EBA/CP/2025/10

02 July 2025

Consultation paper

Draft guidelines

on Credit Conversion Factor estimation under Article 182(5) of Regulation (EU) No 575/2013

Contents

1. Responding to this consultation

The EBA invites comments on all proposals put forward in this paper and in particular on the specific questions summarised in 5.2.

Comments are most helpful if they:

- respond to the question stated;
- indicate the specific point to which a comment relates;
- contain a clear rationale;
- provide evidence to support the views expressed/ rationale proposed; and
- describe any alternative regulatory choices the EBA should consider.

Submission of responses

To submit your comments, click on the 'send your comments' button on the consultation page by 15 October 2025. Please note that comments submitted after this deadline, or submitted via other means may not be processed.

Publication of responses

Please clearly indicate in the consultation form if you wish your comments to be disclosed or to be treated as confidential. A confidential response may be requested from us in accordance with the EBA's rules on public access to documents. We may consult you if we receive such a request. Any decision we make not to disclose the response is reviewable by the EBA's Board of Appeal and the European Ombudsman.

Data protection

The protection of individuals with regard to the processing of personal data by the EBA is based on Regulation (EU) 1725/2018 of the European Parliament and of the Council of 23 October 2018. Further information on data protection can be found under the Legal notice section of the EBA website.

2. Executive Summary

For the calculation of own funds requirements, institutions shall apply a risk weight (RW) to an exposure value. For off-balance sheet (OBS) items institutions shall calculate the exposure value by multiplying the item's nominal value with a credit conversion factor (CCF). This CCF is either a standardised value (SA-CCF) or can be modelled under the Internal Ratings Based approach (IRB-CCF). This model approach is subject to approval of the competent authority.

The EBA did not include CCF estimation in its original IRB repair programme due to updates in the Basel III framework restricting the scope of application of CCF models to revolving commitments. These Basel updates have now been included as part of the Regulation (EU) No 2024/1623 (CRR3) amending Regulation (EU) No 575/2013 (CRR), which also mandates the EBA in Article 182(5) CRR to issue Guidelines (GL) to specify the methodology that institutions shall apply to estimate IRB-CCF. In this sense, these GL can be seen as a natural continuation of the IRB repair programme, now that the CRR requirements have stabilised pertaining to CCF estimation. As a guiding principle, EBA has therefore leveraged on existing EBA guidance, in particular on the GL on Probability of Default (PD) estimation, Loss Given Default (LGD) estimation and the treatment of defaulted exposures, (EBA/GL/2017/16), thus aiming to ensure consistency between PD, LGD and CCF modelling in the IRB approach.

The general estimation requirements from the PD and LGD GL are consequently taken as a starting point for CCF estimation. Many aspects of these CCF GL are a formalisation of the GL applicable to PD and LGD parameters now also for the CCF parameter, with only marginal adaptations, e.g. in relation to the margin of conservatism (MoC) framework, Review of Estimates (RoE) and Application of risk parameters. The downturn framework strongly relies on the EBA Guidelines for the estimation of LGD appropriate for an economic downturn (EBA/GL/2019/03). Next to that, the EBA also developed and published in 2023 the validation handbook (EBA/REP/2023/29), detailing several supervisory best practices in relation to the validation of IRB rating systems. In some instances, expectations from this handbook were formalised into estimation requirements for CCF. Primarily, this relates to the section on the testing requirements for CCF estimation, but also in terms of structure, which clarifies that the section on the definition of realised CCF is relevant for both risk differentiation and risk quantification.

Given the lower materiality and limited application of the CCF parameter relative to PD and LGD, these CCF GL introduce a 'simplified approach' in areas where the risk of underestimation is low. This relates to the treatment of unresolved defaults, in-default CCF estimation, and the downturn CCF estimation, as well as the introduction of a 'fixed' CCF. In addition, the framework for representativeness of data used in the estimation of the CCF parameter has been simplified. New guidance has been developed for aspects that are specific to CCF. This relates in particular to the definition of the realised CCF, which has been developed aiming for consistency with LGD estimation.

Next steps

The draft GL are published for a three-month consultation period. This consultation paper includes a qualitative questionnaire in order to assess the impact of the proposed requirements on the rating systems. The responses received during the consultation period will be considered when specifying the final GL.

3. Background and rationale

3.1 Background and introduction

1. Under Article 182(5) of Regulation (EU) No 575/2013 (hereafter CRR) amended by Regulation (EU) No 2024/1623 (hereafter CRR3), the EBA is mandated to provide guidance to specify the methodology institutions shall apply for the own estimation and application of CCFs, i.e. the IRB-CCF GL.

2. As institutions need to apply a risk weight (RW) to an exposure value for the calculation of own fund requirements, institutions should calculate the exposure value for off-balance commitments by multiplying the off-balance sheet (OBS) commitment with a Credit Conversion Factor (CCF). This CCF is either a standardised value (SA-CCF), or may be modelled (IRB-CCF), subject to the approval of the competent authority.

3.2 Interaction with other regulatory products

3. These Guidelines (GL) should be read in conjunction with other regulatory products from the so-called IRB repair program, and in particular:

    a. The Commission Delegated Regulation for the specification of the assessment methodology (CDR on IRB assessment methodology) competent authorities are to follow when assessing the compliance of credit institutions and investment firms with the requirements to use the Internal Ratings Based Approach;[1]

    b. The Commission Delegated Regulation specifying the nature, severity and duration of an economic downturn (CDR on downturn periods);[2]

    c. The EBA GL on PD estimation, LGD estimation and the treatment of defaulted exposures (GL PD and LGD)[3], and the EBA Guidelines for the estimation of LGD appropriate for an economic downturn (GL DT LGD).[4] Many requirements in these GL are similar to those applicable to PD and LGD parameters; to be comprehensive, these GL include relevant general estimation requirements already described in the GL PD and LGD,

[1] Commission Delegated Regulation (EU) 2022/439 of 20 October 2021 supplementing Regulation (EU) No 575/2013 of the European Parliament and of the Council with regard to regulatory technical stadnards for the specification of the assessment methodology competent authorities are to follow when assessing the compliance of credit institutions and investment firms with the requirements to use the Internal Ratings Based Approach (OJ 90, 18.3.2022, 0 1, ELI: Delegated regulation - 2022/439 - EN - EUR-Lex

[2] Commission Delegated Regulation (EU) 2021/930 Delegated regulation - 2021/930 - EN - EUR-Lex

[3] EBA/GL/2017/16

[4] EBA/GL/2019/03

where specific paragraphs are updated where necessary with appropriate reference to the CCF parameter estimation. Paragraphs that are included in the GL PD and LGD or GL DT LGD but omitted in these GL were deemed not relevant for the purpose of CCF estimates. On the other hand, the rationale for potential (i) additional requirements and (ii) relevant revisions to paragraphs from the PD and LGD GL are described below. At this stage, it is envisaged that revisions in these GL to paragraphs from the GL PD and LGD and GL DT LGD are applicable to CCF only.

3.3 Structure of the guidelines

Chapter 4 – Framework for CCF estimation and application

- Section 4.1: Principles for specifying the range of application of the rating systems
- Section 4.2: CCF estimation methodologies
- Section 4.3: Human judgment in estimation of risk parameters

Chapter 5 – Data requirements

- Section 5.1: Data governance
- Section 5.2: Construction and storage of modelling data
- Section 5.3: Representativeness
- Section 5.4: Data structure for the CCF estimation
- Section 5.5: Calculation of realised CCFs

Chapter 6 – Risk differentiation

- Section 6.1: Risk driver selection
- Section 6.2: Testing model performance

Chapter 7 – Risk quantification

- Section 7.1: Calculation of the long run average
- Section 7.2: CCF Calibration

Chapter 8 – CCF for Defaulted exposures

- Section 8.1: General requirements specific to CCF in-default estimation
- Section 8.2: Simple approach for in-default CCF estimates
- Section 8.3: Modelling approach for in-default CCF estimates

Chapter 9 – Treatment of Deficiencies and Margin of Conservatism

- Section 9.1: Identification of deficiencies
- Section 9.2: Appropriate adjustment
- Section 9.3: Margin of Conservatism

Chapter 10 – Downturn CCF

- Section 10.1: General requirements for the downturn CCF estimation
- Section 10.2: Requirements that apply to the final downturn CCF estimates
- Section 10.3: Downturn CCF estimation for defaulted exposures
- Section 10.4: Downturn CCF estimation for a considered downturn period
- Section 10.5: Reference Value

Chapter 11 – Application of the risk parameters

- Section 11.1: Conservatism in the application of risk parameters
- Section 11.2: Human judgment in the application of risk parameters
- Section 11.3: Use test

Chapter 12 – Review of estimates

3.4 Chapter 4: Framework for CCF estimation and application

3.4.1 Principles for specifying the range of application of rating systems

a. General considerations

4. According to Article 166(8b) of the CRR3, institutions that have obtained permission to use own estimates of credit conversion factors (CCF) in accordance with Article 143(2) of the CRR3 *'shall use IRB-CCF for exposures arising from undrawn revolving commitments treated under the IRB Approach provided that those exposures would not be subject to a SA-CCF of 100 % under the Standardised Approach. Standardised Approach SA-CCFs shall be used for:*

    a. all other OBS items, in particular undrawn non-revolving commitments;

    b. exposures where the minimum requirements for calculating IRB-CCF as specified in Section 6 [of CRR3, PART Three, Title II, Chapter 3] are not met by the institution or where the competent authority has not permitted the use of IRB-CCF'.

b. Fixed CCF

5. According to Article 143 of the CRR3, *'prior permission to use the IRB Approach, including own estimates of LGD and IRB-CCF, shall be required for each exposure class and for each rating system and for each approach to estimating LGDs and CCFs used*'. Therefore, for facilities that include commitments in scope of the IRB-CCF, but to which institutions are not able to assign an IRB-CCF because they cannot meet the minimum requirements for calculating the IRB-CCF as specified in CRR, PART Three, Title II, Chapter 3, Section 6, institutions should assign the LGD values of Article 161(1) of the CRR ("Foundation IRB LGD") instead of own estimates of LGDs. Since there are situations in which institutions would not be able to reliably estimate an IRB-CCF even though they would be able to estimate robust LGD estimates, these CCF GL introduce the notion of a minimum fixed value for the IRB CCF that would allow institutions to meet the requirements in CRR, PART Three, Title II, Chapter 3, Section 6. This is further explained in section 3.9 of this Background and Rationale (BR).

c. Level of application

6. Institutions should estimate and apply the CCF estimate at the level of a single facility. According to Article 4(1)(56) of CRR3, a realised CCF should be calculated for an undrawn revolving commitment from a single facility. Where an institution has an OBS exposure towards one single obligor stemming from different facilities to that obligor, a separate realised CCF should be calculated for each facility.

7. CRR3 introduces a definition of facility which includes some flexibility, namely whether a facility is defined at the level of a single contract or at a set of contracts. For the purpose of CCF estimation and application, where there are several revolving limits that arise from the same contract or set of related contracts, one single realised CCF should be calculated for the combined OBS exposure re-

lated to these revolving limits. In this context, the determination of the set of contracts constituting a single facility should be aligned between the estimation of the CCF and the risk management practices. At the same time, the institution should be able to demonstrate when there is a structure that interconnects these contracts, and when contracts are not connected.

8. To provide more context, for the purpose of CCF estimation, contracts that specify individual (sub)limits could be considered as a single facility (i.e. a related set of contracts) when there exists an overarching agreement (e.g. an umbrella facility) that specifies a debt ceiling or overarching limit up to which the obligor is authorised to draw, connecting these contracts and (potentially restricting) their individual sub-limits. Such agreements can be considered to constitute a single facility as long as they do not combine contracts with very different characteristics.

9. For the purpose of application, there is also the need for a disaggregation within a particular facility, when the set of contracts contains contracts eligible for an IRB-CCF and contracts that are not eligible for an IRB-CCF. As such, institutions should not apply the CCF parameter to the exposures that are not in scope of the IRB-CCF, even if such an exposure is part of the same facility as the revolving commitment.

10. This follows from Article 5(5) and Article 5(6) CRR, where a facility is defined as 'any on-balance or off-balance sheet item, that results, or may result in a credit obligation, arising from a contract or a set of contracts between an obligor and an institution'. Consistently with assigning CCFs according to Article 166(8) and Article 166(8b) CRR, within a single facility, institutions should therefore calculate a realised CCF for the part that is undrawn and related to a revolving commitment. This is confirmed by Article 182(1b)(b) CRR, which specifies that it is not appropriate to use obligor-level estimates that do not fully cover the relevant product transformation options or that inappropriately combine products with very different characteristics.

d. Scope of CCF

11. The scope of IRB CCF should be considered for both the application and the estimation (i.e. construction of the reference data set (RDS) used to estimate the CCF). CCF modelling under the CRR3 is restricted to *'exposures arising from undrawn revolving commitments treated under the IRB Approach*[...]', according to Article166(8b) CRR. Hence, the scope of IRB-CCF models is limited to this type of OBS items only (e.g. credit cards, current accounts with overdrafts), whereas other types of OBS items should be treated by applying the non-own-estimate or SA-CCF values according to Article 166(8a) CRR.

12. It should be noted that the description provided in these GL in relation to overdrafts, unadvised limits, unauthorised drawings and drawings beyond the advised limit should not be used to overrule the triggers of the definition of default (DoD) as provided in Article 178(2) CRR, in particular those related to the non-payment of any payment due, unauthorised overdrafts, unauthorised drawings beyond the advised limit, including any related penalty fees or rates.

1) Contractual arrangements with advised and unadvised limits

13. CRR3 introduces a definition of commitment in Article 5(10) of the CRR3. Commitments to extend credit, purchase assets or issue credit substitutes with a revolving nature that have an advised limit are in the scope of the IRB-CCF, provided that those exposures would not be subject to a SA-CCF of 100 % under the Standardised Approach. This also includes any such contractual arrangement that can be unconditionally cancelled (UCC) by the institution, or any arrangement that can be cancelled by the institution where the obligor fails to meet conditions set out in the facility documentation, including conditions that must be met by the obligor prior to any initial or subsequent drawdown under the arrangement. Under the IRB-framework, where institutions observe realised CCFs at default above zero percent for commitments that they consider unconditionally cancellable, this drawing behaviour should be reflected in their estimates.

14. Notably, this also implies that contractual arrangements offered by an institution, but not yet accepted by the client, that would become commitments if accepted by the client, should be in scope of the IRB-CCF.

15. The definition of the CCF-parameter in Article 4(1)(56) provides further guidance pertaining to the scope of the CCF estimate, clarifying that the commitment is determined by its advised limit, unless the unadvised limit is higher. As such, in order to adhere to the definition of CCF estimates in Article 4(1)(56) of CRR, in the case where the unadvised limit is higher than the advised limit of which the obligor has been informed by the institution, the institution should use the unadvised limit to determine the extent of the commitment, regardless of the unadvised limit not being part of the contractual arrangement. The absence of formal acceptance of the unadvised limit by the client should not prevent the institution from modelling such unadvised limit and better refine the scope of its IRB-CCF.

16. An unadvised limit is defined as a limit that comprises any credit limit determined by the institution and about which the obligor has not been informed by the institution and according to which additional drawings beyond the advised limit are at least temporarily possible.

17. Internally defined limits related to the risk appetite of the institution where additional drawings by the obligor on its revolving line are not possible beyond the advised limit should not be considered as an unadvised limit. This includes cases where the additional drawings are not possible because:

    a. The increased limit is subject to a new approval by the institution, to a credit assessment including a re-rating, or to a confirmation of the rating of the obligor. Even if this increase in limit can be requested by the obligor and the subsequent credit assessment and approval/rejection is automated without manual intervention from the institution, such a higher limit should not be considered to be an unadvised limit;

    b. The increased limit higher than the advised limit to the obligor has been pre-approved internally by the institution, but is not yet effective for the determination of the maximum amount that can be drawn. In other words, this relates to those cases where an

advised limit has been communicated and accepted by the obligor, but because the institution has pre-approved internally a higher limit, the obligor is able to obtain a higher advised limit if the obligor requests an increase in limit. However, because the obligor is not technically able to draw beyond the currently communicated advised limit (i.e. up to the pre-approved higher limit) without first requesting an increase, this pre-approved limit is not an unadvised limit.

18. If a limit of a facility is temporarily blocked such that there are no drawings possible on this facility, this does not mean that the facility should be excluded from the scope of the IRB-CCF.

19. Contractual arrangements that do not specify explicitly an advised limit are not considered in the scope of the IRB-CCF, as the obligor has not accepted any contractual arrangements intended to extend credit. Nevertheless, competent authorities have also observed cases where institutions incurred credit losses on debit accounts without an advised or unadvised limit, for example related to unauthorised overdrafts. Institutions are expected to investigate these losses and their root causes. In particular, institutions should investigate the root causes of losses on current accounts without overdraft authorisation that are not accounted for as an OBS item but from which the client is still able to draw. In general, the advised and unadvised limits used by institutions for their IRB-CCF modelling are subject to the data quality requirements laid down in Articles 69 and Article 73(1) of the CDR on the IRB Assessment Methodology.

2) Revolving nature of commitments

20. The CRR3 provides two definitions for revolving: a general definition in Article 4(1)(151) of the CRR3, and a more specific one for the purpose of defining the scope of the IRB-CCF, in Article 166(8b) of the CRR3: '*a commitment shall be deemed 'revolving' … where the obligor has the flexibility to decide how often to withdraw from the loan and at what time intervals, allowing the obligor to draw-down, repay and re-draw loans advanced to it. Contractual arrangements that allow prepayments and subsequent redraws of those prepayments shall be considered as revolving*'.

