism (i.e. rules concerning the conservatism in the PD parameter and rating systems for data or model weaknesses)	In general, most CAs confirm the requirement of that conservatism should be applied for data and model issues and none of the CAs provides guidelines on the level of conservatism that is expected. As such, the adequacy of the level of conservatism is mainly assessed on a case-by-case basis and less than 30% of CAs has rules on this topic, most being non-public. These rules concern the following aspects: (i) one CA requires that a margin of conservatism is applied for low default portfolio models and for models primarily based on human judgement, (ii) one CA requires an explicit statistical approach to assess the margin of conservatism combined with a qualitative adjustment when the defaults are fewer than 20, (iii) one CA requires that conservatism is applied to address the 'seasonal peak' for mortgages, (iv) another one mentions that a non-compliant definition of default should be addressed by a margin of conservatism, (v) another mentions that institutions should have a methodology to assess the margin taking into account the results of the validation and the results of self-assessment; and (vi) finally one CA mentions that a supervisory add-on will compensate for institutions' lack of conservatism.

21, 45 and 48-63	Data requirements (i.e. rules regarding the use of internal default rates, mapping with external ratings or use of statistical PD model) and calculation of observed default rates	One-third of the CAs specifies rules concerning the PD estimation approach, almost all non-public. In general, the use of internal default rates or statistical approaches is promoted or requested as long as the data are relevant and representative. For low default portfolios, the mapping with external rating or expert models is usually tolerated, but (i) with the use of an additional level of conservatism, or (ii) where benchmarking should be performed with other approaches, and where again the institutions are encouraged to collect data in order to develop statistical models in due time. Some CAs however allow for all approaches without restriction.
59-63	Historical observation period (i.e. rules on the business cycle/'downturn period')	Whereas the majority of CAs reported rules on the topic, these rules were public and binding in only two cases. However these rules are usually not specific, but rather general and 'principle based'. A wide variety in requirements has been observed; examples are that (i) institutions should generally include good and bad economic periods, or (ii) periods when higher credit losses are experienced, or (iii) should include at least one recession period, or (iv) should cover a complete economic cycle (good and bad years), or (v) institutions are required to include specific periods in the datasets (e.g. 1991–2008). Only few CAs specify the years of reference for a recession period or a complete cycle. Some CAs mention that different weights can be applied to data (higher weights to more recent data) if adequately motivated.
64-67	Risk drivers and rating criteria (i.e. rules concerning the assessment of the choice of variables that influence the PD estimation)	Approximately one-third of CAs have rules on this topic, most being non-public and general, in the sense that the most relevant variables should be included in the model and missing variables are challenged. In two Member States there is a requirement that there should be risk drivers or rating criteria on some key groups of variables (such as characteristics of the borrower, terms of the transaction, collateral, unpaid amounts, etc). When it comes to assessing the information value of the risk drivers, some Member States specify a threshold for the p-value of the regression, whereas others specify more general rules regarding the adequacy of the discriminatory power.
75-79	Design of grades or pools	More than 40% of CAs has rules concerning the number of grades, which are usually public and binding. The majority sticks to the minimum number of grades fixed by the CRD (seven plus default); one CA increases the number to 10 for wholesale portfolios. Related rules require in some Member States that the number of pools and grades should be high enough to allow adequate quantification and validation. In one