21. The following products are considered within the scope of revolving commitments (and thus the scope of the IRB-CCF), as long as they meet the other criteria described in section 4.1.2 of the GL:

    a. Overdrafts on current accounts with an advised limit;

    b. Commitments where the obligor has the flexibility to decide how often to withdraw from the loan and at what time intervals, up to a certain limit, but where the outstanding balance is scheduled to be repaid in full on fixed due dates on an interval basis, e.g. monthly. As such, credit cards or deferred debit cards are in the scope of the IRB-CCF, including where the outstanding balance is contractually scheduled to be repaid monthly and where the obligor does not necessarily have the possibility to repay the outstanding balance prior to the fixed monthly repayment date;

c. Commitments that include contractual fees or (higher) interest rates pertaining to the drawing and repayment of the commitment. Where contractual arrangements allow for more flexibility of the obligor related to the drawing and repayment on revolving products in return for an additional fee or higher interest rate, these fees or higher interest rate do not necessarily impede the obligor's flexibility to draw and repay;

d. Commitments that include a duration after which the revolving commitment matures, or the revolving nature of the commitment expires (e.g. revolving commitments that will be automatically transformed into term loans if they have been fully drawn).

3) Fully drawn commitments

22. The CRR3 requires institutions to incorporate '*drawings amounts in excess of facility limits*' in their CCFs, and prevents the application of any cap at 100% of the CCF. As such, for an undrawn facility, future increases in limit have to be capitalised incorporating all relevant realised CCFs, in particular also those observations where drawings in excess of the limit have led to realised CCFs higher than 100%, with an increase in the outstanding amount between reference and default date being higher than the undrawn amount at reference date. Therefore, in order to be consistent with the CCF estimates applied to undrawn commitments, where increases in the limit after the reference date are explicitly taken into account in the realised CCF and hence in the CCF estimates, institutions should apply (and estimate) an IRB-CCF also to fully drawn facilities.

23. In accordance with Article 4(56) CRR, revolving commitments are fully drawn when they are drawn up to the limit considered by the institution in the calculation of the CCF, namely the higher of the advised and unadvised limit. In other words, where the revolving commitment is drawn up to the advised limit, but the institution recognises an unadvised limit that allows for more drawings by the obligor, the commitment is not considered to be fully drawn.

Consultation box

SA-CCF and the use of own estimates of LGDs

Question 1: How material are the cases for your institution where you would have to assign an SA-CCF to exposures arising from undrawn revolving commitments and thus restrict the use of own estimates of LGDs within the scope of application for IRB-CCF in the CRR3? For which cases would you not have enough data to estimate CCFs but have enough data to estimate own estimates of LGDs?

Level of application

In addition to providing a requirement that aligns the use of the facility concept for CCF estimation with the institution's risk management definition of facility, it is also considered to provide more detailed clarification on what can entail a set of contracts that constitute a facility. However, such guidance would potentially affect other risk parameters as well. It is therefore understood that such

additional guidance would be provided in a more general context, also weighing the potential impact on other risk parameters.

Question 2: Do you have any comments related to guidance on the identification of a related set of contracts which are connected such that they constitute a facility?

Scope of IRB-CCF

Question 3: Do these GL cover all relevant aspects related to the definition of revolving commitments that you consider relevant for the scope of the IRB-CCF? Have you identified any product that should be in the scope of the IRB-CCF that is currently excluded in the GL? In terms of off-balance sheet exposures, how material are the exposures that fall within the defined scope of the IRB-CCF for your institution?

Question 4: Are there products that have an advised limit of zero but a nonzero unadvised limit that should be included in the scope of the IRB-CCF GL? How material are these cases for your institution?

Question 5: Do you think that dynamic limits (e.g. limits the extent of which is dependent on the market value of financial collateral pledged by the obligor in relation to the revolving loan) warrant a specific treatment in the IRB-CCF GL? How material are these cases for your institution?

Question 6: Have you identified any unwarranted consequences of including fully drawn revolving commitments in the scope of the IRB-CCF. How material are these cases for your institution?

3.4.2 CCF estimation methodologies

24. As a general consideration, these GL aim for consistency with the guidance provided for the LGD estimation methodologies, where this is considered feasible and not in contradiction with the CRR3. It is expected that institutions, when modelling CCFs for the purpose of estimating their exposure at default, seek to align relevant definitions and methods that are applied in the calculation of the realised outstanding amount at default used as the denominator of the realised LGD.

25. As such, the general estimation requirements for the CCF estimation methodologies follow that of the PD and LGD GL. These general estimation requirements specify that the estimation of CCFs is (i) performed for facility grades and pools; (ii) should be based on the institution's experience with their obligor's drawing and repayment behaviour; (iii) that institutions should be able to demonstrate that the estimation methods reflect the activities and facility characteristics of the institution; and (iv) that the estimation methods should be adequate to the type of exposures to which they are applied.

26. The guidance provided in these GL for fully drawn facilities is consistent with the CCF estimation guidance for undrawn commitments. However, because there is no undrawn amount at application date for fully drawn products, it is not possible to apply the standard CCF definition. As such, institutions are required to apply an alternative CCF approach. This is done by reparametrising the CCF

for fully drawn exposures into a limit factor. Institutions are expected to express the drawn amount at default as a percentage of the limit amount at the application date. The choice for the limit factor is further explained in section 3.5.5d of this BR.

27. Institutions may also apply, under certain conditions, this alternative CCF to facilities that are close to be fully drawn at application date, i.e. to those facilities that are in the region of instability (RoI). The treatment and rationale are further explained in section 3.5.5d of this BR.

28. All estimation and application requirements specified in these GL apply to both CCF approaches described.

3.4.3 Human judgment in estimation of risk parameters

29. The requirements provided in the PD and LGD GL in relation to this section also apply to CCF estimates.

3.5 Chapter 5: Data requirements

3.5.1 Data governance

30. The requirements laid down in the chapter on data governance follows closely the data governance requirements as described in chapter 4 of the PD and LGD GL, namely in section '4.2.1 Quality of Data' and section '4.2.2 Governance for data representativeness'.

3.5.2 Construction and storage of modelling data

31. The requirements for the RDS for the purpose of CCF estimation closely mirrors the framework of the requirements for PD and LGD estimation. This section leverages largely on the GL PD and LGD, sections 5.2.2 and section 6.2.1. The rationale for those criteria is explained in the background and rationale section of the GL PD and LGD.

32. The scope of data necessary for CCF 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 on the obligors and transactions that could be used as risk drivers in the model development. As the CCF estimates should be based on the institution's own experience, it is important that all relevant data be properly recorded and stored, irrespective of whether it is used for only risk differentiation or only for risk quantification purposes (or for both). As such, the RDS should include all information necessary for the risk differentiation as well as for risk quantification of CCF estimates.

33. For the purpose of CCF estimation, the RDS should include complete information on all defaulted facilities observed during the historical observation period. As such, requirements on the historical observation period are included in the general data requirements for CCF estimation, reflecting that, before the construction of the different samples to be used for risk differentiation and risk quantification, the historical observation period for which data is collected should be as broad as possible and contain data from various periods with differing economic circumstances. It should be

composed of consecutive periods and includes the most recent periods before the moment of CCF estimation. It includes the full period for which the institution is reasonably able to replicate the currently applicable DoD.

34. Institutions may use different data samples for different stages of modelling the CCF estimate. Next to the 'calibration sample' as defined in the GL PD and LGD[5], three naming conventions of data samples have been introduced in these GL. These are the samples in relation to the data used for (i) the development of the CCF model ('the development sample'); (ii) for the testing the model performance of the CCF model ('the testing data'); (iii) for the quantification of the CCF model ('the quantification sample'). To note, the testing data may entail different samples or sub-samples. For example, the testing data could comprise of an out-of-sample, out-of-time, or any other subsamples relevant to perform the minimum set of tests required. Next to that, the testing data may comprise of many different samples when cross-validation methods are used. The different samples may also overlap, e.g. between the development and quantification sample.

35. The development and testing samples should include all potential risk drivers that institutions analyse in the risk differentiation of CCF estimates. The development sample may however span over a period that is shorter than the historical observation period. For the quantification sample, institutions are expected to include all data needed to calculate the long run average (LRA) CCFs for each calibration segment, grade or pool over the entire historical observation period.

Consultation box

Question 7: Do you have any concerns on the introduction of the notion of the different samples that constitute the RDS for CCF estimation? Do you have a modelling practice implemented that deviates from this approach?

Question 8: Are there cases for your institution where the calibration samples should be shorter than the sample used to calculate the long run average (LRA) CCF?

3.5.3 Representativeness

a. General framework for representativeness

36. The requirements on representativeness are simplified for CCF in comparison to the GL PD and LGD, and were drafted to mitigate the model risks related to where representativeness of the data is not met:

    a. Model performance (discriminatory power) is producing a bad score, indicating that the model does not discriminate exposures sufficiently, potentially because the model

[5] The sample of exposures on which the ranking or pooling method is applied in order to perform the calibration (e.g. to align the average CCF estimates with the long-run average CCF).

is developed on a dataset which is not representative of the application portfolio, e.g. because a risk driver weight is too low or high due to changing distributions. This could happen for the portfolio as a whole, or for a subsegment of the portfolio;

b. The data used to test the model is not representative of the application portfolio; even a 'good' performance on the data used to test does not imply a good performance on the application portfolio;

c. The data used to quantify the estimates at the level of estimation is not representative of the data at the level of estimation in the application portfolio.

37. A section on the general framework to assess the representativeness of these three samples has been introduced. The representativeness analysis on the risk differentiation sample is now further broken down between the development and the testing sample. The representativeness of the data should be analysed along the same dimensions as the ones introduced in the GL on PD and LGD estimations, i.e. in terms of the scope of application, DoD, internal policies and external factors, economic conditions and material subsegments of the application portfolio defined across potential risk drivers of the application portfolio. These dimensions of analysis are applicable to all samples and hence grouped int a single section as further discussed in section 3.5.3c of the BR.

38. The implications of the analysis of representativeness may differ across samples. It is clarified that the representativeness requirements to develop the model are subordinate to the actual performance of the model and are therefore relaxed in comparison to the GL PD and LGD. If the model performance is still appropriate, it is not required to select a different development sample or make adjustments. However, if the model performance is weak, the institution should consider redeveloping the model, after making adjustments in the development approach (e.g. selection of a different sample or selecting different risk drivers), as it would under any observation of poor model performance. As such, the lack of representativeness might be a root cause, but the main requirement is on the appropriate model performance.

39. Instead, the representativeness requirements on the data to test the model performance are still in place, meaning that institutions should, in the case of an observed lack of representativeness, either (i) make adjustments to the data; or (ii) select a different testing sample. This is because the test results may be skewed or biased as a result of a lack of representativeness. As such, it would not be ensured that the model performs well (in terms of discriminatory power) on the application portfolio. These representativeness requirements apply to the data used to test the model performance as a whole and not on individual testing subsamples, e.g. in case of cross validation or similar validation techniques. If the institution uses testing subsamples (including in the case of testing subsegments of the portfolio, or in the case of cross validation), representativeness analyses of the testing data may be performed on the aggregated data from the different testing subsamples, rather than performing the analyses for each testing subsample individually.

40. The distinction between the two samples intends to have the following two effects:

a. On the one hand, institutions should have flexibility in the development of their model, in particular in relation to the definitions used. Primarily, the DoD in the development sample may not need to be the same as in the application portfolio, if this allows for an increase in model performance of the model. This is in particular the case in the context of pooled models and extensions of rating systems to additional exposures. Cases, where the model is developed on data not representative of the application portfolio, are expected to trigger further analyses to assess whether the corresponding model performance on the application portfolio is considered adequate and whether it should be monitored with care during the Review of Estimates (RoE);

b. On the other hand, data to test the performance of the model should be representative of the application portfolio, to ensure that the model performs adequately on this portfolio.

41. For the 'quantification sample', it is important to ensure representativeness of the data that is used for the calculation of estimates because the estimates of the target variable are directly applied to the application portfolio. With that, given the CRR3 requirement that all data should be used, institutions should make appropriate adjustments and incorporate a margin of conservatism (MoC) in case they observe a lack of representativeness between the quantification and the application of the estimates.

b. Availability of historical data

42. In addition to risk arising from a lack of representativeness of the data, two cases are identified where there might be a lack of historical data available to the institution.

Subsegment of the application portfolio not covered by the RDS

43. First, when analysing whether the RDS samples are representative of subsegments of the application portfolio, there might be relevant subsegments of the application portfolio for which the institution does not have sufficient default observations to test the performance of the model on this subsegment of the application portfolio. For example, it is possible that a portfolio contains product X and product Y but the institutions has only observed defaults on product X and none (or very few) defaults on Y. As such, for product Y institutions may not be able to discriminate the exposures or accurately estimate the target variable. This mismatch stems mainly from the fact that, for CCF estimation, the RDS and performing application portfolio contain by construction different populations:

a. The non-defaulted application portfolio entails both the population of facilities that will default in 12 months (Sample b2 in Figure 1 below), and the population of facilities that will not default in 12 months (Sample a2);

b. By contrast, the RDS for CCF includes only those non-defaulted facilities that defaulted in twelve months (Sample b1) but does not include those non-defaulted facilities that do not default in twelve months (Sample a1).

Figure 1: Relevant segments of the historical and application portfolio.

Status of client - *at reference date in historical portfolio* - *at application date in application portf.*	Historical portfolio	Application portfolio
performing and does not default in 12m	a1	a2
performing but will default in 12m	b1	b2
defaulted	c1	c2

44. For this risk, there seem to be limited possibilities to select a different data sample, or include a different risk driver or more generally, use a different development approach to solve the issue, given that there is no or insufficient historic data. For these subsegments of the application portfolio (e.g. product Y in the example above), institutions are allowed to apply the guidance on the minimum value of 100% CCF as explained in section 3.9 of the BR.

Expected future changes in the structure of the application portfolio

45. Second, there might be future changes materialising in the application portfolio that are not yet reflected in historic data. A particular case is when a certain product type becomes more material in the application portfolio, but this is not yet sufficiently reflected in the current default data available to the institution. As such, this is primarily related to risk characteristics that are not selected in the development approach, because historical data has not picked up on its materiality, but it is likely to be a risk driver in the application portfolio. Two resulting weaknesses are identified:

a. *Weakness in discriminatory power:* The change was not accounted in the risk differentiation (low materiality historically), such that the institution is not able to discriminate exposures in the application portfolio;

b. *Weaknesses in homogeneity:* This shift will likely lead to changes in the future estimates at the level of estimation, such that there might be a bias in the estimate for at least a subsegment of a grade or of a portfolio.

46. Given the lack of historic data to test the relevance on the application portfolio, it may not be possible to fix this issue for development and testing, for instance by forcing in this potential risk driver. However, for quantification of the CCF estimates, institutions should apply appropriate adjustments and conservatism in their final estimates that reflects the potential bias and uncertainty coming from the change in population. In accordance with paragraph 164 of the GL PD and LGD, institutions should take into account future changes by making a positive appropriate adjustment and apply a

corresponding MoC. In any case, human judgment may be applied in the application of the parameters.

c. Dimensions of representativeness

47. The dimensions along which to analyse the representativeness have been simplified. As an overarching point, institutions are required to identify differences in their data samples observed across time, data sources used, and jurisdictions, for the dimensions of representativeness to analyse. With that, it is clarified which elements institutions are required to analyse.

48. The requirement on the scope of application is simplified. Institutions are required to analyse whether variable boundaries (assumed to be primarily in relation to obligor or product type) used to determine the scope of the historical application portfolio used for development, testing and quantification are consistent with the variables and their boundaries used to define the application portfolio. This analysis is considered to have a more qualitative nature and therefore impose a low burden on institutions.

49. The requirement on the analysis for the DoD is streamlined but remains similar in content in comparison to the analysis required in the GL PD and LGD. It is clarified that the DoD used in estimation should be consistent with the DoD used in application, which implies consistency with the DoD as stipulated in Article 178 CRR, also in the case where external data is used. This includes an analysis of consistency with respect to the following key elements of the DoD:

    a. That an obligor is defaulted when an unlikely-to-pay (UTP) event occurs or when the obligor has a material credit obligation that is past due more than 90 days past due;

    b. Elements in relation to the past due counter such as (i) commencing of counting DPD in relation to credit cards, unauthorised overdrafts and drawings beyond the advised limit; (ii) materiality threshold; and (iii) the actual counting of days past due;

    c. The minimum requirements stipulated in relation to the indications of an UTP event;

    d. Criteria for the return to non-default status.

50. The analysis for the internal policies and external factors focusses on those policies and external factors relevant for the CCF parameter.

51. The analysis of representativeness of current and future economic and market conditions is focussed on identifying structural breaks in the historical observation period. In particular, institutions should consider whether years with lower CCFs are representative of a particular state of the economy within an economic and business cycle, or whether there were significant structural changes in the economic or market conditions (‘structural break’) compared to the current and foreseeable economic or market conditions. As an example, a significant decrease in realisations of the CCF during the COVID19 pandemic compared to levels observed before and after the crisis

indicates a potential lack of representativeness and should be analysed in more depth. In any case, institutions should not adjust their CCF estimates downwards as a result of this analysis.

52. The analysis of key risk characteristics is simplified, requiring institutions to analyse whether there are material subsegments of the application portfolio for which the institution has not observed sufficient observations to differentiate, test or quantify CCF estimates for those subsegments. For the purpose of identifying material subsegments of the application portfolio, institutions should segment the portfolio along key risk characteristics. As explained in paragraph 44 above, institutions may apply a fixed CCF estimate subject to monitoring conditions for the subsegments of the application portfolio that are not covered by the RDS.

53. Institutions should analyse the coverage by the RDS of material subsegments of the application portfolio to ensure that the discriminatory power and homogeneity testing can be performed adequately. It is noted that any differences in distributions of risk drivers between the historical data used for testing and the application portfolio do not necessarily invalidate the model performance tests, if the institution is able to perform tests on relevant subsegments of the application portfolio (i.e. specifically for CCF, those subsegments that are likely to default).

Consultation box

Question 9: Do you have any concerns with the requirements introduced to analyse and mitigate a lack of representativeness for CCF? Do the requirements on the different data samples when observing a lack of representativeness impede your ability to model CCF portfolios?

Question 10: Do you have any concerns with linking the fixed CCF to the lack of historical data available to the institution in relation to the coverage by the RDS of material subsegments of the application portfolio? How is your institution currently treating these cases?