		Member States, the concentration across the rating scale should be assessed by the Hirschman-Herfindahl index. In another Member State, the concentration in one grade should not be greater than 30% unless the grade cover a reasonably narrow PD band. Another CA applies a 25% limit for the wholesale portfolios. These rules however do not apply to low default portfolios, where a case-by-case approach is typically allowed.
75-79	Rating philosophy (i.e. rules specifying how stable rating assignments should be during the economic cycle or how much they should change with the economic context (Point-In-Time (PIT), Through-The-Cycle (TTC) or hybrid philosophies)	Only very few CAs appeared to have rules on this topic, mostly non-public, and only one CA publicly requires ratings to be TTC. One CA explicitly assesses the stability of the ratings and one other specifically allows hybrid systems. Some of the other CAs note that they implicitly allow for all rating philosophies, leaving the choice to institutions. The CAs seem to focus on the inclusion of all relevant and recent information regarding the credit quality of obligors. The CAs have also been asked whether they have rules concerning the dynamics of the transitions of exposures or clients among rating classes. However, only three CAs reported rules on the topic, all non-public. This means in particular that they monitor/challenge the migration matrices in order to assess their stability, at different stages of the economic cycle. For two CAs, analysis regarding the stability of migration matrices is only conducted during the approval process of the IRB Approach.
80	Calibration sample (i.e. rules concerning the data used for calibration of the PD estimate)	Around one-third of the Member States have rules on this topic, some being public and binding and some non-public. These rules usually mention the requirement of 5 years of representative data. When a shorter period is used, a margin of conservatism must usually be added to address the data issue. The answers however appeared incomplete for several CAs and therefore no robust conclusions could be drawn.
LGD estimation		
89-92	General requirements with regard to estimation methodologies	The majority of Member States do not have any specific rules with regard to estimation methodologies apart from those specified in GL 10 but it was indicated by several respondents that mostly (of even only) workout LGD is in use. Only in 2 jurisdictions there were public and binding rules in that regard, where workout LGD was prescribed in one of them for mortgage portfolios and in the other workout LGD was expected for corporate and retail portfolios while market LGD was allowed for large corporate, institutions and sovereign exposures. A few Member States apply certain rules with regard to cure rates: one of them explicitly requires institutions to identify cure rates and another forms such requirement

		where there is potentially higher rate of technical defaults. In any case the definition of cure is left for the institutions to be specified.
112-127	Calculation of economic loss for the purpose of workout LGD, including discounting factor	Only several Members States have any specific rules with regard to the calculation of economic loss and realized LGD and most of them are not public and cover only selected aspects such as for instance conservative approach to cost calculation and allocation. One of the CAs defined minimum types of data to be collected by the institution for the purpose of calculation of realized LGD while another specified that in cases of collateral repossession, institutions have to estimate haircuts on the value of the collateral considering the potential sale value and the time to sale. 4 CAs specified specific rules for the discounting factor which include the following approaches: (i) the discount rate that is applied shall reflect the uncertainty at the time of default; (ii) discount rate should not be lower than risk free rate; (iii) a risk premium calculated using an internal model or, in its absence, 400 basis points over the base rate; (iv) minimum expectation of a 9% discount rate. Other CAs base on the principles specified in GL 10 or in BCBS guidelines.
134-138	Length of workout period and treatment of incomplete workout cases	A few CAs specified some general rules with regard to the length of workout period, whereas one CA considers 95% of recovery rate to be a specific point to terminate workout process for recovery curve calculation purpose. In addition, one CA requires institutions to take into account at least 2 complete recovery cycles. With regard to the treatment of incomplete cases most of the Member States do not have any specific rules. Those few that do have such rules require including such cases in the calculation and allow estimation of future cash flows.
140-144	Risk differentiation	Only 2 CAs have specific rules in terms of the granularity of risk differentiation and in both cases they are not public. Institutions are required to ensure adequate segmentation within each portfolio in order to ensure a proper risk differentiation. More rules exist with regard to explanatory variables, in 3 jurisdictions such rules are public and binding whereas in 6 other they are not public but part of supervisory practices. While in some cases the rules refer to certain risk drivers that have to be used in model development, other CAs require that banks use the most relevant variables and that they adequately reflect the recovery processes.
128-133	Length of observation period	While rules regarding the length of the observation period exist in several jurisdictions, in a few of those cases they are only reflective of the minimum periods specified in the CRR. Other requirements specified by