3.5.4 Data structure for CCF estimation

a. Changes to the consumer product profile

54. Article 182(1)(h) CRR requires institutions to consider for the CCF estimation the restructuring and transformation of facilities. Furthermore, Article 182(1b) CRR clarifies that institutions shall demonstrate to the competent authorities that they have a detailed understanding of the impact of changes in customer product mix on the exposures in the RDS and the associated IRB-CCF, and that the impact is immaterial or has been effectively mitigated within their estimation process.

55. This requirement implies that institutions should identify all cases where there has been a change in the obligors' mix of borrowing and other credit-related products (customer product profile), including the restructuring of contracts between reference and default dates, and identify those contracts replacing the contracts at the reference date. As such, this includes cases where a revolving contract is fully or only partially replaced by another contract, and also the cases where a revolving commitment is restructured in a commitment that has a non-revolving nature. It also includes cases

where new contracts are originated that are related to existing contracts at reference date. As such, the requirements on the change in consumer product mix are closely related to the identification of the set of contracts that constitute a single facility: while in the application phase, the identification of a single facility is done for one specific date (the application date), in the estimation phase the identification is done for the full period within 12 months before each default. This identification is necessary to ensure no downward bias is introduced to CCF estimates, either by artificially splitting one facility into two facilities (via a new revolving contract instead of a limit increase) with lower realised CCF, or by changing a revolving commitment into a term loan before the default.

56. As a general rule, the grouping of contracts in a single facility should follow a consistent policy as the one put in place in the application of the CCF parameter. Furthermore, in this context of identification of related contracts impacted by a change in customer product profile, the EBA expects institutions to justify if there are changes in the customer product mix 12 months before the default date that they do not consider as related. Specifically for the following cases or restructurings where one or more facilities of an obligor have been (partially) closed or repaid and where one or more facilities have been originated for the same debtor within a short period of time, it is deemed likely that the facilities are related:

    a. Cases associated with performing forborne measures, in line the institution's policies for identifying performing exposures to which forbearances measures have been granted, and in accordance with section 7.3.4 of the GL on management of non-performing and forborne exposures (EBA/GL/2018/06);

    b. Cases associated with a distressed restructuring, i.e. where the default is triggered due to the restructuring of one or more facilities;

    c. Cases without a decrease in the overall drawn amount at the moment of the change in the customer product profile;

    d. Cases that occurred shortly before the default date;

    e. Cases where the drawing of the commitments of the (partially) closed or repaid facility before the change was fully drawn or close to fully drawn.

Consultation box

Question 11: Are there any concerns with requiring consistency in the analysis of changes in the product mix with the institution's definition of facility? Are institutions able to identify and link contracts (partially) replacing other contracts where the closing or repayment of one contract is related to the origination of a new contract? Are institutions able to link new contracts that are originated after the reference date to related contracts existing at reference date? In particular, is this possible for the case where contracts that are revolving commitments are replaced by contracts that are non-revolving commitments (e.g. by a term loan)?

Question 12: Do institutions consider it proportionate to the risks of underestimation of CCF to perform the identification analysis and allocation procedure? If it is deemed not proportional, what would be an alternative approach that is still compliant with Article 182(1b) CRR?

b. Twelve-month fixed reference date

57. Article 182(1)(g) of the CRR3 prescribes that a "12-month fixed-horizon approach" should be used for the estimation of IRB CCF. This requirement is complemented by Article 182(1), subparagraph 3 of the CRR3, which further clarifies that *"each default shall be linked to relevant obligor and facility characteristics at the fixed reference date defined as 12 months prior to the date of default".*

58. This CRR3 implementation follows the prescription in the final Basel 3 framework, in which CRE 36.93 requires that "Banks' EAD estimates must be developed using a 12-month fixed-horizon approach, i.e. for each observation in the reference data set, default outcomes must be linked to relevant obligor and facility characteristics twelve months prior to default".

59. As such, the 12-months fixed horizon approach impacts all the three phases of the CCF estimation:

    a. For the definition of the target variable (calculation of the realised CCF), the 12-months fixed-horizon approach implies that the reference date is fixed exactly 12 months before the default date;

    b. For the risk differentiation (definition of the risk drivers), the 12-months fixed-horizon approach implies that the value of the risk drivers used for the construction of the model must be observed exactly 12 months before the default;

    c. For the risk quantification (calculation of the LRA), the 12-months fixed-horizon approach implies a certain weighting of exposures, which is different from other approaches such as a "cohort approach".

c. Facilities defaulting within twelve months after origination

60. A specific case relates to those facilities that do not meet the conditions to be eligible to have an IRB-CCF assigned, according to section 4.1.2 of these GL, 12 months prior to their default date. The most prevalent of those are facilities that defaulted shortly (within 12 months) after their origination, referred to below as "fast defaults". Applying a fixed 12-month reference date would imply excluding these cases, as they did not exist twelve months prior to their default date. However, given the requirement in Article 182(1)(a) of the CRR3 that *"institutions shall estimate conversion factors by facility grade or pool on the basis of the average realised conversion factors by facility grade or pool using the default weighted average resulting from all observed defaults within the data sources",* institutions should not omit any observations in the RDS.

61. To ensure that the so-called fast defaults can be identified, and appropriate measures can be taken in the CCF estimation, institutions should have a thorough understanding of the drawdown pattern

of a credit facility on its path to default. These GL provide guidance when a credit facility does not meet the conditions, as set out in section 4.1.2, 12 months prior to the default date. For such a facility, institutions should assess whether the facility met these conditions at any point in time in the 12 months period prior to the moment of default. If that is the case, institutions should identify the earliest (oldes) reference date ('retract' the reference date), where the credit facility meets the conditions as set out in section 4.1.2 of these GL. For the avoidance of doubt, by construction this reference date can therefore not be earlier (i.e. older) than 12 months before the default date (as by definition, the retractation only occurs when the conditions are met in the 12 months period prior to the moment of default: If those conditions are not met at any point in time in the 12 months prior to default, the facility should not be included in the RDS used for CCF estimation. Institutions should also check whether this specific facility is not related to a change in the customer product mix as described in section 5.4.1 of these GL.

62. For a credit facility that does not meet the conditions as set out in section 4.1.2 of these GL 12 months prior to the default date, institutions should calculate the realised CCF using the retracted reference date, as specified above. The 'retracting' approach applies in particular to the so-called 'fast' defaults.

63. As a general principle, each default observation that meets the conditions to be eligible to have an IRB-CCF 12 months prior to the default date (irrespective of product profile transformation on the path to default) should be counted only once for the determination of CCF estimates. Depending on the drawn and undrawn amount at reference date, the default observation determines the realised (alternative) CCF either for:

    a. A fully drawn facility, or

    b. A facility in the region of instability, or

    c. A facility that is neither fully drawn nor in the region of instability (standard case).

64. For the sake of clarity, this implies for example that if a defaulted facility is fully drawn 12 months prior to the default date, the facility is used in the calculation of the CCF estimates for fully drawn facilities (such that no retraction of the reference date is needed).

65. For risk quantification, the general principle is that all observations need to be taken into account. Institutions should assess whether a bias is introduced by including all observations, and whether an appropriate adjustment is therefore needed. This bias can arise e.g. due to a too high proportion of credit facilities with a 'retracted' reference date (including so-called 'fast defaults') in the RDS compared to their expected share in the application portfolio. Institutions should appropriately take into account the effect of 'fast' defaults in the risk quantification and, where necessary, distortions of the estimates should be addressed via an appropriate adjustment and a related margin of conservatism.

66. Whether adjustments are needed depends in particular on

a. The ability of the CCF model to differentiate between 'fast' defaults and other defaults by using appropriate risk drivers;

b. The portfolio composition. Portfolios with only a few 'fast' defaults might require different adjustments than portfolios with a large share of facilities with maturities shorter than one year (producing exclusively defaults that did not exist 12 months prior to their default date).

Consultation box

Question 13: Do you have any concerns on the proposed approach for the treatment of so-called 'fast defaults'? In case you already apply a 12-month fixed-horizon approach, do you apply a different treatment for 'fast defaults' in practice, (and if so, which one)? Is the 'fast default' phenomenon material according to your experience? If yes, for which exposures, exposure classes or types of facilities?

d. Multiple default treatment

67. The multiple default treatment has been introduced in paragraph 101 of the GL PD and LGD for the purpose of LGD estimation. In the general case of a second default event occurring shortly after the end of the first default event, it is expected that, without merging these default events, the loss for the first default will be small, biasing the LRA downwards.

68. A similar treatment is proposed for CCF estimation. This implies that multiple default events of the same facility should be merged in case the exit date of one default event and the start date of the second default event occur within a period to be specified by the institution (the 'dependence period'), regardless of the observation year the default events occurred in.

69. These GL prescribe that the minimum length of this dependence period is nine months. A dependence period of nine months is chosen because this allows for as much consistency as possible with the multiple default treatment for LGD.

70. This implies that for the multiple defaults that are merged into one default:

a. the date of default is the date of the first default;

b. the reference date is 12 months before the date of the first default, consistently with the fact that the second default is not considered as a default for CCF estimation;

c. the potential exit date of the default (as far as this is relevant) is the exit date of the last default; and

d. for exposures for which additional drawings after default are included,[6] additional drawings between the start date of the first default and the exit date of the last default should be considered, including those drawings that occur between the exit date of the n^{th} default and the start date of the $(n+1)^{th}$ default.

Example box 1 – illustration of the non-conservative bias for LGD estimation

Date	Jan 22	Apr 22	Jul 22	Oct 22	Jan 23	Apr 23
Default status	ND	D	D (prob period)	ND	D	/ (sold)
Outstanding amount	110	100	90	90	80	/
Of which: past due		10	0		10	
Recoveries	10	10	0	10	0	40 (via sale)

If two defaults are recognised and two realised LGD are calculated, a "close to 0" will be factored in the LRA,[7] and the second realised LGD of 50% (i.e. 40 recovered on an outstanding amount of 80) will be calculated.

If the two defaults are merged, a single realised LGD of 40% (10+ 10+ 40 recovered on the outstanding amount of 100) will be used.

71. For CCF estimation, however, the treatment of additional drawings can lead to different outcomes than for the LGD estimations. More specifically, two cases can be distinguished:

a. The case of non-retail exposures where, in accordance with Article 182(1)(c) CRR, an institution that obtained permission to use own estimates of LGD and CCF is required to reflect the possibility of additional drawings by the obligor up to and after the time of default in their CCF estimates. Similarly, the case of retail exposures where, in accordance with Article 181(2)(b) and Article 182(3) CRR, an institution has opted to reflect future drawings in their CCF. These future drawings should be understood as additional drawings by the obligor after the moment of default;

[6] Non-retail exposures for which additional drawings after default must be included in the realised CCFs, and retail exposures when institution chooses to include additional drawings after default in their realised CCFs instead of LGDs.

[7] The exact realised LGD will depend on the impact of discount rate, the existing of direct or indirect costs related to the recovery process, and potential penalty fees received by the institution. In the second example of realised CCF, the effect of the discount rate is also neglected without loss of generality.

b. The case of retail estimates where an institution has opted not to take into account additional drawings after default.

72. In the first case (a), in a multiple default event, it can be expected that the outstanding amount of a revolving facility will increase such that it is generally prudent to merge these multiple defaults, except in the very specific case where the difference between the drawn amount at the default date and reference date of the second default is significantly larger than the undrawn amount of the second default.

73. In the second case (b), i.e. where additional drawings after default are not taken into account, for the CCF estimation, the conservatism of the multiple default treatment is dependent on the drawing behaviour on the two defaults. This is illustrated in the Example box 2 below, which takes into account the proposed treatment of additional drawings after default as explained in section 3.5.5a of this BR.

74. The multiple defaults treatment is in line with the expectation that institutions set probation periods for defaulted and non-performing exposures (NPE) to identify in an early stage whether obligors are having financial difficulties after repayment continuation. As such, additional drawings that have taken place between two defaults may point to a potential weakness in the identification of financial difficulties of the obligor that re-defaulted, and the resulting realised loss should be modelled appropriately. Similarly, additional drawings during the second default increase the exposure of the institution and as such affects the final loss.

Example box 2 – illustration of the non-conservative bias in CCF

Date	Apr 21	Apr 22	Jul 22	Oct 22	Jan 23	Apr 23
Default status	ND	D	D (prob period)	ND	D	/ (sold)
Outstanding amount	100	150	140	140	180	/
Undrawn	100	50	60	60	20	/
Drawing	+50	-10	0	+40	0	/

If two defaults are recognised and two realised CCFs are calculated, the first realised CCF is 50% (50 drawn out of a 100 undrawn amount at reference date), and the second realised CCF is of 67% (40 drawn out of 60 undrawn amount at reference date).

If the two defaults are merged, then:

a. When additional drawings are taken into account, a single realised CCF of 80% is used. This CCF is calculated as the ratio of the total increase of the outstanding amount of 50 and an additional drawing post default of 30, where 30 is the difference between the maximum drawn amount during the merged default (180) and the drawn amount at default date (150), over an undrawn mount of 100 at the reference date;

b. When additional drawings are not taken into account, a single realised CCF of 50% is used (total increase of the outstanding mount of 50, on an undrawn amount of 100 at the reference date).

As such, the multiple default treatment leads to a more conservative result for the case where additional drawings are taken into account.

To note, even if the outstanding amount decreases after the first default, the multiple default treatment leads to a more conservative result.

Date	Apr 21	Apr 22	Jul 22	Oct 22	Jan 23	Apr 23
Default status	ND	D	D (prob period)	ND	D	/ (sold)
Outstanding amount	100	150	140	140	50	/
Undrawn	100	50	60	60	150	/
Drawn	+50	-10	0	-90	0	/

If two defaults are recognised and two realised CCF are calculated, the first realised CCF is 50% (50 drawn out of 100 undrawn amount at reference date), and the second realised CCF is for the LRA will be 0% (-150% floored at 0%: 0 drawn out of 60 undrawn amount at reference date, and reduction of 90 of the outstanding amount).

If the two defaults are merged, a single realised CCF of 50% is used (total increase of the outstanding mount of 50 and no additional drawing post default, on an undrawn mount of 100 at the reference date), irrespective of whether additional drawings are taken into account or not.

Consultation box

A multiple default treatment is also aligned with the concept of a fixed reference date for a facility defined as 12 months prior to the date of default. Not introducing a multiple default treatment would either imply the exclusion of all those defaults on a facility occurring within 12 months after the exit date of a preceding default on that facility, or it would imply an analysis of the retraction of the reference date of those defaults. As such, it could also be argued to extend the dependence period to identify defaults on a facility that should be merged from 9 to 12 months. However, a consistent approach with the LGD multiple default treatment was chosen, because the number of facilities defaulting between 9 to 12 months after the exit date from their first default is likely to be small.

An issue with the multiple default treatment is that the drawing behaviour in between the exit date of the first default and the default date of the second default might not be representative of normal behaviour of additional drawings after default. However, it is assumed that such cases would not occur frequently provided that the institution appropriately risk-manages their credit lines after default and sets a probation period that reflects internal default experience.

Question 14: Do you have any concerns on the multiple default treatment? To what extent are your current models impacted by the application of a multiple default treatment?

3.5.5 Calculation of realised CCF

75. Article 4(1)(56) of the CRR3 states that '*"conversion factor" or "credit conversion factor" or "CCF" means the ratio of the undrawn amount of a commitment from a single facility that could be drawn from that single facility from a certain point in time before default and therefore outstanding at default to the undrawn amount of the commitment from that facility, the extent of the commitment being determined by the advised limit, unless the unadvised limit is higher*'.

76. As such, institutions should calculate realised CCFs for each facility, as a ratio of:

    a. in the numerator, the difference between the drawn amount at default date and the drawn amount at the reference date;

    b. in the denominator, the committed but undrawn amount at the reference date.

77. The drawn amount should treat fees, interests, and forgiven and written off debt in accordance with sections 5.5.2 and 5.5.4 of these GL, respectively. This treatment is consistent with the treatment expected for the estimation of the realised LGD. Drawings in excess of advised limits should also be incorporated in the drawn amount in accordance with Article 182(1d) CRR.

78. The undrawn amount at reference date should be calculated as the difference between the extent of the commitment and the drawn amount at reference date. The commitment is determined by

the advised limit unless the unadvised limit is higher. In the latter case, the advised limit should be replaced by the unadvised limit.

a. Calculation of realised CCF for the customer product profile

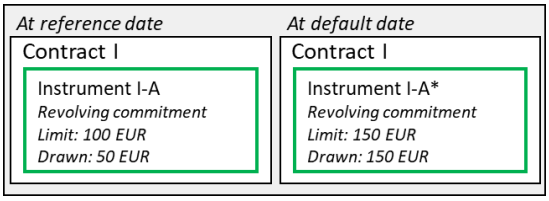
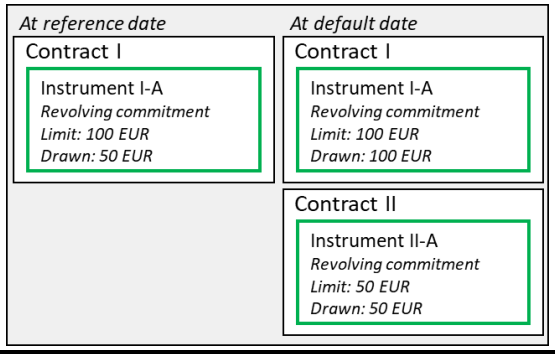
79. One facility may be comprised of several revolving commitments, or of a combination of revolving and non-revolving commitments. As such, the GL are based on the following three principles:

a. Two revolving contracts in the same facility should be treated as one single revolving contract. This include cases where a revolving is originated after the reference date of a first revolving contract;

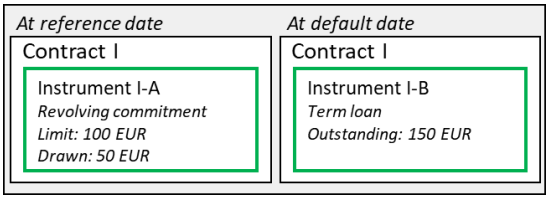
b. There should be consistency between the application and estimation at reference date. In other words, a revolving loan at reference date transformed into a term loan before default is in scope of the estimation;

c. The CCF estimates should not be biased by the payment behaviour of term loans. In other words, the drawn amount of term loans existing at reference date and at default date should be excluded from the realised CCF calculation.

Example box 3 – consumer product mix

Example of changes made to a facility	Realised CCF calculation
Case I 	There is a limit increase on the contract. The limit increase is not taken into account in the denominator, but the drawn amount (beyond the limit at reference date) is taken into account in the numerator. Realised CCF = (150-50)/(100-50) = 200%
Case II 	Contract II is originated within the same facility as Contract I. The treatment is consistent with limit increases. As such, Contract II is considered for the drawn amount at default date. Realised CCF = (150-50)/(100-50) = 200%

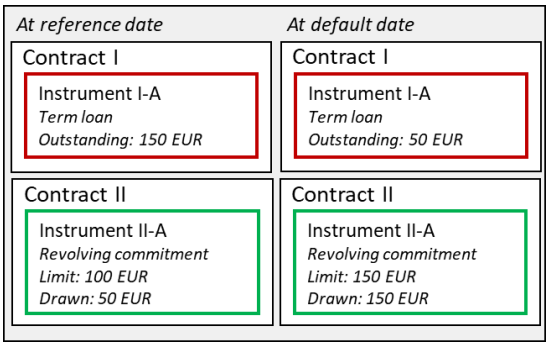
Case III



The revolving commitment is restructured between reference and default date into a term loan. In order to maintain consistency between application and estimation date, the outstanding amount at default on the term loan should be considered for the calculation of the CCF.

Realised CCF = (150-50)/(100-50) = 200%

Case IV

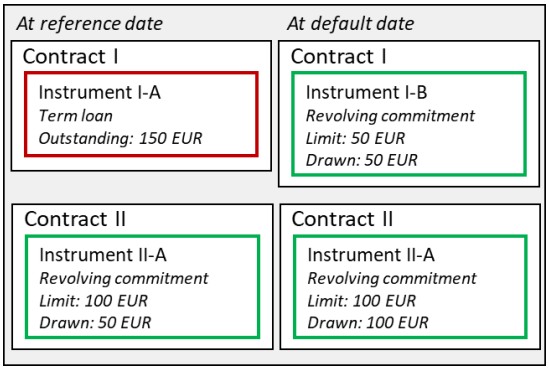


Changes in the outstanding amount of the term loan in the same facility should not dilute the CCF calculation.

To note, in the application phase, this leads to a conservative treatment, as the reduction of the exposure value in the term loan is not accounted for, while the exposure value on the revolving loan is accounted for. This is consistent with the conservatism embedded in the CRR3, as this non reduction of exposure value of the term loan is already present in the CRR3; in the case of the non-existence of a revolving loan, the exposure value at default used for the calculation of own funds requirement should equal 150 and is not to be reduced by any pre-payment expected before default.

Realised CCF = (150-50)/(100-50) = 200%

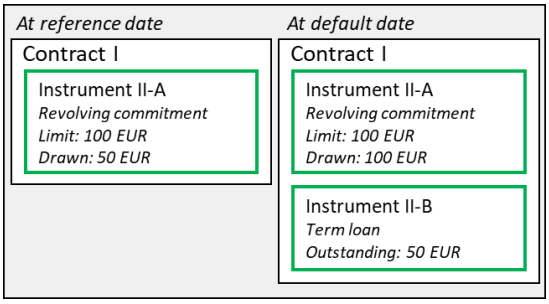
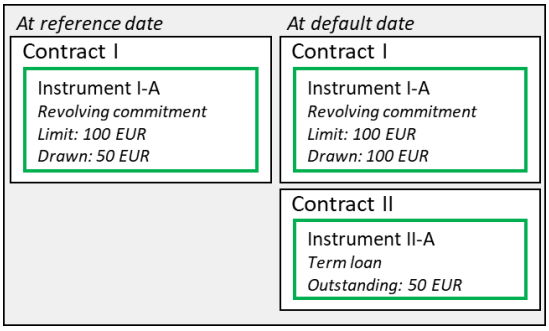
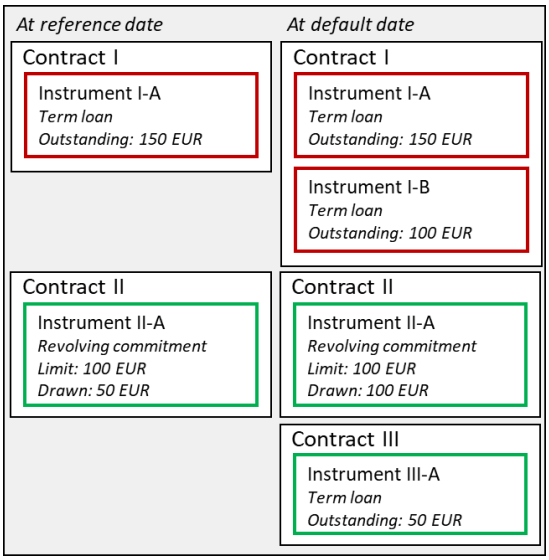
Case V

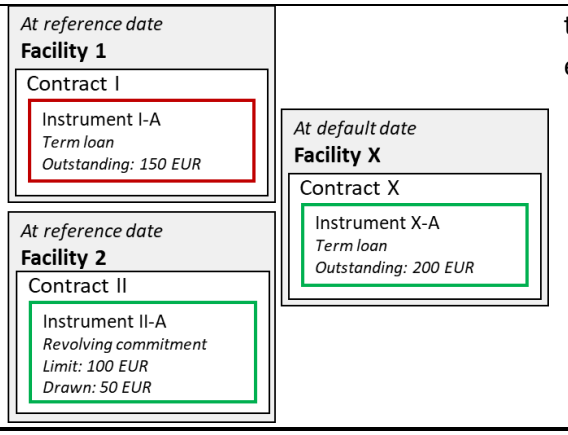


Instrument I-A is not taken into account in the realised CCF calculation (consistent with Case IV), but instrument I-B is taken into account (consistent with Case II). Again, the conservatism embedded in this calculation stems from CRR3, where prepayments on term loans are not taken into account in the EAD determination.

Realised CCF = (150-50)/(100-50) = 200%

Remark: *Instrument I-B can be excluded if it is in another facility. The principles used to demonstrate*

	that it should be in another facility should be consistent with the principles used to determine what constitutes a facility at application date.
Case VI 	Consistent with Case II and Case III, the outstanding amount on the added term loan should be taken into account in the drawn amount at default. Realised CCF = (150-50)/(100-50) = 200%
Case VII 	Consistent with Case VI above, the term loan should be considered for the drawn amount at default. Realised CCF = (150-50)/(100-50) = 200% **Remark:** *Instrument II-A can be excluded if it is in another facility. The principles used to demonstrate that it should be in another facility should be consistent with the principles used to determine what constitutes a facility at application date.*
Case VIII 	Consistent with Case IV (term loan excluded) and Case VII (Instruments II A and Instrument III-A included). Realised CCF = (150-50)/(100-50) = 200% **Remark**: *Instrument III-A can be excluded if it is in another facility.*
Case IX	Two facilities are restructured and merged into one recovery account. Institutions should determine the allocation of the outstanding amount of the



term loan at default to the revolving commitment existing at reference date.

80. For those contracts replacing other contracts, institutions should develop an appropriate methodology for the allocation of drawings and repayments to the original contracts constituting the facilities already available at the reference date.

81. Institutions should be able to demonstrate the soundness of the allocation mechanism, which should reflect the relevant institutions' policies as well as the actual practices for the management of restructuring and should apply it consistently across exposures and over time. In any case institutions should demonstrate that the process of allocation of drawings and repayments is effective and does not lead to biased CCF estimates.

Consultation box

Question 15: Do you agree with the three principles for the calculation for realised CCF in the context of consumer product mix, and their implications for the cases mentioned as examples? In case of disagreement, what is the materiality of the cases with unwarranted results, in particular in relation with the definition of facility applied in your institution? In case of material unwarranted results, can you describe your alternative practice to this CP?

Question 16: Are there any concerns related to the allocation mechanism described in these GL?

b. Additional drawings after default

82. For non-retail, the CRR3 requires institutions to reflect the possibility of additional drawings by the obligor up to and after the time the default event is triggered in their CCF estimates. For retail, Article 181(2), second subparagraph, CRR, provides institutions the discretion to include these drawings in their CCF estimates (as long as they ensure consistency with the LGD).[8] The figure below describes a typical default cycle observed in the RDS:

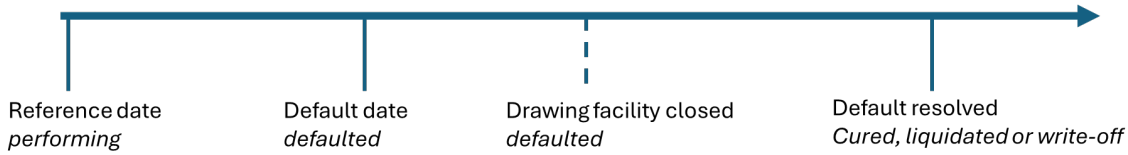
[8] 'where institutions include future additional drawings in their conversion factors, those should be taken into account in the LGD in both the numerator and the denominator. Where institutions do not include future additional drawings in their conversion factors, those should be taken into account in the LGD numerator only.'

a. At reference date, the facility is still performing;

b. At default date, the facility is defaulted;

c. At some point during the default period, the institution decides to close the drawing possibilities on the facility. This could take place at the default date, later in the default process (e.g. when the institution starts liquidation procedures), or not at all (for example if the obligor is going concern and the cures back to non-defaulted, and was able to keep using the facility through forbearance measures);

d. At some point, the default resolves, either in a cure (facility goes back to non-defaulted), a liquidation and the loan is repaid (partially by liquidating collateral), or a write-off.



83. Where the institution takes into account additional drawings after default in their CCF estimates, all *observed* drawings should in any case be taken into account for the calculation of the realised CCF. However, if the defaulted facility relates to an obligor that is managed by the bank as a 'going concern', many drawings (and repayments) can be observed on the facility. Simply adding all additional drawings to the drawn amount at default date (after discounting) would in such cases lead to very high CCFs and very low LGDs. The better and more granular the data of the institution, the higher the CCFs, and the lower the LGDs. Although at the level of the expected loss estimation these high CCFs multiplied with low LGDs would cancel each other out, in case risk differentiation for either model does not perform perfectly, this simple treatment can still cause issues for the estimation of RWEA and EL amounts.

84. As such, the requirements on the calculation of additional drawings after default have been clarified, namely that these additional drawings should be calculated as the difference between the exposure at default, and the maximum of the drawn amounts in default, discounted back to the default date, over the observed defaulted period. For the avoidance of doubt, the total drawn amount should be calculated as follows:

$$additional\ drawn\ amount = \max_{t\ \epsilon\ [0:T]} \left(DA_t * \frac{1}{(1+r)^t} \right) - DA_{t=0}$$

85. Where DA_t is the drawn amount at time t, where $t = 0$ at the default date and $t = T$ at the end of the default of the facility. The discount rate r should be applied following a similar methodology as described in paragraph 143 of the GL PD and LGD.

86. This approach avoids calculating very high realised CCFs and very low realised LGDs without a business meaning. However, institutions should ensure that they are consistent in applying this approach for the calculation of the realised CCF and the calculation of the denominator used for the realised LGD, in particular in relation to their implementation of paragraph 140 of the PD and LGD GL.

Consultation box

Several other options were also considered for the treatment of additional drawings after default. An alternative option was to include all observed drawings after default in the drawn amount at default date (after discounting), and to clarify that repayments and recoveries should not be subtracted (when including additional drawings after default in the numerator of the realised CCF). As mentioned, including these drawings in the realised CCF without any consideration of repayments leads to unintuitive results. It was also considered under the alternative option to allow the netting of drawdowns and repayments over a relatively short time horizon (e.g. one month) in these types of situations/products. Although this alternative option is not introduced in these GL, feedback from the industry is requested on the impact of the chosen approach, in particular in relation to the consistency with the calculation of the denominator of the realised LGD in relation to the institutions' approved LGD models.

Another element is related to the potential occurrence of additional drawings that are not necessarily reflective of the default risk, e.g. drawings during the probation period or during the 'performing' period of two consecutive defaults that are merged under the multiple default treatment.

Question 17: Where credit lines are kept open even if the facility is in default, the alternative option described in this consultation box could lead to high realised CCF values. Is this a relevant element for your institution and if yes, why and how material are these cases within the scope of IRB-CCF models?

Question 18: In case of multiple defaults, the CCF might also be driven by drawings while the obligor was in its default probation period or in the dependence period between the merged defaults. Do you expect this to be material for your CCF models?

Question 19: Do you see any unwarranted consequences of the proposed approach for incorporating additional drawings after default? In particular, in order to maintain consistency between the realised CCF calculation and the calculation of the denominator of the realised LGD as described in paragraph 140 of the GL PD and LGD, would this require a redevelopment of your LGD models?

c. Unadvised limit

87. Institutions should consistently apply their definition of the unadvised limit in the calculation of the denominator of the realised CCF, the application of the risk parameters as set out in chapter 11 and during the RoE as set out in chapter 12. Consistency between the estimation and the application

phase, as well as during RoE, should be ensured to avoid any source of arbitrage (i.e. by using a higher "unadvised" limit during the estimation phase, and then the "advised" limit in the application phase). Such a requirement is introduced in the different relevant sections to ensure this consistency.

d. Region of instability

88. in accordance with Article 182(1a) CRR, Institutions are required to ensure that their CCF estimates are effectively quarantined from the potential effects of the region of instability (RoI) caused by a facility being close to being fully drawn at reference date. To prevent exposures in the RoI from falling in the same grades or pools as other exposures, institutions shall identify and appropriately differentiate the facilities in the ROI. To this end, the requirements describe three principles related to the calculation of realised CCFs and the estimation of CCFs:

    a. **Segregate the region of instability.** As a first principle (stemming from CRR3), institutions are required to appropriately differentiate the facilities in the RoI such that the CCF estimates are quarantined from its effects. For the assessment of the adequacy of the RoI definition, institutions should test whether their models have sufficient predictive power. The predictive power should not only be measured at the level of the CCF estimate, but also at the level of the final exposure value estimates, for both facilities inside and outside of the RoI. This requirement is introduced because even CCF models with a high discriminatory power and small prediction errors in CCF estimates may lead to large prediction errors in the exposure value estimates;

    b. **Conditions to use an alternative realised CCF.** As a second principle, institutions are allowed to deviate for the facilities in the RoI from the definition of realised CCF, subject to some conditions, and use a different definition to calculate a realised CCF;

    c. **Estimation of the alternative realised CCF.** As a third principle, requirements are prescribed on how to calculate under this alternative approach the realised exposure amount at default.

89. The rationale for the latter two principles is described below.

Conditions to use an alternative realised CCF

90. The differentiation between the facilities that are within and outside the RoI is already possible under the general framework, based on adequate risk drivers such as the utilisation rate. However, a mere segregation of these exposures may not be sufficient and lead to model outcomes that do not relate to the economic reality. For such cases, where institutions may not be able to meet discriminatory and predictive testing requirements in certain circumstances when estimating CCFs for facilities in the RoI, an alternative CCF parameter may be used.

91. In this RoI, high utilisation rates that would lead to high realised CCFs do not necessarily lead to overly conservative results. This is because, as long as the drawn amount between the reference date and the default date is not higher than the undrawn amount at the reference date, CCF estimates are not expected to be higher than 100%. This entails that, in the application phase, the OBS part of the exposure value for the facilities with a high utilisation rate is not expected to be material, as the CCF is applied to a low undrawn amount.

92. However, some counter-intuitive results can occur when the drawn amount at default date goes beyond a conversion of the undrawn amount at the reference date, leading to realised CCFs potentially much higher than 100% (or much lower than 0% in case of negative realised CCFs). For example, this is the case where the limit is increased between the reference date and the default date, or due to the application of fees that can make the additionally drawn exposure much higher than the undrawn amount at reference date. For instance, a fee of 10 euros on a facility with an undrawn amount of one euro leads to a realised CCF of 1000%. In these circumstances, some overestimation can occur in the case where the related CCF estimates are applied to undrawn amounts that are larger in the application portfolio. This overestimation should, in the general framework, be tackled via appropriate differentiation, and as such could be seen as a problem of homogeneity of the design of grades or pools. However, in the RoI, building homogenous grades or pools could require an unduly high number of grades, and could therefore not be feasible in practice, due to the high dispersion of the realised CCFs. Instead, a re-parametrisation of the CCF estimation may ease the modelling process without deviating from the CRR3 principles to derive an exposure value.

93. The Basel 3 framework specifically allows for a different approach in this RoI:

> Basel III – CRE 36.95: '*An acceptable approach could include using an estimation method other than the ULF* [undrawn limit factor] *approach that avoids the instability issue by not using potentially small undrawn limits that could approach zero in the denominator or, as appropriate, switching to a method other than the ULF as the region of instability is approached, e.g., a limit factor, balance factor or additional utilisation factor approach.*[9] *Note that, consistent with CRE36.94, including limit utilisation as a driver in EAD models could quarantine much of the relevant portfolio from this issue but, in the absence of other actions, leaves open how to develop appropriate EAD estimates to be applied to exposures within the region of instability.'*

94. As such, it is considered that an alternative approach, where institutions may estimate CCFs for facility grade or pools based on an alternative definition of the realised CCF, is only appropriate for those facilities where the CCF estimation is not possible or is infeasible. In practice, these facilities should be identified as being above a certain threshold value relative to the utilisation rate. As

[9] ULF, or undrawn limit factor, is the CCF calculation approach as prescribed in the CRR3. A limit factor (LF) is a specific type of CCF, where the predicted balance at default is expressed as a percentage of the total limit that is available to the obligor under the terms and conditions of a credit facility.

mentioned, the utilisation rate is defined as the ratio of the total drawn amount over the limit of a facility.