		individual Member States include the following: (i) covering a complete business cycle; (ii) covering at least 2 complete recovery cycles. In a few cases different weighting is allowed, for instance to address structural changes in data, but such weighting has to be sufficiently justified and conservatism has to be ensured. In addition, one CAs required including downturn period of 1990s.
145-155	Collaterals and guarantees	The rules on the treatment of collaterals and guarantees exist in several jurisdictions but only in half of them these rules are public. The examples of such rules include the following: (ii) estimates have to be made for homogeneous pools of collateral, where similar recoveries can be expected and shown; (ii) FX risk must be considered; (iii) banks must establish internal standards for collateral management consistent with those required under the standardized approach. With regard to valuation there are various requirements across jurisdictions which range from requiring that the valuation of real estate collateral is done by an independent appraiser to allowing the use of statistical methods in determining the value of the real estate. In some cases it is required to apply specific haircuts which are specified differently by different Member States. In addition, a few CAs specified rules with regard to minimum frequency of revaluations which again differ across jurisdictions. While one CA requires annual reviews for real estate collaterals and quarterly for financial collaterals, other allow less frequent reevaluations, at least in some cases.
156	Downturn LGD	In general, the calibration of the LGD parameter is affected by the downturn LGD calibration. However, only 35% (7 CAs) of the CAs define any rules concerning the methodology of downturn LGD. Among those CAs in only one case the rule is public and binding. Moreover, most of the CAs confirm that banks should base their downturn LGD estimates on historical scenarios and moreover check for conservativeness of the estimation made at the institution level.
23-35	Margin of conservatism	While a few CAs apply some rules in terms of the margin of conservatism they are usually not very prescriptive in terms of the quantification of MoC and are mostly focused on the general types of weaknesses that the MoC should address (data, methodologies); one CA requires specifically that MoC should cover additionally significant differences between the debtors and their guarantors positive correlations and currency mismatches between exposures and collaterals. In one Member State it is required that MoC should be applied on top of the estimates and another specifies that can be established

		as an LGD floor (e.g. 45% in the case of large corporate) or specific add-ons (e.g. stressing the probability of incompletes).
Defaulted exposures		
157-179	EL$_{BE}$	Only 35% of the CAs (7 CAs) define a rule concerning the methodology of the best estimate of expected losses on defaulted assets. Moreover, the rules specified show divergence of practices, for example, some refer to the GL10 rules, others align the methodology to the LGD for non-defaulted exposures and some simply use provisions. Among those CAs which specify a rule only 3 confirm to have this rule public and, in particular, in two cases the rule is also binding.
157-171 and 180-184	LGD in-default	Only 25% of the CAs (5 CAs) define a rule concerning the methodology of LGD in-default calculation. Among those CAs in only one case this rule is public and binding. In terms of approach used in most of the cases LGD in-default is obtained as EL$_{BE}$ + add-on or as LGD downturn.

D. Options considered

This section presents the assessment of the technical options considered in the CP. Under each option, the potential advantages and disadvantages of the options together with potential costs and benefits are discussed.

Framework for margin of conservatism

Current regulatory framework does not provide detailed criteria related to data and method deficiencies for which institutions have to provide margin of conservatism according to Article 179 of the CRR. Moreover, there are currently no provisions regarding the level at which MoC should be identified and there is no guidance on the quantification of MoC for certain triggers or in general.

Regarding the general framework for MoC the following options were considered:

(a) non-exhaustive long list of triggers for MoC as part of the guidelines (including recommendations for the according appropriate adjustments):

- ✓ Pros: provides a more harmonised approach towards the triggers that require MoC and the method to quantify the impact;

- ✓ Cons: could lead to less suitable approaches for individual models.

(b) MoC categories with minimum list of triggers in the guidelines:

- ✓ Pros: provides a base for a more harmonised reporting on the level of margin of conservatism, but leaves room for distinct approaches at the same time;

- ✓ Cons: different approaches could still lead to different levels of MoC.

It has been decided in favor of option (b).

Regarding the level at which MoC should be identified the following options were discussed:

(a) quantification and application of MoC at the level of calculation of the long-run average default rate:

- ✓ Pros: simple approach;

- ✓ Cons: can lead to significantly different capital requirements where direct estimates of risk parameters for individual obligors or exposures on a continuous scale, calibrated to a central tendency, are used.

(b) quantification and application of MoC at the level it is identified but reporting with respect to the final estimate of risk parameter used for own funds requirements:

- ✓ Pros: ensures a harmonised approach and common notion of long-run average default rate excluding MoC.

It is a common practice to add MoC to the long run average default rate or the central tendency (which is quite often specified based on the long run average default rate of the considered portfolio). However, Article 179 of the CRR says that an institution shall add to its estimates a margin of conservatism, which is literally not done if adding it to the long run average default rates (or central tendency) and using these as input to a calibration method which might be non-linear. In the light of continuous PD estimates where there might be only 1 obligor per grade, developing a confidence interval (to specify the margin of conservatism) might not be straight forward and also to prevent potential breaches of monotony of the estimation of risk parameters used for own funds calculation it has been decided to introduce option (b) in the guidelines.