95. Institutions should set up a clear policy on how to define the value of the relative threshold described above. Such a threshold value should be defined in relation to a dispersion measure (such as the variance) of the realised CCF. The general principle for setting up the threshold is that, on the one hand, it should lead to an RoI definition that covers the facilities that potentially distort the CCF estimates and, on the other hand, includes an undrawn amount as small as possible (at portfolio level). The general aim of defining such an RoI should be to limit the number of defaults in the RoI whilst quarantining as many outliers caused by the RoI as possible. Furthermore, the threshold should be established in such a way to have a manageable dispersion of the realised CCF below such threshold.

96. Due to the large diversity in products and limit sizes, it was considered not appropriate to prescribe a regulatory value for this threshold.

Requirements on estimation of the alternative CCF

97. Regarding the third step, i.e. the requirements for the alternative CCF approach, it is considered that institutions should apply a single approach, as this would further the harmonisation of CCF estimates used by institutions**.** Comparability and benchmarking (performance and discriminatory power) of estimates under this single prescribed approach would also be more straightforward.

98. The Basel III framework allows for alternative approaches to calculate the exposure amount at default for facilities in the RoI. The Basel III framework describes in footnote 8 of CRE 36.95 three main different estimation approaches:

a. Calculate the drawn amount at default date as a percentage of the limit at reference date;

b. Calculate the drawn amount at default date as a percentage of the drawn amount at reference date;

c. Calculate the drawn amount at default date minus the drawn amount at reference date as a percentage of the limit at reference date.

99. It was considered most straightforward to allow institutions to calculate for the facilities in the RoI the realised drawn amount at default as a percentage of the limit at reference date. Institutions would then also be allowed to estimate this alternative CCF and apply this alternative CCF estimate consistently to facilities in the RoI at application date.

100. For defaulted facilities that are fully drawn at the reference date, this alternative realised CCF definition should in any case be used, as the denominator of the standard CCF is not defined for fully drawn facilities

Consultation box - On the conditions to use an alternative EAD approach

It was also considered to include, in addition to allowing for relative thresholds to be used for different limit or product types, an absolute threshold with respect to the undrawn amount in absolute currency (e.g. euro) amounts.

The relative threshold would suffice in many cases, as also small euro amounts (e.g. 5 EUR) would often be covered by the relative threshold (e.g. a 2% relative threshold on a 1000-EUR limit already implies an absolute threshold of 20 EUR). Rounding errors would therefore in any case be captured. However, it was argued that an absolute threshold would make sense for products with small limits. For example, a 500-EUR limit with a relative threshold of 1% would not include in their region of instability amounts above 5 EUR. The EBA would be specifically interested in feedback regarding the materiality of these products with relatively small limits.

Institutions might use the absolute threshold to differentiate between two products with totally different limit amounts. Here, it was considered that it is more appropriate to allow for multiple relative thresholds for different limit magnitudes (instead of one additional absolute threshold).

Question 20: Do you think that the relative threshold is an appropriate approach to restrict the use of the alternative CCF approach for those facilities in the region of instability? Do you think it is appropriate to define a single relative threshold per rating system or are there circumstances where multiple relative thresholds would be warranted? Do you see a need to use an absolute threshold in addition to the relative thresholds?

Question 21: Do you consider the guidance sufficiently clear in relation to the requirement for institutions to set up a policy to define a threshold value?

Question 22: Do you consider it appropriate to set a prescribed level or range for the defined threshold, and if so, what would be an appropriate level for the threshold? In case an absolute threshold is warranted, what would be an appropriate prescribed level for an absolute threshold?

On the requirements on the alternative EAD approach

Question 23: Do you think that, for the facilities in the region of instability, and/or for fully drawn revolving commitments, a single approach should be prescribed (e.g. one of the approaches above defined in the Basel III framework), or that more flexibility is necessary for institutions to use different approaches they deem most appropriate for these facilities?

Question 24: If such flexibility is indeed warranted, what is the technical argumentation why prescribing a single alternative approach for these facilities is not suitable? Which cases or which types of revolving commitments could not be modelled under the approaches prescribed? Are there types of revolving commitments that could not be modelled by any of the approaches described in the Basel III framework?

Question 25: Which of the three approaches described in the Basel III framework is preferred in case a single approach would be prescribed?

3.6 Chapter 6: Risk differentiation

1.1.1 Risk driver selection

101. This section leverages largely on the PD and LGD GL, sections 5.2.2 and section 6.2.1. The rationale for these criteria is explained in the background and rationale section of the GL PD and LGD.

3.6.1 Testing model performance

102. This section on the testing requirements that are applicable during model development has been expanded in comparison to the GL PD and LGD and leverages strongly on the supervisory handbook on the validation of rating systems under the Internal Ratings Based Approach ('the validation handbook'). The required testing dimensions are introduced in this validation handbook to ensure a robust model.

103. Although the CRR3 explicitly floors negative CCFs in the risk quantification, no treatment is prescribed for negative CCFs in the differentiation of drawing behavior. Nonetheless, as part of the evaluation of the performance of the model, institutions should assess whether the CCF model appropriately assigns facilities with negative CCFs to the lowest CCF grades.

104. It is clarified that the testing of model performance, and particularly the discriminatory power, should be performed on the final ranking as well as on relevant intermediate steps of the model development process.

a. Discriminatory power

105. A requirement for discriminatory power is introduced, namely that the institution should ensure that the developed model can efficiently discriminate riskier facilities from less risky ones, based on the difference in the level of drawn-down risk, on the entire portfolio and on relevant subsegments of the portfolio. The introduced requirements leverage on the validation handbook and further clarify the requirement in Article 170(3)(c) CRR that the process of assigning exposures to grades or pools shall provide for a meaningful differentiation of risk and Article 34(1)(a) of the CDR on IRB assessment methodology.

106. These GL require institutions to perform out-of-sample and out-of-time testing for discriminatory power. This requirement is derived from Article 175(4)b) CRR and Article 35 of the CDR on IRB assessment methodology, to ensure that institutions have sufficient confidence that the developed model does not suffer from overfitting and that its performance is preserved over different economic conditions.

a. Out-of-sample testing is required as IRB models should not suffer from overfitting and be able to perform robustly on the application portfolio, which is likely to contain different exposures to different obligors compared to the observations in the RDS and development sample;

b. Furthermore, applying model estimates to the application portfolio to calculate the capital requirements needed to cover unexpected losses is an out-of-time application. As such, out-of-time testing the performance of the model under various economic conditions should be performed to allow for stable model use across time and across changing environment or economic conditions.

107. In the case where negative realisations of CCFs in the out-of-time and out-of-sample samples are observed in grades or pools associated with higher draw-down risk, institution should demonstrate that these observations do not put into question the discriminatory power of the models.

b. Homogeneity and heterogeneity

108. Institutions should analyse whether any concentration of facilities in rating grades or pools is not an indication of a lack of homogeneity within grades or pools and therefore of missing risk drivers or of insufficiently granularity of the grades or pools. At the same time, institutions should avoid significant overlaps of the distributions of draw-down risk between grades or pools, without creating an undue concentration of facilities in certain grades or pools. Lack of heterogeneity between grades or pools may limit the robustness of CCF estimates within individual grades or pools.

109. On the other hand, institutions should analyse whether any concentration in rating grades or pools is not an indication of a lack of homogeneity within grades or pools and therefore of missing risk drivers. As such, institutions should perform homogeneity testing on the final grades of the model and compare for subpopulations of a particular grade identified along key risk characteristics that distinguish relevant subsegments of the application portfolio the LRA CCF, over the entire historical observation period.

3.7 Chapter 7: Risk quantification

3.7.1 The long-run average CCF

110. Institutions should calculate the LRA CCF as an arithmetic average of realised CCFs over a historical observation period weighted by the number of defaults. Institutions should not use for that purpose any averages of CCFs calculated on a subset of observations, in particular any yearly average CCF, in line with the requirements for LGD estimation. No other subset of observations should be defined to calculate averages of CCFs. This relates in particular to averaging facilities belonging to an obligor and are assigned to a single grade and using these intermediate averages to estimate grade level average CCFs, as this practice could potentially hide homogeneity issues that should be resolved in risk differentiation.

111. Next to that, Article 182(3) second subparagraph, CRR has been amended removing the derogation of Article 182(1)(a) that an institution need not give equal importance to historic data if more recent data is a better predictor of drawdowns. As such, these GL do not allow for such a derogation or another type of unequal weighting of default observations.

Consultation box

An alternative approach was considered, namely a two-step weighted average:

a. Average the realised CCF of facilities within one grade at the obligor level, weighting each observation with the undrawn amount-at-reference date; and then

b. Perform the arithmetic average CCF (i.e. weighted by the number of defaulted obligors) within the CCF grade.

However, under this approach, three situations for a single obligor with two facilities can occur.

a. There is a similar drawing pattern for the two facilities; in such case, instead of weighting the LRA with a weight 2 (i.e. 2 facilities), a weight 1 (i.e. 1 obligor default) would be used. It is not clear whether this weight of one is appropriate in relation to another obligor that has only one facility, given that the final estimate is applied to facilities;

b. There is a different drawing pattern for the two facilities such that they are in different grades; in such case, there is no difference between the approach in these GL and the approach described in this consultation box;

c. There is a different drawing pattern such that the two facilities are in the same grade, but there is a homogeneity issue in this grade.

Question 26: For the purpose of the long run average calculation, are there any situations where such intermediate exposure weighted averaging at obligor level would lead to a different outcome (that is unbiased) with regard to the CCF estimation? How material is this for your portfolio?

3.7.2 Incomplete observations

112. For non-retail exposures, Article 182(1)(c) of the CRR3 requires institutions to include additional drawings after default in their CCF estimates. For retail exposures, Article 182(3) of the CRR3 provides institutions the discretion to include these drawings in their CCF estimates (as long as they ensure consistency with the LGD).

113. When institutions take into account additional drawings in their CCF estimates, the *observed* drawings after default should be included in the realised CCF calculation. Similarly to the LGD, institutions should also calculate the 'observed average CCF' taking into account realised CCFs of only

those defaults that are related to closed drawing processes. The following sets of exposures should be used for the calculation of observed average CCF for resolved cases:

a. Terminated facilities (i.e. credit lines are closed or where the drawing is permanently disabled);

b. Facilities that remain in the defaulted status for a period longer than the maximum period of the recovery process as described in paragraph 156 of the GL PD and LGD;

c. Facilities fully repaid or written off; and

d. Facilities reclassified to non-defaulted.

114. The 'observed average CCF' has to be adjusted to account for the most recent experience based on the incomplete drawing processes, to obtain an adequate LRA CCF. However, a modelling challenge is that not all additional drawings are observed for unresolved default cases at estimation date. Analogously, for the realised LGD calculation, institutions have to estimate the expected recoveries for the unresolved cases. To note, the estimation of additional drawings for incomplete workout processes is also relevant for the denominator of the realised LGD (if additional drawings are included in the CCF estimates).

115. To deal with these incomplete drawing processes, it is considered appropriate to provide for two different approaches, where the institution has the discretion to choose between the two approaches (i.e. if the conditions for the use of the simple approach are met, there is no supervisory expectation favouring one of the two approaches). As such, these GL provide guidance for the following:

a. a simple approach, to calculate the additional drawings on the unresolved cases; and

b. a modelling approach, similar to the approach in the GL PD and LGD for estimating the recoveries for unresolved cases for the purpose of the LGD.

116. It is noted that such a simple approach would only be relevant for the non-retail facilities, and subject to some conditions. For retail facilities, the institutions can choose to exclude additional drawings from their CCF estimates. In case they opt to include them in the CCF estimates, they should apply the modelling approach, as described in paragraph 95 to 96.

a. Simple approach

117. While institution might observe drawings after default, the burden of estimating the future drawings for unresolved cases might be disproportionate relative to having more reliable estimates. This would be the case in particular when additional drawings would represent a limited portion of total drawn amount considered in the numerator of the realised CCF.

118. Under the simple approach, the realised CCF of the defaulted facilities with a remaining positive undrawn amount at the estimation date should be calculated as the realised CCF of the individual defaulted facility calculated as if no further drawn amounts were observed after the estimation date. To maintain the conservatism of the simple approach, these estimated realised CCFs should not contribute to the calculation of the LRA CCF, in case the realised CCF is lower than the LRA CCF calculated in the corresponding facility grade or pool on the resolved cases.

119. However, in order to be able to use the simple approach, institutions should demonstrate that the expected impact of estimated additional drawings on the CCF estimates would be low, as mentioned in paragraph 117. These GL describe two different methods to demonstrate such low materiality. As a condition to use the simple approach for non-retail facilities, institutions should either demonstrate that:

a. the low materiality of the facilities currently in default with a remaining positive undrawn amount at estimation date, both in terms of number of facilities and total outstanding amount of unresolved defaults; or

b. their internal risk management policies in place restrict additional drawings shortly after default. The effectiveness of such risk management policy should be determined by observing, across the historical observation period, a low share of observed additional drawings after default relative to the observed undrawn amount at reference date.

120. Under this simple approach, the margin of conservatism (MoC) for each category should not be reduced by the inclusion of facilities in default with a remaining positive undrawn amount at estimation date. This is equivalent to excluding the observations for estimating the uncertainty related to Category C MoC, but use these observations potentially for Category A MoC and Category B MoC.

b. Modelling approach

121. A key element of the LGD treatment is the introduction of a maximum recovery period, determined by the institution, after which no estimation of future recoveries and cost is possible. This treatment is necessary to ensure reliable estimations, by dividing the estimation of the LGD until the end of the work out into two steps: (i) the determination of a maximum duration of the work out period is common for all facilities; and (ii) the estimation of the recoveries up to the end of this work out period. To note, this sequencing generally goes in the direction of conservativeness on the LGD side, as stopping the estimation of the recoveries after a certain point in time increases the observed LGD (provided the cost do not outweigh recoveries). A maximum recovery period also makes sense from an economic perspective, as there is an increasing likelihood of zero or very little recoveries after a certain period.

122. Stable and reliable estimations of future drawings for unresolved cases are needed if additional drawings after default are considered for CCF estimates. To determine up to which point the

expected additional drawings on unresolved cases should be calculated, institutions could, under the modelling approach, specify a maximum drawing period after which they do not expect any more drawings on their unresolved cases. However, for the sake of simplicity and in order to prevent wrong incentives to reduce this period to reduce the realised CCF, these GL require to use as the same period for the maximum drawing period as the one used for LGD estimation, i.e. the maximum recovery period. This does not add any conservative bias; in the case where the facility is closed (i.e. the drawing process is closed) before the end of the recovery process, and hence no drawings are observed between the end of the drawing process and the end of the recovery process, the (estimated) additional drawings over this period would be zero EUR.

123. For unresolved facilities that have not reached the maximum drawing period, the additional drawings that are expected to occur for that facility should be estimated by applying a modelling approach based on the already existing text of the PD LGD GL. The principles of this approach are relevant for the unobserved additional drawing process as well.

Consultation box

On the simple approach

Question 27: Do you have any comments on the condition set to use the simple approach to estimate additional drawings after default. Do you consider that the simple approach is also relevant for retail portfolios?

Question 28: It was considered that requiring institutions to exclude unresolved cases from the long run average CCF, if their realised CCF is lower than the LRA of the corresponding facility grade, could be seen as too conservative. Do you have any comments on this treatment introduced in the simple approach? Do you have specific examples when this treatment would not be appropriate?

On the modelling approach

The EBA considered the following options to be possible in relation to the marginal drawing after the maximum drawing period.

Option A: currently implemented in these GL require institutions to set the maximum drawing period equal to the maximum recovery period. Exposures that have passed the maximum drawing period are included in the set of resolved cases assuming that no additional drawings will occur and realised CCFs are calculated accordingly, based on the assumption that drawing processes are likely to be shorter than recovery processes. Including these facilities in the resolved set is likely to be a conservative choice for the calculation of CCF, since exposures that have been very long in the portfolio, i.e. have passed the maximum drawing period, are likely to have already high CCFs.

Option B: it was also considered to allow institutions to set a maximum drawing period different from the maximum recovery period. However, whereas it is for LGD generally conservative to not allow for any additional recoveries after the maximum recovery period and consider facilities that

are in default longer than this period to be closed, not estimating any additional drawings after the maximum drawing period would not be conservative for CCF. Under this option B, two approaches were considered, i.e. to require institutions to either:

a. calculate one additional drawing to occur after the maximum drawing period: this one additional drawing would be calculated as a simple average of the marginal observed drawings after the maximum drawing period, based on the set of resolved facilities; for unresolved facilities that have reached (and passed) the maximum drawing period, institutions should also add this single additional drawing; or

b. include exposures that have passed the maximum drawing period in the set of resolved cases, adding one additional drawing of the size of the full undrawn amount. This would be a conservative alternative.

Question 29: Do you have any comments on the modelling approach to estimate additional drawings after default for unresolved cases?

Question 30: Do you have any concerns with the requirement to use as a maximum drawing period the maximum recovery period set for LGD?

3.7.3 Calibration to the long-run average CCF

124. While the flexibility is left for institutions to choose an appropriate estimation methodology, it is also necessary that the estimates are calibrated to the LRA CCF. This is reflected in section 7.2 of these GL that heavily relies on section 6.3.3 'Calibration to the long-run average LGD' of the GL PD and LGD. Two elements are introduced in these GL:

a. It is clarified that the calibration sample length should be the same length as the length of the quantification sample, as was already clarified in the background and rationale of the GL PD and LGD; and

b. For the case of missing risk drivers, a link is made to the appropriate MoC category.

Consultation box

The concept of calibration, as well as related concepts of calibration segment and calibration samples were introduced in the framework via the GL PD and LGD. As such, they refer to the calibration as the part of the estimation process which leads to appropriate risk quantification. Several methodologies can be used in this context.

One way (among many others) to classify these methodologies, is to refer to the calibration methods at grade level, versus the calibration methods at portfolio level. In the context of PD and LGD estimation, the portfolio-level calibration has been used for several reasons, such as achieving a specific

dynamic of the average portfolio PD or derive direct estimates with continuous rating scales in accordance with Article 169(3) CRR.

While these notions proved useful in the context of the PD and LGD estimation, their relevance is less clear in the context of CCF estimation, also considering the reduced scope of modelling under CRR3.