One-year-default rates (frequency of motoring)

Regarding the prescribed frequency of monitoring one year default rates in paragraph 53 the following policy options have been considered:

(a) the one-year default rate calculated at least at a monthly frequency for all retail exposures, and at least quarterly for all other exposures:

- ✓ Pros: ensures up-to date information for the purpose of internal risk managements and allows identification of changes in the trends in a timely manner;

- ✓ Cons: for low default portfolios probably no new information contained;

- ✓ Cons: could be overly burdensome.

(b) the one-year default rate calculated at least quarterly for all exposures:

- ✓ Pros: less burdensome but at the same time ensures minimum frequency of monitoring that allows identification of any seasonal effects;

- ✓ Cons: obligors that default in less than three months after credit origination could be omitted in the default rate.

(c) the one-year default rate calculated at least at a quarterly frequency for all retail exposures, and at least at semi-annually for all other exposures:

✓ Cons: obligors that default in less than half a year (for non-retail) after credit origination could be omitted in the default rate.

Option (b) has been chosen as the option which balances the burden on the institutions and ensures a base for comparability of analysis and reporting of default rates.

Long-run average default rates

Article 180(1)(a) of the CRR requires institutions to estimate PDs by obligor grade from long-run averages of one-year default rates. Therefore the notion of the long-run average default rate is crucial and a number of options have been considered. The main policy options discussed can be summarized as follows:

(a) Long-run average default rate estimated as the observed average default rate multiplied by an adjustment-factor where appropriate and subject to certain triggers and limitations:

✓ Pro: this approach would provide a high level of harmonization;

✓ Cons: might be overly complex;

✓ Cons: difficult to implement for both institutions and competent authorities.

(b) Long run average default rate estimated starting from the observed average default rate and adjusted subject to the criteria listed in paragraph 61 (a)-(c);

✓ Pros: leaves flexibility where appropriate to estimate the likely range of variability of one-year default rates;

✓ Cons: may lead to excessive flexibility and insufficient harmonisation.

(c) Long run average default rate estimated as the observed average default rate and additional MoC where the according historical observation period does not contain a downturn period.

✓ Pro: simple;

✓ Cons: could lead to pro-cyclicality in capital requirements where downturn years are overly represented in the historical observation period.

Option (a) required the estimation of a long-run adjustment factor, which would be a particular kind of appropriate adjustment, for which also a MoC should be applied (consistent with the approach proposed in the chapter on margin of conservatism). Under this option the appropriate adjustment should lead to an "expected" value of a one year PD, where MoC should account for the additional uncertainty due to the data or method deficiencies. The bearing point in the discussion related both to options (a) and (b) was whether the estimated long run average default rate can be lower than the observed average default rate. Under option (a) such result would have been allowed subject to very restrictive analysis and only following certain circumstances (e.g. historical data only from DT-years but improvement of economic conditions can be proven over the last 3 years).

Option (c) has the advantage of being the simplest one but has been criticized as having the potential of leading to pro-cyclicality. Eventually, option (b) was chosen as a compromise. It should be noted that possible benchmarks or floors have been discussed under all options but were softened again due to concerns regarding pro-cyclicality.

Additional drawings after default and interest and fees capitalised after the moment of default

As outlined in the explanatory box two approaches have been considered for the treatment of additional drawings after default and interest and fees capitalized after the moment of default.

(a) Interest and fees capitalised after the moment of default as well as the according cash flows not to be taken into account in the determination of economic loss

- ✓ Pros: ensures that the reported EAD at the date of default equals the EAD for the purpose of calculation of realized LGD;

- ✓ Pros: simple approach with less burden of data collection;

- ✓ Cons: may not be sufficiently prudent as the recoveries related to the interest and fees calculated after default would decrease the economic loss;

- ✓ Cons: due to differences between the discounting rate and the interest rate applicable after default the value of money in time and the recoveries related the amount outstanding at the moment of default would not be reflected correctly.

(b) Interest and fees capitalised after the moment of default as well as the according cash flows to be taken into account in the determination of economic loss.

- ✓ Pros: ensures accurate and consistent calculation of realized LGD.

- ✓ Cons: requires a broader scope of data collection.