Question 31: For CCF estimation, do you use estimation methods that incorporate portfolio-level-calibration of the estimates? What are the main reasons to use a calibration at a level that is higher than the grade-level calibration?

3.8 Chapter 8: CCF for defaulted exposures

125. These GL prescribe the methods to assign a CCF estimate to defaulted facilities.

126. For portfolios where additional drawings are not taken into account in the CCF estimates, no CCF needs to be assigned to defaulted facilities as any increase in exposure is taken into account in institution's LGD estimates.

127. For portfolios where additional drawings are taken into account in the CCF estimates, the guideline provides for two approaches.

a. A modelling approach that follows the principles of the modelling approach for LGD in-default estimates. It is noted that the 12-month fixed-horizon reference date in any case is not appropriate for CCF-in-default estimates;

b. For non-retail facilities, a simple approach that allows institutions to apply CCF estimates for non-defaulted facilities also to defaulted facilities.

128. This simple approach is appropriate to allow for modelling efforts to be proportional to the materiality of the resulting estimates, with sufficient conservatism when internal risk management policies are in place to restrict additional drawings, as evidenced by a low share of observed additional drawings after default in the historical observation period relative to the observed undrawn amount at default date.

129. Institutions should apply the non-default grade level estimates to facilities based on their latest available grade assignment before default date. In other words, no specific rating scale is expected for defaulted exposures in the estimation phase, and no migrations are expected during the time in default of the facility in the application phase.

Consultation box

Question 32: Do you have any comments on the guidance for the CCF estimation of defaulted exposures?

Question 33: Do you have any comments on the determination of the low share of observed additional drawings after default in the historical observation period relative to the observed undrawn amount at default date? Do you consider it appropriate to set a prescribed threshold to determine what constitutes this low share? If so, what would be an appropriate value for such a materiality threshold?

3.9 Chapter 9: Treatment of deficiencies and margin of conservatism

130. The framework for the treatment of deficiencies and MoC in CCF estimation is similar to the framework applicable for PD and LGD estimation.

131. However, specifically for the CCF estimation, in some instances, at least for parts of the portfolio, institutions would not be able to reliably estimate an IRB-CCF. Situations where this might be the case include the following:

a. Revolving exposures represent an immaterial part of the application portfolio: this could be exacerbated in the context of low-default portfolios, where there are too few CCF observations for revolving commitments;

b. Poor discriminatory power (e.g. model performance AUC metric is insufficient implying that the model does not perform better than a random model). A related issue is that the risk drivers identified by the institution exhibit a counterintuitive relationship with drawing behaviour;

c. Determining specifically for one single facility an IRB-CCF for the revolving commitment part only, rather than modelling the exposure at obligor level, introduces a lot of model complexity for which institutions might not have the data.

132. However, in order to meet the requirements of the CRR, Part three, Title II, chapter 3, section 6, in particular Article 179 and Article 182, it is sufficient for institutions to apply a sufficient MoC in their CCF estimates such that these final CCF estimates have a minimum value of 100%. This approach is subject to the following conditions:

a. It can only be applied to the part of the application portfolio where the institution can demonstrate that there is a scarcity of historical data to reliably model the CCF estimate;

b. Institutions should define a MoC that is sufficiently conservative. As such, it is possible that the final CCF estimate for the related facilities is higher than 100%; and

c. The fixed CCF approach is subject to back-testing requirements to ensure sufficient conservatism in the estimate.

3.10 Chapter 10: Downturn CCF estimates

3.10.1 Differences in application between LGD and CCF downturn framework

133. The framework for downturn LGD is generally applicable also for the estimation of downturn CCF estimates. In particular, the CDR on downturn periods is relevant for both the LGD and CCF estimates. Although institutions can play an active role in limiting CCFs in a downturn period, e.g. by active limit management and risk appetite control, it is still important to test the relevance of downturn periods for CCF estimates. This also clearly stems from the Article 182(1)(b) CRR which states that '*in quantifying the risk parameters to be associated with rating grades or pools institutions shall use conversion factor estimates that are appropriate for an economic downturn if those are more conservative than the long-run average*.' In crisis situations where liquidity and solvency issues are difficult to differentiate, it is possible that institutions increase the flexibility and relax potential drawing restrictions on credit lines to obligors which could result in higher CCFs during these periods.

134. However, several simplifications are suggested that are considered proportional to the complexity of CCF models as summarised below.

135. Where the estimation of the downturn CCF component is based on an observed impact, institutions should carry out an analysis of the impact of the downturn period on the drawing behaviour on facilities. In this analysis, several elements that are relevant for the LGD downturn component are not required for the CCF downturn estimation.

136. Where the estimation of the downturn CCF component is based on an estimated impact, two simplifications are introduced.

a. Whereas the GL DT LGD allow for using a haircut approach where the downturn LGD estimation is based on estimated impact and there is a direct link between the economic factor and the LGD, the CCF GL do not foresee the option. The reasoning for this is that the haircut approach is not very likely to be appropriate for CCF downturn estimation;

b. The extrapolation approach is allowed, but only at the level of the CCF and not at the risk-driver level; whereas for the LGD, the GL DT LGD consider the optionality of having a modular approach to estimate LGDs, and therefore allow for a modular extrapolation approach, it is considered that CCF models are not likely to be component based. As

such, in case there is a statistical dependency between an economic factor and an important risk driver of the CCF, this should translate in a direct statistical dependency between an economic factor and the CCF itself.

137. Where an observed and estimated downturn impact is not available for the downturn CCF estimation, the add-on of 15 percentage points is maintained but the LGD-cap of 105 percent is removed. For the latter point it is reminded that the realised CCF can go well beyond 100%.

138. The reference value is maintained. The reference value can be used to challenge the downturn CCF estimates. It acts as a non-binding challenger similarly to the reference value described in the GL DT LGD. Where institutions can justify that the reference value is not appropriate (e.g. they can show that higher CCFs are associated with years that relate to a peak in the economic cycle), the framework already allows them not to deviate from their downturn estimates.

139. For defaulted facilities, a simple approach is introduced. Institutions are allowed to apply the downturn component of the CCF estimate, that is estimated for non-defaulted facilities, to defaulted facilities in the application portfolio.

Consultation box

One major difference of the draft GL on CCF estimation compared to the GL on DT LGD estimation is that institutions cannot estimate their downturn CCF estimates using the so-called 'haircut approach'.

Question 34: Are there examples where the haircut approach should be considered the most appropriate approach for estimating the downturn CCF?

Question 35: Do you think the add-on of 15 percentage points is adequately calibrated when the downturn impact cannot be observed nor estimated? Could you provide clear examples or reasons why this add-on should be higher or lower than 15 percentage points?

Question 36: Have you observed, or do you expect a (statistically significant) correlation between economic indicators and realised CCFs? If so, do you expect higher or lower levels of CCFs observed in the downturn periods compared to the rest of the cycle? Do you have policies in place that restrict or, on the other hand, relax the drawing possibilities in the downturn periods?

Question 37: The possibility to have no downturn effect on CCF estimates is restricted to the case where observations are available during a downturn period. Which alternative methodologies could be used to prove the non-existence of a downturn effect on CCF estimates, in the case where no observation is available during a downturn period?

1.1.2 Correlation between the default frequency and magnitude of the conversion factors

140. Article 182(1) of the CRR3 states that "*For the purposes of the first subparagraph, point (c), IRB-CCF shall incorporate a greater margin of conservatism where a stronger positive correlation can reasonably be expected between the default frequency and the magnitude of the conversion factor.*" This is derived from the requirement CRE36.90 of the Basel framework, which specifies that "*under the advanced approach, banks must assign an estimate of EAD for each eligible facility. It must be an estimate of the long-run default-weighted average EAD for similar facilities and borrowers over a sufficiently long period of time, but with a margin of conservatism appropriate to the likely range of errors in the estimate. If a positive correlation can reasonably be expected between the default frequency and the magnitude of EAD, the EAD estimate must incorporate a larger margin of conservatism. Moreover, for exposures for which EAD estimates are volatile over the economic cycle, the bank must use EAD estimates that are appropriate for an economic downturn, if these are more conservative than the long-run average.*"

141. It is the understanding of the EBA that this requirement should be interpreted in the context of the downturn CCF, such that institutions should consider the default rates of the portfolio in scope of application of the relevant IRB-CCF rating system as a potential downturn indicator, as referred to in Article 2(1)(c) of the CDR on downturn periods. The reasoning for this is that Article 182(1)(c) of the CRR3 addresses the dependency between elevated default rates and elevated CCFs, and the assessment of this dependency is already embedded in the framework by the assessment of the downturn CCF (including the respective MoC components). It is EBA's understanding that the assessment of the correlation between the default frequency and CCF values that is performed within the context of the estimation of the downturn component is sufficient to fulfil the related requirement of Article 182(1) of the CRR3.

3.11 Chapter 11 & 12: Application of risk parameters

142. The requirements laid down in chapter 11 and 12 follows closely the requirements for the application of risk parameters and the RoE as described in chapter 8 and 9 of the GL PD and LGD. To be comprehensive, this chapter is also included also in these GL and updated where necessary with appropriate reference to the CCF parameters estimation. Paragraphs that are included in the GL PD and LGD but omitted in these GL were deemed not relevant for the purpose of CCF estimates.

143. A new requirement is added to emphasise the importance of the consistency of the parameters between estimation, application and RoE in these chapters. Institution should ensure that the same definition of the (alternative) CCF is used during application as in estimation of the risk parameters. In particular, institutions should use the unadvised limit consistently in the estimation, application and review of the risk parameters in order to determine the committed but undrawn amount as referred to in Article 166(8) of regulation (EU) No 575/2013.

4. Draft guidelines

EBA/GL-REC/20XX/XX

DD Month YYYY

Draft guidelines

On Credit Conversion Factor estimation under Article 182(5) of Regulation (EU) No 575/2013

1. Compliance and reporting obligations

1.1 Status of these guidelines

1. This document contains guidelines issued pursuant to Article 16 of Regulation (EU) No 1093/2010[10]. 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.

1.2 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 with the reference 'EBA/GL/202x/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).

[10] 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 conversion factor (CCF) in accordance with Part Three, Title II, Chapter 3, Section 6 of Regulation (EU) No 575/2013.

6. The guidelines specify how the arrangements referred to in the previous paragraph should be reviewed and monitored by competent authorities, in the context of the application of Article 159 of that Regulation and Commission Delegated Regulation (EU) 2022/439.

2.2 Scope of application

7. 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 conversion factors in accordance with Article 143 and 151(8) to (9) of that Regulation, these guidelines do not apply.

8. Competent authorities responsible for the supervision of institutions should comply with these guidelines.

2.3 Addressees

9. These guidelines are addressed to competent authorities as defined in point 40 of Article 4(1) of Regulation (EU) No 575/201323 , including the European Central Bank with regards to matters relating to the tasks conferred on it by Regulation (EU) No 1024/201324, and to institutions as defined in point 3 of Article 4(1) of Regulation (EU) No 575/2013.

2.4 Definitions

10. Unless otherwise specified, terms used and defined in Regulation (EU) No 575/2013 and Directive (EU) 36/2013 and in the EBA guidelines EBA/GL/2017/16 on PD estimation, LGD estimation and the treatment of defaulted exposures have the same meaning in these guidelines. In addition, for the purposes of these guidelines, the following definitions apply.

Unadvised limit	An unadvised limit should be comprised of all of the following criteria: • any credit limit determined by the institution and • about which the obligor has not been informed by the institution and • according to which additional drawings are possible (at least temporarily).

For the purpose of determining the unadvised limit, cases where additional drawings by the obligor on its revolving line are not possible beyond the advised limit should not be considered as an unadvised limit. This includes cases where the additional drawings are not possible because:

a. The increased limit is subject to a further credit assessment by the institution, including a re-rating or a confirmation of the rating of the obligor;

b. Cases where a higher limit than the one advised to the obligor had been only pre-approved, but not yet effective for the determination of the maximum amount that can be drawn

3. Implementation

3.1 Date of application

11. These guidelines apply from XXX. 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

12. The internal validation function should verify the changes which are applied to the rating systems as a result of the application of these guidelines and the regulatory technical standards developed in accordance with Article 144(2) of Regulation (EU) No 575/2013, and the classification of the changes in accordance with Commission Delegated Regulation (EU) No 529/2014.

13. Institutions that need to obtain prior permission from competent authorities in accordance with Article 143(3) of Regulation (EU) No 575/2013 and Regulation (EU) No 529/2014 for the changes in the rating systems required to incorporate these guidelines for the first time by the deadline referred to in paragraph 11 should agree with their competent authorities the final deadline for submitting the application for such prior permission.

4. Framework for CCF estimation and application

4.1 Principles for specifying the range of application of the rating system

4.1.1 General principles

14. [par 15 GL PD LGD] A rating system in the sense of point (1) of Article 142(1) of Regulation (EU) No 575/2013 should cover all those exposures where the obligors or facilities show common drivers of risk and credit-worthiness and fundamentally comparable availability of credit-related information. The CCF model within a rating system may comprise various calibration segments. Where all obligors or exposures within the range of application of the CCF model are jointly calibrated the whole scope of application of the model is considered one calibration segment.

15. [par 13 GL PD LGD] Exposures covered by the same rating system should be treated similarly by the institution in terms of risk management and should be assigned to a common facility rating scale for the purposes of Article 182(1)(a) of Regulation (EU) No 575/2013.

16. [par 14 GL PD LGD] For the purpose of quantification of all risk parameters within a rating system, institutions should apply the same definition of default for the same historical observations used in different models. Institutions should also apply for a certain risk parameter the same treatment of multiple defaults as referred to in section 5.4.2 across internal, external and pooled data sources.

4.1.2 Principles for specifying the scope and level of CCF application

17. In accordance with article 166(8), the exposure value of off-balance sheet items which are not contracts listed in Annex II, shall be calculated by using either IRB-CCF or SA-CCF, in accordance with paragraphs 8a and 8b and Article 151(8). According to Article 166(8b), institutions that have obtained permission to use own estimates of LGD and CCF in accordance with Article 143(2) of Regulation (EU) No 575/2013 should assign an own CCF estimate to each exposure arising from undrawn revolving commitments treated under the IRB approach, provided that those exposures would not be subject to a SA-CCF of 100% under the standardised approach.

18. institutions should assign a single CCF to one facility. For this purpose,

    a. Where contracts are related, institutions should consider the exposure arising from this set of contracts as part of the same facility.

b. Where a facility comprises of several exposures that meet the conditions laid down in paragraph 20, institutions should assign one single CCF for the combined off-balance exposure related to these exposures.

c. Where a facility comprises exposures that meet the conditions laid down in paragraph 20 and exposure that do not, institutions should assign a CCF only to the exposure that meet the conditions laid down in paragraph 20.

19. For the purpose of paragraph 18.a, institutions should consider a set of contracts as related when they are treated by the institution in its risk management practices as a single facility. In particular, contracts that specify individual limits may be considered as related when there exists an overarching agreement that specifies a debt ceiling or overarching limit up to which the obligor is authorised to draw, connecting these contracts and potentially restricting their individual sub-limits. Institutions should specify and document in their internal policies the criteria to consider a set of contracts as related.

20. Institutions should assign a CCF to the exposures that meet the following conditions (hereafter called 'revolving commitments')

a. The exposure arises from a contractual arrangement with an advised limit that an institution offers to a client and is accepted by that client, or a contractual arrangement offered by an institution, but not yet accepted by the client, that would become a commitment if accepted by the client. This also includes any such contractual arrangement that can be unconditionally cancelled by the institution at any time without prior notice to the obligor or any arrangement that can be cancelled by the institution where the obligor fails to meet conditions set out in the facility documentation, including conditions that must be met by the obligor prior to any initial or subsequent drawdown under the arrangement.

b. The obligor has the flexibility to decide how often to draw and at what time intervals, allowing the obligor to drawdown, repay and re-draw exposures advanced to the commitment, including for contractual arrangements that allow prepayments and subsequent redraws of those prepayments. For the sake of clarity, the following cases should be considered as revolving when they meet the conditions defined in Article 166(8b) of Regulation (EU) No 575/2013;

i. Current accounts with an advised limit and related overdrafts on these accounts.

ii. Commitments that include contractual fees or (higher) interest rates pertaining to the drawing and repayment of the commitment.

iii. Commitments that include a duration after which the revolving commitment matures, or the revolving nature of the commitment expires.

4.2 CCF estimation methodologies

21. [par 100 GL PD LGD] Institutions should estimate CCFs for all facility grades of the distinct facility rating scale or for all pools that are incorporated in the rating system. For this purpose, institutions should consider any exposure that defaulted and was meeting the conditions as described in paragraph 20 at any point in time within 12 months prior to the default date. This includes any exposure that was ineligible under paragraph 20 at the moment of default but was eligible for IRB-CCF anytime within 12 months prior to the default date.

    [par 101 follows in section of multiple defaults]

22. Institutions should differentiate those grades or pools for which CCF estimates are based on the realised CCF calculation described in paragraph 61.a, from the grades or pools for which CCF estimates are based on the realised CCFs calculation described in paragraph 61.b.

23. [par 102 GL PD LGD] Institutions should estimate their own CCFs based on their own experience with their obligor's drawing and repayment behaviour, as it is reflected in historical data on defaulted exposures. Institutions may supplement their own historical data on defaulted exposures with external data, but institutions should not derive their CCF estimates from external data only.

    [par 103 & 104 GL PD LGD irrelevant for CCF]

24. [par 105 GL PD LGD] Institutions should be able to demonstrate that the methods that they choose for the purpose of CCF estimation are appropriate to their activities, facility characteristics and the type of exposures to which the estimates apply and they should be able to justify the theoretical assumptions underlying those methods. The methods used in the CCF estimation should in particular be consistent with the limit management policies adopted by the institution and should take into account possible drawing scenarios as well as potential differences in the legal environment in relevant jurisdictions.

25. Institutions should be able to demonstrate the consistency of the calculation of the realised CCF used in estimation with the definition used in the application of the CCF estimate, in particular in relation to:

    a. the use of CCF calculation approaches described in paragraphs 61.a and 61.b [limit factor], and the application of the derogation as described paragraph 61.c [region of instability].

    b. the use of the unadvised limit as described in section 5.5.6 in order to determine the committed but undrawn amount as referred to in Article 166(8) of regulation (EU) No 575/2013.

26. [par 106 GL PD LGD] The methods used by the institution in the CCF estimation, the assumptions underlying these methods, the institution's consideration of any downturn effect, the length of data series used, the MoC, the human judgement and, where applicable, the choice of risk drivers, should be adequate to the type of exposures to which they are applied.

4.3 Human judgment in estimation of risk parameters

27. [par 35 GL PD LGD] In order for institutions to complement their statistical models with human judgement, as referred to in Articles 174(b), 174(e), 175(4), 179(1)(a) and of Regulation (EU) No 575/2013, they should do all of the following:

    a. assess the modelling assumptions and whether the selected risk drivers contribute to the risk assessment in line with their economic meaning;

    b. analyse the impact of the human judgement on the performance of the model and ensure that any form of human judgement is properly justified;

    c. document the application of human judgement in the model, including at least the criteria for the assessment, rationale, assumptions, experts involved and description of the process.

5. Data requirements

5.1 Data governance

5.1.1 Governance for data quality

28. [par 16 GL PD LGD] In order to comply with the requirement of Article 73 of the CDR on IRB assessment methodology that institutions should have sound policies, processes and methods for assessing and improving the quality of data used for the purpose of credit risk measurement and management processes, institutions should ensure that those policies apply to all data used in model development and risk quantification, the review of estimates, as well as to the data used in the application of the risk parameters.

29. In particular, institutions should duly justify the exclusion from the RDS of the type of products for which it observes drawdowns at default dates. For revolving commitments with an observed exposure at default that did not have any off-balance commitment registered at reference date, institutions should analyse whether a limit, advised or unadvised, has been incorrectly registered in the IT systems and should check whether it affects the off-balance sheet amounts of similar facilities.

30. [par 16 GL PD LGD] In order for the data used in the model development, the review of estimates, and the application of risk parameters to meet the requirements of accuracy, completeness and appropriateness specified in Article 174(b) of Regulation (EU) No 575/2013, it should be sufficiently precise to avoid material distortions of the outcome of the assignment of exposures to obligors or facility grades or pools, and it should not contain any biases which make the data unfit for purpose.

5.1.2 Governance for data representativeness

31. [par 17 GL PD LGD] In order to comply with the requirement of the representativeness of data used in the CCF models specified in Articles 174(c), 179(1)(d), 179(2)(b) and 182(1)(h) of Regulation (EU) No 575/2013 as well as in Articles 37(2) and 42(2) of the CDR on IRB assessment methodology, institutions should have sound policies, processes and methods for assessing the representativeness of data used for the purpose of estimation of risk parameters. Institutions should specify in their internal policies the statistical tests and metrics to be used for the purpose of assessing the representativeness of data used for risk differentiation and, separately, for data underlying the risk quantification. Institutions should also specify methods for qualitative assessment of data for the cases, defined in their policies, where the application of statistical tests is not possible.

32. [par 18 GL PD LGD] Institutions should use the same standards and methods for the assessment of representativeness of data stemming from different sources, including internal, external and

pooled data or a combination of these, unless different methods are justified by the specificity of the data source or availability of information.

33. [par 19 GL PD LGD] Where external or pooled data are used institutions should obtain sufficient information from the data providers to assess the representativeness of such external or pooled data to the institutions' own portfolios and processes.

5.2 Construction and storage of modelling data

5.2.1 Construction and storage of the RDS

34. [par 70 & 107 PD LGD GL] Institutions should ensure that at least the following data is properly stored, safeguarded and available, including any external or pooled data used in the CCF estimation, hereafter referred to as the reference data set (RDS):

    a. The criteria for identifying the relevant type of exposures covered by the CCF model under consideration according to section 4.1.2;

    b. All defaults identified during the historical observation period, in accordance with paragraphs 35, 36 and 103, where the credit facility was meeting the conditions as defined in paragraph 21. Institutions should not exclude from the RDS the observations that are affected by the product profile transformation as referred to in section 5.4.1, between reference and default dates;

    c. All data necessary for calculating the realised CCFs in accordance with paragraph 37;

    d. The potential risk drivers that differentiate the drawing behavior of obligors in accordance with paragraph 38 and 39.

35. [par 147/147c/147d PD LGD GL] The historical observation period should be as broad as possible and should contain data from various periods with differing economic circumstances. It should be composed of consecutive periods and includes the most recent periods before the moment of CCF estimation. It should include the full period for which the institution is reasonably able to replicate the currently applicable definition of default.

36. [par 147a GL PD LGD] The length of the historical observation period, defined as the timespan between the oldest default considered in the RDS and the moment of the CCF estimation, should cover at least the minimum length specified in Article 182(2) of Regulation (EU) No 575/2013 for exposures to corporates, institutions, central governments and central banks and, for retail exposures, the minimum length specified in Article 182(3) of that Regulation and, where applicable, Commission Delegated Regulation adopting technical standards laid down in Article 182(4)(b) of that Regulation.

37. [par 109 GL PD LGD] The RDS should contain at least the following information:

a. moment (date) of default and related reference date;

b. all default triggers that have occurred, including both past due events and unlikeliness to pay events, even after the identification of default;

c. Information on the evolution of the customer product profile over the observation period;

d. The drawn amount of the exposure, including principal, accrued interest, other due payments, fees, and drawings in excess of advised limits;

e. Information on the extent and nature of the commitment, in particular on committed but undrawn amount, the advised limit of the commitment and the presence and characteristics of an unadvised limit of the commitment in accordance with section 5.5.6;

f. the amounts and timing of the additional drawings after the moment of default, including on incomplete drawing processes;

g. the amounts and timing of write-offs before or at the moment 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.

38. [par 121 GL PD LGD] The RDS should contain potential risk drivers, which should include in particular the following:

a. transaction-related risk characteristics, including type of product, exposure size, limit type (e.g. advised or unadvised), limit amount, committed but undrawn amount and utilisation rate, drawing and repayment characteristics. This can include risk drivers that reflect the changes in customer product mix or characteristics that take place between the reference and default date;

b. obligor-related risk characteristics, including, where applicable, size, capital structure, geographical region, industrial sector, line of business, and [par 57 GL PD LGD] behavioural information, including delinquency and the use of credit facilities;

c. institution-related factors, including internal organisation and internal governance, including monitoring and repayment processes, authorisation processes related to unadvised limits. Information on drawdown restrictions for products, either specified in the contractual arrangement of the exposure or present in the policies or procedures of the institution.

d. external factors, including legal environment, specifically regulation related to social and corporate governance, and including indicators of transition and physical climate risks.

39. [par 56 GL PD LGD] Institutions should ensure that the RDS contains the values of the risk drivers for appropriate points in time. In accordance with article 182(g) of Regulation (EU) No 575/2013, each default shall be linked to relevant obligor and facility characteristics at the fixed reference date defined in accordance with section 5.4.3. [par 70c GL PD LGD] Where a newly relevant risk driver has been included in the model for which not all relevant historical data is available institutions should make efforts to minimise missing data on risk drivers over time as outlined in paragraph 142.a, and apply an appropriate adjustment and a MoC in accordance with section 9.

40. [par 59 GL PD LGD] Institutions should ensure that the decrease of reliability of information over time, for instance of information on obligor characteristics obtained at the time of the loan origination, is appropriately reflected in the CCF estimation. Institutions should also ensure 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 adequate MoC is applied where a higher degree of uncertainty exists due to the lack of up-to-date information.

41. Institutions should ensure that the RDS also contains at least the following data:

a. The data considered in the construction of:

i. the data sample used to develop the model (‘development sample’),

ii. the data used to test the model performance (‘testing data’);

b. the data used to quantify the CCF estimates (‘quantification sample’).

42. Institutions should document the steps performed to construct the RDS in order to be able to allow a third party to replicate it. [par 72 GL PD LGD] In particular, institutions should document all data cleansing in accordance with Article 31(3)(b) of the CDR on IRB assessment methodology, in particular:

a. for non-retail CCF models, a list of all defaulted facilities within the dataset that were excluded in accordance with paragraph 103, with a case-by-case justification;

b. for retail CCF models, information on the reasons and quantity of exclusions of defaulted facilities made in accordance with paragraph 103.

5.2.2 Development and testing samples

43. [based on par 20 & 21 GL PD LGD] Institutions should select an appropriate dataset for the purpose of model development (‘development sample’) and to test the model performance

('testing data'), as described in section 6.1.These datasets should at least contain all data as referred to in paragraph 34.a, 34.c, 34.d.

5.2.3 Quantification sample

44. [based on par 28 GL PD LGD] Institutions should ensure that the data used for calculating long run average CCFs as referred to in Article 179(1)(d) of Regulation (EU) No 575/2013 and, where relevant, the pool in accordance with Article 179(2)(b) of that Regulation ('quantification sample') contain all data as referred to in paragraph 34.a, 34.b, 34.c, as well as the risk drivers and segmentation variables to allocate facilities to grades, pools and calibration segments.

5.3 Representativeness

5.3.1 Consequences of a lack of representativeness

45. As required in Article 174(c) of Regulation (EU) No 575/2013, institutions should analyse whether the data used to develop the model (development sample) and the data used to test the model performance (testing sample) referred to in paragraph 43, is representative of the application portfolio, in terms of the dimensions as described in paragraph 48.

    a. Where the institution has observed a lack of representativeness on the development sample as defined in section 5.2.2 vis a vis the application portfolio, institutions should analyse specifically whether this lack of representativeness negatively impacts the model performance as defined in section 6.1. In the case where model performance is considered to be insufficient, the institution should redevelop the model either by making adjustments to the development sample, by selecting a different development sample, or by changing the modelling approach.

    b. Where the institution has observed a lack of representativeness on the testing sample vis a vis the application portfolio, institutions should analyse whether this lack of representativeness negatively impacts its ability to measure the performance of the model. In the case where model performance cannot be measured with sufficient accuracy, institution should adjust the observations in the testing sample or use another testing sample.

46. Institutions should analyse whether the data used to quantify the CCF estimates ('quantification sample') as referred to in paragraph 44 is representative of the application portfolio, at the level of estimation, in terms of the dimensions as described in paragraph 48.

    a. Where the institution has observed a lack of representativeness of the quantification sample as defined in section 5.2.3 vis a vis the application portfolio, institutions should analyse the potential bias in the estimates of CCF parameter in terms of

realised CCFs. In this context, institution should assess whether years with a significantly lower observed realised CCFs at grade level are sustainable and not driven by extraordinary measures.

b. Where they observe a bias or an increased uncertainty, institutions should introduce an appropriate adjustment to correct the bias and they should apply a margin of conservatism, in accordance with sections 9.2 and 9.3. In this context, for the dimension in paragraph 48.d, adjustments made due to a lack of representativeness should not lead to a decrease in the CCF estimates.

c. For the dimension in paragraph 48.e, for those subsegments of the application portfolio where institutions have observed this lack of historical data, institutions should apply a minimum conservative estimate of the CCF as described in paragraph 139.

47. [based on par 164 GL PD LGD] Institutions should analyse whether there are changes to the structure of the portfolio, in particular in terms of potential risk drivers, that materialised at estimation date or that are expected to materialise in the foreseeable future, but are not yet sufficiently reflected in the historical data available to the institution. In this case, institutions should analyse the potential bias of the CCF estimates. Where they observe a bias or an increased uncertainty, institutions should introduce an appropriate adjustment to correct the bias and they should apply a margin of conservatism, in accordance with sections 9.2 and 9.3. Adjustments made in this context should not lead to a decrease in the CCF estimates.

5.3.2 Dimensions of representativeness to analyse

48. [based on par 21 & 28 GL PD LGD] For the purposes described in paragraphs 45 and 46, institutions should analyse the representativeness in terms of all of the following:

a. Definition of default;

b. Scope of application;

c. Internal policies and external factors;

d. Economic or market conditions;

e. Material subsegments of the application portfolio.

49. The analyses described in paragraph 48 should in particular take into account differences observed across time, each data source used, and jurisdictions.

50. [based on par 23 GL PD LGD] For the purpose of paragraph 48.a, institutions should analyse in particular the consistency of the definition of default in relation to each individual criteria specified in Article 178 of Regulation (EU) No 575/2013.

51. [based on par 22 GL PD LGD] For the purpose of paragraph 48.b, institutions should analyse the consistency of the definitions used to determine the scope of application of the rating system.

52. [based on par 26 GL PD LGD] For the purpose of paragraph 48.c, institutions should analyse whether there were significant changes in internal policies of institutions and external factors which may influence the level of risk in the portfolio covered by the considered model. Where institutions observe such changes, they should assess whether these changes impact the drawing behaviour of obligors. These changes include:

    a. changes in the relevant legal environment,

    b. changes in insolvency law,

    c. changes in institutions' lending standards, policies pertaining to limit monitoring, repayment policies, restructuring policies and policies aimed at preventing further drawings prior to default, related also to events such as covenant violations and early warning triggers.

    d. Where the institutions include drawings after default in their CCF estimates, changes in restructuring and recovery policies as well.

53. For the purpose of paragraph 48.d, institutions should analyse whether there were significant structural changes in the economic or market conditions ('structural break') compared to the current and foreseeable economic or market conditions. Changes in the state of the economy ('economic and business cycle') should not be considered as a structural break for the sake of this paragraph.

54. For the purpose of paragraph 48.e,institutions should analyse whether there are material subsegments of the application portfolio for which the institution has not observed sufficient observations to differentiate, test or quantify CCF estimates for those subsegments. For the purpose of identifying material subsegments of the application portfolio, institutions should segment the portfolio along key risk characteristics.

5.4 Data structure for the CCF estimation

5.4.1 Changes in the customer product profile

55. [par 201 EGIM] Institutions should identify changes in the obligors' mix of borrowing and other credit-related products ('customer product profile') in the period 12 month before default date. This relates to cases

    a. where a revolving commitment is fully or partially replaced by another exposure, or

b. where a new contract is originated instead of increasing the limit of a revolving commitment.

56. Institutions should document the criteria for the identification of the changes in the customer product profile described in paragraph 55 and their consistency with the criteria specified in accordance with paragraph 19. In particular, institutions should justify the following changes in the customer product profile where they consider that contracts restructured or originated after the reference date are not related to any revolving commitments at reference date:

a. Changes associated with forbearance measures, in line the institution's policies for identifying exposures to which forbearances measures have been granted, and in accordance with section 7.3.4 of the guidelines on management of non-performing and forborne exposures (EBA/GL/2018/06); This includes forbearance measures where a default is triggered due to the restructuring of one or more facilities;

b. Changes without a decrease in the overall drawn amount at the moment of the change;

c. Changes that occurred shortly before the default date;

d. Changes relating to revolving commitments that have been fully or almost fully drawn over a sustained period just before the change;

5.4.2 Multiple defaults

57. [par 100 GL PD LGD] For the purpose of CCF estimation, institutions should treat each defaulted facility as one distinct default observation, unless more than one independent defaults were recognised on a single facility which do not meet the conditions of paragraph 58.

58. [par 101 GL PD LGD] With regard to defaults recognised on a single facility, where the time between the moment of the return of the exposure to non-defaulted status and the subsequent classification as default is shorter than nine months, institutions should treat such exposure as having been constantly defaulted from the first moment when the default occurred. Institutions may specify a period longer than nine months for the purpose of considering two subsequent defaults as a single default in the CCF estimation, consistently with the LGD approach as specified in paragraph 101 of the EBA GL on PD and LGD estimation, if this is adequate to the specific type of exposures and reflects the economic meaning of the default experience. As such, Institutions should ensure consistency with the approach used for LGD estimates. In the case where a high number of defaults stemming from exposures for which the time between the moment of the return of the exposure to non-defaulted status and the subsequent classification as default is shorter than twelve months, institutions should analyse whether its risk management policy meets the criteria set up in chapter 7 of the guidelines on default definition.

5.4.3 Twelve-month fixed reference date and defaults within twelve months after origination

59. In accordance with Article 182(1) sub paragraph 3 of Regulation (EU) No 575/2013, where a credit facility meets the conditions as set up in section 4.1.2 of these guideline 12-months prior to the default date, the fixed reference date for this credit facility should be defined as 12 months prior to the date of default. The default date should be determined in a way to prevent bias from multiple defaults in accordance with section 5.4.2.

60. Where a defaulted facility does not comprise of any revolving commitment 12 months prior to the default date, but the facility includes a revolving commitment at any point in time 12 months prior to the moment of default date, institutions should use as reference date the earliest date prior to default date where the facility includes a revolving commitment. In the case of a facility that defaults within twelve months after its origination, institutions should use as reference date the earliest date where the committed but undrawn amount for this facility is strictly positive. In this latter case, institutions should check whether this facility is related to a change the customer product mix as described in section 5.4.1.

5.5 Calculation of realised CCFs

5.5.1 Definition of realised CCFs

61. For the purpose of the CCF estimation, institutions should calculate the realised CCFs in the following way:

    a. for each facility with a utilisation rate at the reference date lower than 100%, as a ratio of:

        i. In the numerator, the difference between the drawn amount at default date and the drawn amount at the reference date;

        ii. In the denominator, the committed but undrawn amount at the reference date.

    b. for each facility with a utilisation rate at reference date equal to or higher than 100%, as a ratio of:

        i. In the numerator, the drawn amount at default date;

        ii. In the denominator, the committed amount at the reference date.

    c. In derogation to point a of this paragraph, institutions may calculate for each facility in the region of instability, subject to the conditions described in paragraph 73, the realised CCFs as the ratio referred to in point b of this paragraph.

d. For the purpose of point b of this paragraph and paragraph 73, institutions should calculate the utilisation rate as the ratio of:

    i. In the numerator, the drawn amount;

    ii. In the denominator, the committed amount.