Discounting rate

The discounting rate has been recognised as one of the major drivers of the lack of RWA comparability across institutions and for this reason it is proposed that these guidelines should provide detailed guidance on this aspects. The broad variety of practices requires therefore clear guidance on what should be reflected by the discounting factor and how it should be applied. In this regard the following options have been considered:

(a): Original effective interest rate: discounting factor is derived from facility specific interest rates:

- ✓ Pros: consistency with international accounting standards;

- ✓ Cons: lack of comparability of losses within and across institutions as the interest may depend on institutions pricing strategies.

(b) Risk free rate + add-on: the add-on reflects the risk premium for the uncertainty related to the recoveries:

- ✓ Pros: ensures simplicity and comparability and independence from the own credit standing of the institution;

- ✓ Pros: consistency with GL10 and BCBS guidance;

- ✓ Cons: if the risk premium is estimated by institutions the harmonization may still not be sufficient.

(c) Funding costs + add-on: discounting factor reflects the funding costs of the institution and an appropriate risk premium reflecting the uncertainties associated with the receipt of recoveries with respect to a defaulted exposure:

- ✓ Pros: consistency with GL10 and BCBS guidance where it is proposed that discount factor should capture the opportunity costs of holding the defaulted asset during the workout period; better reflects market conditions;

- ✓ Cons: lack of comparability could stem from different spread computation methodologies;

- ✓ Cons: institutions from the Member States with worse credit standing may be systematically penalised.

The application of option (a) would imply that different discounting factors would apply to different products or even individual exposures. These differences may be very significant even within one institution and would reflect not only the risk of specific clients or transactions but also specific marketing policies as well as market and economic conditions at the moment of origination of a loan. However, if original effective interest rate was used it would remain unchanged throughout the lifetime of a specific exposure.

Option (b) was chosen as the preferred option. In addition, in order to ensure a harmonised approach it has been specified that the risk free rate should be chosen as the 1-year EURIBOR or a comparable interbank rate in the countries from outside the Eurozone (relevant *X*-IBOR rate) at the moment of default and the add-on should be calibrated to 5%.

Incomplete recovery processes

The treatment of incomplete recovery processes for the purpose of calculating the average realized LGD as referred to in Article 181 (a) of the CRR the following options have been considered:

(a) Institutions may estimate future recoveries for the periods further than the maximum length of the recovery process only if these recoveries will stem from the realisation of the existing collaterals:

- ✓ Pros: more accurate in some cases, especially where individual case-by-case assessment is applied and there is high probability that the recovery on a given exposure will be realised;

- ✓ Cons: often not enough data to estimate recoveries for further periods;

✓ Cons: less strict approach that allows more subjective and less comparable estimates and may lead to disregarding in practice the effect of the maximum length of the recovery process.

(b) Institutions should not estimate any future recoveries for the periods further than the maximum length of the recovery process:

✓ Pros: addresses the problem that institutions cannot present reliable estimates for further periods due to insufficient data;

✓ Pros: where the collateral has not been realised within the specified period it may indicate some problems with the collateral that could prevent its realisation;

✓ Cons: less flexible and hence in some cases less accurate, as it is not possible to include future expected cash flows even if there is high probability they will be realised (but if the maximum period is defined appropriately this inaccuracy should not be significant);

✓ Cons: Cash flows from collaterals, if they exist, are usually more significant than other cash flows and at advance stages of recovery processes can be predicted on an individual basis.

Option 1 (b) was chosen as the most appropriate.

E. Cost-Benefit Analysis

The guidance given in these guidelines regarding the development and maintenance of risk parameter estimation methodologies as well as regarding the treatment of defaulted assets will affect all areas of modelling PD, LGD, EL_{BE} and LGD-in default. Therefore it is expected that these GL will lead to model changes. However detailed assessment of the costs for institutions of these model changes and their impact on capital requirements is not possible as the current flexibility of the IRB Approach does not allow a definition of a common baseline scenario regarding definitions and current modelling choices from a institutions perspective. It is expected that the impact of these GL on individual institutions will vary depending on the currently implemented solutions.

However, the main costs of implementation of these draft GL are considered to have the nature of one-off costs covering:

- the training of the staff on these draft GL,

- the redevelopment of the models,

- the IT specification and implementation of the reviewed models,

- the set-up of monitoring reports where the drat GL contain additional monitoring requirements,

- the costs for the regulatory approval process.

As the latter type of costs will depend on the severity of the expected model changes, the EBA plans to issue a qualitative survey to institutions to assess the amount and severity of model changes expected. However, when analyzing these costs of implementation it has to be kept in mind that the other regulatory products, in particular the RTS on assessment methodology and the RTS on materiality threshold, within EBAs review of the IRB Approach will also trigger material model changes, which are expected to be handled together with the model changes arising from these draft GL to the extent possible.

Before collecting more detailed data on the current practices of the institutions the expected impact of these GL can be assessed on the basis of the changes proposed with regard to the currently applicable GL 10, which can serve as a proxy to assess the nature of the expected changes. The following analysis outlines the major policy changes with respect to the GL 10 and provides initial indication of the direction of the severity of model changes expected.

The impact of the GL may be assessed by analyzing the scope of the changes in comparison to the currently applicable Guidelines on the implementation, validation and assessment of Advanced Measurement (AMA) and Internal Ratings Based (IRB) Approaches (so called GL 10) published by CEBS in April 2006. It is planned that relevant parts of GL 10 will be repealed when the new EBA GL come into force. Hence the changes in the policy reflected in the EBA GL relatively to GL 10 will indicate the scope of the changes that will have to be introduced in the rating systems of the institutions.

In principle GL 10 were more general than the currently proposed draft GL and provided more description of the possible approaches and challenges related to them rather than strict, normative rules. The currently proposed GL are more specific in most of the addressed areas and therefore even where there no explicit change of policy is proposed some changes may still be necessary in order to comply with the more detailed requirements.

The main areas where an explicit change in policy relatively to GL 10 is proposed include the following:

a. Discounting factor – the draft GL is based on the same concept as GL 10 that discounting rate should include risk-free rate and risk premium but propose a fixed value of the risk premium and there is no possibility for institutions to estimate it themselves for specific portfolios. The GL are less flexible with regard to haw the uncertainty should be addressed and suggest that it is no longer possible to include this uncertainty elsewhere, for instance in the recovery cash flows, instead of the discounting factor.

   Currently various approaches are used by institutions in practice for determining the discounting rate ranging from the use of discounting factors based on effective interest rates of the underlying loans, different add-ons with wide range of values on top of different underlying internal and external interest rate benchmarks to fixed discounting rates reflecting downturn conditions. In the light of these differences it is expected that the policy proposal included in the draft GL may have significant impact on the calculation of the realised LGDs at least for some of the institutions.

b. Recovery processes with positive outcome – GL 10 recognise that some defaulted positions may generate no loss, or may even have positive outcomes in the recovery process and specify that the estimated LGD used to calculate capital requirements must not be less than zero. However GL 10 do not prescribe any specific treatment of individual positive realized LGDs other than that these cases should be monitored. The proposed draft GL introduce the rule that realized LGDs should be floored to zero at individual level.

It is expected that this policy should not have significant impact on the LGD estimates in general as these estimates have to reflect downturn conditions. However, for some specific portfolios that may systematically lead to positive outcomes, such as some leasing portfolios, this proposal may lead to significant change of the model.

c. LGD estimation methodologies – GL 10 specify that the Market LGD and Implied Market LGD which are based on market data on the prices of certain instruments are possible methodologies for estimating LGD in some cases, especially where internal data is not sufficient and capital markets are deep and liquid. However, it was also recognised already in GL 10 that these methods could potentially be used only in specific circumstances and that LGD estimates based on an institution's own loss and recovery experience (so called workout LGD) should in principle be superior to other types of estimates. According to the draft GL methodologies based purely on market data will no longer be allowed as these methodologies do not meet certain CRR requirements, in particular those related to the specification of the observation period and representativeness of data. Market data could only be use to supplement internal data that reflects own experience of the institution.

In the light of the most recent proposals of the Basel Committee for Banking Supervision (BCBS) with regard to low default portfolios and in particular the proposals for limiting the scope of application of the IRB approaches it is expected that the impact of the proposed GL by the date of its application should not be significant. It seems that market based methodologies are not widely used across the EU, however, the full assessment of the impact of the policy will only be possible when more data will be gathered on this aspect.

d. LGD in-default – GL 10 seem to allow that downturn adjustment may not be part of LGD estimation for defaulted exposures as it states that downturn conditions should be taken into account in measuring the possibility of additional unexpected losses during the work-out period if they are relevant to a certain type of exposures. The currently proposed draft GL are clear that LGD in-default should comply with all requirements for LGD estimation and therefore it should also reflect downturn conditions.

As the currently proposed GL provide more prescriptive requirements with regard to estimating LGD for defaulted exposures it may lead to necessity to adjust the calibration of some of the models.

The above analysis does not include the analysis of the requirements for the estimation of downturn LGD which may potentially be another aspect where the change in the policy may be proposed. These aspects however are not currently covered by the proposed text of the GL. The EBA continues working on the aspects related to downturn adjustment by considering together the RTS on the nature, severity and duration of economic downturn and the possible additional

section of the GL that will clarify how to apply the requirements of the RTS to derive the downturn LGD. The respective proposals will be presented and consulted at the later point in time.

4.2   Overview of questions for consultation

4.1: Do you agree with the proposed requirement with regard to the application of appropriate adjustments and margin of conservatism? Do you have any operational concern with respect to the proposed categorization?

5.1: Do you see any operational limitations with respect to the monitoring requirement proposed in paragraph 53?

5.2: Do you agree with the proposed policy for calculating observed average default rates? How do you treat short term contracts in this regard?

5.3: Are the requirements on determining the relevant historical observation periods sufficiently clear? Which adjustments (downward or upward), and due to which reasons, are currently applied to the average of observed default rates in order to estimate the long-run average default rate? If possible, please order those adjustments by materiality in terms of RWA.

5.4: How do you take economic conditions into account in the design of your rating systems, in particular in terms of:

d.   definition of risk drivers,
e.   definition of the number of grades
f.   definition of the long-run average of default rates?

Question 5.5: Do you have processes in place to monitor the rating philosophy over time? If yes, please describe them.

Question 5.6: Do you have different rating philosophy approaches to different types of exposures? If yes, please describe them.

Question 5.7: Would you expect that benchmarks for number of pools and grades and maximum PD levels (e.g. for exposures that are not sensitive to the economic cycle) could reduce unjustified variability?

6.1: Do you agree with the proposed principles for the assessment of the representativeness of data?

6.2: Do you agree with the proposed treatment of additional drawings after default and interest and fees capitalised after the moment of default in the calculation of realised LGDs?

6.3: Do you agree with the proposed specification of discounting rate? Do you agree with the proposed level of the add-on over risk-free rate? Do you think that the value of the add-on could be differentiated by predefined categories? If so, which categories would you suggest?

6.4: Do you agree with the proposed approach with regard to the specification of historical observation period for LGD estimation?

6.5: Do you agree with the proposed treatment of incomplete recovery processes in obtaining the long-run average LGD?

6.6: Do you agree with the proposed principles on the treatment of collaterals in the LGD estimation?

6.7: Do you agree with the proposed treatment of repossessions of collaterals? Do you think that the value of recovery should be updated in the RDS after the final sale of the repossessed collateral?

6.8: Do you think that additional guidance is necessary with regard to specification of the downturn adjustment? If yes, what would be your proposed approach?

7.1: Do you agree with the proposed approach to the EL_{BE} and LGD in-default specification? Do you have any operational concerns with respect to these requirements? Do you think there are any further specificities of EL_{BE} and LGD in-default that are not covered in this chapter?

7.2: Do you agree with the proposed reference date definition? Do you currently use the reference date approach in your EL_{BE} and LGD in-default estimation?

7.3: Do you agree with the proposed approach with regard to the treatment of incomplete recovery processes for the purpose of estimating LGD in-default and EL_{BE}?

7.4: Which approach do you use to reflect current economic circumstances for EL_{BE} estimation purposes?

7.5: Do you currently use specific credit risk adjustments as EL_{BE} estimate or as a possible reason for overriding the EL_{BE} estimates? If so how?

8.1: Do you see operational issues with respect to the proposed requirements for additional conservatism in the application of risk parameter estimates?

9.1: Do you agree with the proposed principles for the annual review of risk parameters?

10.1: Do you agree with the clarifications proposed in the guidelines with regard to the calculation of IRB shortfall or excess?

11.1: How material would be in your view the impact of the proposed guidelines on your rating systems? How many of your models do you expect to require material changes that will have to be approved by the competent authority?