62. For the calculation of the realised CCF as described in paragraph 61,

a. The default date should be determined in order to prevent bias from multiple defaults in accordance with section 5.4.2.

b. The fixed reference date should be determined in accordance with section 5.4.3.

c. Institutions should take into account the customer product profile in accordance with section 5.5.2.

d. The drawn amounts should incorporate fees, interests, and additional drawings after default in accordance with sections 5.5.3, 5.5.4, and 5.5.5. The drawn amounts should take into account any drawings, also those in excess of advised limits.

e. The committed but undrawn amount at reference date is determined as the difference between the extent of the commitment and the drawn amount at reference date. In accordance with Article 4 (1)(56) of Regulation (EU) No 575/2013, the extent of the commitment is determined as the maximum of the advised limit and the unadvised limit. Institutions should use the unadvised limit in accordance with section 5.5.6.

5.5.2 Calculation of realised CCF in relation to customer product profile

63. Institutions should calculate the realised CCF of facilities impacted by a change in customer product profile in accordance with paragraph 55 according to the following rules:

a. In the numerator, the drawn amount at reference date should only include the drawn amounts of the revolving commitments existing at reference date;

b. In the numerator, the drawn amount at default date should include the drawn amounts at default date of

    i. All revolving commitments

    ii. All non-revolving commitments originated after the reference date and not related to non-revolving commitments existing at reference date

c. The denominator should only include the undrawn amounts or limits of revolving commitments at reference date.

64. For the purpose of paragraph 63, institutions should develop an appropriate methodology for the allocation of drawings and repayments to the original revolving commitments constituting the facility already available at the reference date. Institutions should be able to demonstrate the soundness of the allocation mechanism, which should reflect the relevant institutions' policies as well as the actual practices for the management of cases restructuring, and should apply it consistently across exposures and over time. In any case institutions should demonstrate that the process of allocation of drawings and repayments is effective and that it does not lead to biased CCF estimates.

5.5.3 Treatment of fees and interest

65. [par 137 GL PD LGD] For the purpose of Article 182(1)(b) of Regulation (EU) No 575/2013, any fees and interests that have been capitalised in the institution's income statement at the reference date should be included in the drawn amount of the credit obligation at the reference date in the calculation of the realised CCF. On the other hand, any fees and interests not capitalised at reference date should not increase the amount drawn at the reference date.

66. Similarly, any fees and interests that have been capitalised in the institution's income statement at the default date should be included in the drawn amount of the credit obligation at the default date in the calculation of the realised CCF. On the other hand, any fees and interests not capitalised at default date should not increase the amount outstanding at the default date.

5.5.4 Treatment of amount forgiven or written off not included in the drawn amount at the moment of default

67. [par 134 GL PD LGD] Where, relating to a default event, any part of exposure that 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 drawn amount of the credit obligation at the moment of default, the amount of the exposure that was forgiven or written off should be added to the drawn amount of the credit obligation at the moment of default for the calculation of the drawn amount of the credit obligation in the numerator of the realised CCF.

5.5.5 Treatment of additional drawings after default

68. [Art 182 CRR3] In the case of non-retail exposures, in accordance with Article 182(1)(c) of Regulation (EU) No 575/2013 institutions that obtained permission to use own estimates of LGD and CCF 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 Articles 181(2)(b) and 182(3) of this Regulation, institutions may reflect future drawings either in their CCF or in their LGD estimates. These future drawings should be understood as additional drawings by the obligor after the moment of default.

69. [par 140 GL PD LGD] Where institutions include additional drawings by the obligor after the moment of default in their CCF estimates, these additional drawings should include:

a. drawings in excess of advised limits.

b. In the case institutions treat multiple defaults of the same facility as one default observation in accordance with section 5.4.2, all additional drawings that occurred between the default date of the first default and the date when the facility returned to non-defaulted status.

70. Where institutions include additional drawings by the obligor after the moment of default in their CCF estimates they should calculate the realised CCF by increasing the drawn amount at default date by the positive difference between the maximum of the drawn amounts after the moment of default, discounted to default date, and the drawn amount at default date. For this purpose:

a. Institutions should apply the discounting rate as provided in section 6.3.1.3 of EBA/GL/2017/16.

b. In the case institutions treat multiple defaults of the same facility as one default observation in accordance with section 5.4.2, all drawn amounts should be discounted to the default date of the first default of the facility.

5.5.6 Use of unadvised limit

71. In order to fulfil the requirements stemming from the definition of CCF estimates in Article 4(1)(56) of Regulation (EU) No 575/2013, in the case where the unadvised limit is higher than the limit the obligor has been informed by the institution, the institution should use the unadvised limit in the denominator of the realised CCF, as well as during the application of the risk parameters as set up in chapter 11 and during the review of estimate as set up in chapter 12.

72. Institutions should not use the unadvised limit in case where the criteria of sufficient data quality as defined in the Article 73(1) of the CDR on assessment methodology are not met.

5.5.7 Region of instability

73. In case institutions want to use the derogation described in paragraph 61.c, to ensure that this derogation is applied to a small part of the portfolio, they should determine a threshold value relative to the utilisation rate. For those facilities where the utilisation rate at reference date is higher than the threshold value as determined by the institution, institutions may apply the derogation described in paragraph 61.c and use the different calculation as described in paragraph 61.b. Institutions should set the value of this threshold at a point such that the dispersion of the unfloored realised CCFs below this value is significantly below the dispersion above this value. Institutions should clearly define the dispersion measure used to identify the relative threshold.

6. Risk differentiation

1.2 Risk driver selection

74. [par 121 GL PD LGD] In the selection of risk drivers, institutions should identify and analyse risk drivers from the list of potential risk drivers in the development sample referred to in paragraph 34.d.

75. [par 58 GL PD LGD] Institutions should ensure that for the purpose of selecting risk drivers and rating criteria the relevant experts from business areas of the institution are consulted with respect to the business rationale and risk contribution of the considered risk drivers and rating criteria.

76. [par 61 GL PD LGD] Where there is a significant proportion of customers using multiple revolving commitments of the same type within a considered retail rating system, institutions should analyse the level of risk of such customers compared with customers carrying only one revolving commitment of the relevant type and, where necessary, reflect the difference in the level of risk in the model through appropriate risk drivers.

77. [par 60 GL PD LGD] Institutions should use the risk drivers and rating criteria consistently, in model development, model quantification and model application.

78. To ensure that their CCF estimates are effectively quarantined from the potential effects of region of instability caused by a facility being close to being fully drawn at reference date, institutions should appropriately differentiate between the facilities in the region of instability and facilities outside of this region of instability. For this purpose, institutions may use the derogation as described in paragraph 61.c and differentiate the facilities in and outside the region of instability accordingly.

79. [par 162 GL PD LGD] Where institutions observe extremely high values of realised CCFs stemming from other reasons than facilities having a small committed but undrawn amount at the reference date, they should identify relevant risk drivers to differentiate these observations and adequately reflect these specific characteristics in the assignment to grades or pool.

80. [Validation handbook 36] The chosen input variables should form a reasonable and effective basis for the resulting predictions such that the model does not have any material bias. In particular, institutions should ensure that:

    a. The selection process and related outcomes of risk drivers and rating criteria ensures a sufficient discriminatory power and homogeneity in the grades as described in section 6.1, such that all relevant information is taken into account;

b. Any functional form or 'hyperparameters' used in the model development to aggregate all the risk drivers to derive the final assignment of exposures to grades or pools ensures an adequate rank ordering in terms of conversion risk.

c. The features of the model, including its scope of application, limitations and weaknesses, main and alternative assumptions or approaches to those finally chosen should be appropriately documented.

6.1 Testing model performance

6.1.1 Discriminatory power

81. [Validation handbook 34a] The institution should ensure that the developed model can discriminate riskier facilities from less risky ones, based on the difference in the level of conversion risk.

82. [validation handbook 37] For this purpose, institutions should be able to demonstrate the robustness of the performance of models, using a testing sample as described in section5.2.2, that includes out-of-time (OOT) and out-of-sample (OOS) performance tests. For such an evaluation, institution should:

a. Test the performance of the model at all relevant levels. In this context, institution should perform the evaluation both on the final ranking as well as on the intermediate steps of the model. For the evaluation of the selection of risk drivers and final ranking, the evaluation is expected to be performed for each calibration segment separately when used.

b. Test the performance of the model under various economic conditions, to allow for stable model use across time and across changing environment or economic conditions.

c. Test the performance of the model for material subsegments of the application portfolio, in particular where the institution has observed a lack of representativeness of the development sample vis-à-vis the application portfolio as referred to in paragraph 45.a.

6.1.2 Homogeneity and heterogeneity

83. Institutions should assess the homogeneity of facilities assigned to the same grades or pools based on the data and they should ensure, in particular, that grades are defined in such a manner that individual grades are sufficiently homogeneous with respect to conversion risk. Institutions should at least:

a. Conduct homogeneity testing on the final grades of the model. The evaluation should be performed for each calibration segment separately when used. In this context, institutions should in particular compare the long run averages CCF over

the entire historical observation period as referred to in paragraphs 35 and 36 for subpopulations of a particular grade identified along key risk characteristics that distinguish material subsegments of the application portfolio, in particular where the institution has observed a lack of representativeness of the development sample vis-à-vis the application portfolio as referred to in paragraph 45.a;

b. [validation handbook 38f] analyse whether any concentration in rating grades or pools is not an indication of a lack of homogeneity within grades or pools and therefore of missing risk drivers or an inadequate discretisation of the scale;

c. Furthermore, and to the extent that this is possible without materially diminishing the homogeneity in the grades or pools, institutions should avoid significant overlaps of the distributions of conversion risk between grades or pools. The evaluation should be performed for each calibration segment separately when used.

7. Risk quantification

7.1 Calculation of long-run averages

7.1.1 Calculation of long-run average CCF

84. [par 147e GL PD LGD] For the purpose of risk quantification, all available internal data as required for the quantification sample described in section 5.2.3 is considered 'relevant', as referred to in Articles 182(1)(c), 182(1)(h), 182(1b), 182(2) and 182(3) of Regulation (EU) No 575/2013.

85. [par 149 GL PD LGD] In accordance with letter (a) of Article 182(1) of Regulation (EU) No 575/2013 institutions are required to calculate the long-run average CCF separately for each facility grade or pool. In the calculation of long-run average CCF institutions should use all defaults observed in the historical observation period that fall within the scope of the CCF model.

86. [par 150 GL PD LGD, removal of unequal weighting option] institutions should calculate the long-run average CCF as an arithmetic average of realised CCFs over a historical observation period weighted by the number of facilities. Institutions should not use for that purpose any averages of CCFs calculated on a subset of observations, in particular any yearly average CCFs or averages over facilities of the same obligor within one grade.

[deletion of par 151 and 152 GL PD LGD - removal of unequal weighting option]

7.1.2 Treatment of incomplete drawing processes

87. [par 153 GL PD LGD] For the purposes of letter (a) of Article 182(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 CCF estimation, where institutions include additional drawings by the obligor after the moment of default in their CCF estimates in accordance with paragraph 68, institutions should ensure that the relevant information from incomplete drawing processes is taken into account in a conservative manner. The CCF estimation should be based on the long-run average CCF.

88. [par 147b GL PD LGD] Institutions should ensure that the data used to quantify the CCF estimates includes a sufficient number of closed drawing processes in order to provide robust CCF estimates. [par 148 GL PD LGD] In assessing whether this data includes a sufficient number of closed drawing processes, institutions should take into account the number of closed drawing processes in the total number of observations.

89. [par 154 GL PD LGD] Institutions should first calculate the observed average CCF for each facility grade or pool and at the level of the portfolio covered by the CCF model taking into account

realised CCFs on all defaults observed in the historical observation period related only to closed drawing processes in accordance with paragraph 91 without including any expected future drawings. The observed average CCF of closed drawing processes should be weighted by the number of defaults included in the calculation.

90. [par 155 GL PD LGD] Institutions should clearly specify in their internal policies the moment of closing the drawing process for the revolving facility, i.e. the moment obligors can no longer draw from that facility. All revolving facilities that have been closed should be treated as closed drawing processes for the purpose of the calculation of the observed average CCF, notwithstanding the requirements on the product profile transformation described in section 5.4.1.

91. [par 157 GL PD LGD] For the purpose of the calculation of the observed average CCF, institutions should recognise without undue delay as closed drawing processes all exposures in default which fall into at least one of the following categories:

    a. facilities that are closed permanently as outlined in paragraph 90;

    b. exposures that remain in defaulted status for a period of time longer than the maximum period of the recovery process as described in paragraph 156 of the PD and LGD guidelines.;

    c. exposures fully repaid or written-off;

    d. exposures that have been reclassified to non-defaulted status.

92. [par 158 GL PD LGD] For the purpose of calculating the long-run average CCF, institutions should obtain the long-run average CCF by adjusting the observed average CCF referred to in paragraph 89, taking into account the facilities not included in the set of facilities as referred to in paragraph 91 (incomplete drawing processes).

93. For these facilities, institutions should estimate a realised CCF by using the modelling approach as outlined in paragraphs 95 to 96, or the simple approach as set out in paragraphs 97 and 98. Irrespective of the method used, for each facility where institutions include additional drawings estimates in their CCF estimates, the same additional drawings estimates should be used in the denominator of the realised LGD in line with paragraph 140 of the GL PD LGD.

94. The simple approach may only be used for the facilities related to non-retail obligors, and where either one of the following conditions are met:

    a. the materiality of the facilities currently in default with a remaining positive committed but undrawn amount at estimation date is low, both in terms of number of facilities and total outstanding amount of unresolved defaults, or;

b. the internal risk management policies in place restrict additional drawings shortly after default. The effectiveness of such risk management policy should be determined by observing a low share of observed additional drawings after default in the historical observation period in relation to the observed committed but undrawn amount at reference date.

a. Modelling approach

95. [par 158 GL PD LGD] Where institutions apply the modelling approach:

a. They should take into account all observed drawings;

b. They should estimate future drawings within the maximum period of the recovery process.

96. [par 159 GL PD LGD] For the purpose of the estimation of future drawings referred to in paragraph 95.b, institution should comply with the following principles:

a. Institutions should analyse the drawings realised on these exposures until the moment of estimation, in comparison with the average drawings realised during a similar period of time on similar exposures; for this purpose institutions should analyse the drawing patterns observed on both closed and incomplete recovery processes, taking into account only drawings realised up to the moment of estimation;

b. The assumptions underlying the expected future drawings as well as the adjustment to the observed average CCF should be:

i. proven accurate through back-testing;

ii. based on a reasonable economic rationale;

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

c. in estimating the future drawings institutions should take into account any potential bias stemming from incomplete recovery processes;

d. the adjustment of the observed average CCF may be estimated at the level of individual facilities, at the level of grade or pool or at the level of portfolio covered by the CCF model;

e. any uncertainty related to the estimation of the future drawings on incomplete recovery processes should be reflected in an adequate MoC applied in accordance with section 9.

b. Simple approach

97. Where institutions apply the simple approach , they should estimate the realised CCF for each individual defaulted facility as the maximum between:

a. the observed average CCF calculated for the respective facility grade or pool as referred to in paragraph 89, and;

b. the realised CCF of the individual defaulted facility calculated under the assumption that no further drawings will be observed for this facility after the estimation date.

98. If institutions use the simple approach, the inclusion of facilities in default with incomplete drawing processes should not lead to a reduction of the MoC for any of the categories, as referred to in section 9 of these guidelines.

7.1.3 Treatment of cases with negative outcomes

99. [par 160 GL PD LGD] In accordance with Article 182(1) second sub paragraph, where institutions observe that the drawn amount at default date is lower than the drawn amount at the reference date, the realised CCF on these observations should equal zero for the purpose of calculation of the observed average CCF and the estimation of the long-run average CCF. Institutions may use the information on the realised CCFs before the application of this floor in the process of model development for the purpose of risk differentiation.

7.1.4 Treatment of cases with a retracted reference date

100. For the facilities where a realised CCF has been calculated according to paragraph 60 (‘retracted reference date’), institutions should assess whether the proportion of these facilities in the calculation of the long run average CCF reflects the proportion of facilities that default over a 12-month period. Where necessary, any bias on the CCF estimates should be addressed via an appropriate adjustment.

7.2 CCF calibration

101. [par 161 GL PD LGD] Institutions should calibrate their CCF estimates to the long run average CCF calculated in accordance with section 7.1. For this purpose institutions should choose a calibration method that is appropriate for their CCF estimation methodology from the following approaches:

a. the calibration of CCF estimates to the long-run average CCF calculated for each grade or pool, in which case they should provide additional calibration tests at the level of the relevant calibration segment;

b. the calibration of CCF estimates to the long-run average CCF calculated at the level of calibration segment, in particular where they use direct CCF estimates in accordance with Article 169(3) of Regulation (EU) No 575/2013, including where they use CCF estimation methodology based on intermediate parameters. In this case institutions should at least compare this long-run average CCF with the average CCF estimate applied to the same set of observations as those used for calculating the long-run average CCF and, where necessary, correct the individual CCF estimates for the application portfolio accordingly, for instance by using a scaling factor. Where realised values are higher than estimated values at the level of calibration segment, institutions should correct the estimates upwards or readjust their estimation in order to reflect their experience with conversion risk.

102. [BR page 35 GL PD LGD] In both cases, the calibration sample, i.e. the sample of exposures used to compare the average CCF estimates with the long-run average CCF, should be the same as the sample used to calculate the long-run average CCF. In either case, institutions should ensure that an appropriate margin of conservatism is added to its estimates in the case of missing risk drivers that increase the uncertainty on the rating assignment, as per paragraph 127.a.

[par 162 GL PD LGD in risk differentiation section]

103. [par 163 GL PD LGD] In order to comply with the requirement of Article 182(1)(a) of Regulation (EU) No 575/2013 to use all observed defaults in CCF quantification, institutions should not exclude any defaults observed in the historical observation period that fall within the scope of application of the CCF model. [par 71 GL PD LGD] Exclusion of observations from the average realised CCF calculation should be undertaken only for facilities wrongly assigned to the considered CCF model, despite not falling in the range of application of that CCF model, should be excluded from the calculation of the average realised CCF, notwithstanding the guidance provided in section 5.4.

[par 164 GL PD LGD in representativeness section]

104. Institutions should assess, for both, facilities within and outside the region of instability, the predictive power at the level of both the CCF and the implied exposure value estimate at grade or pool level, to ensure that their CCF estimates are effectively quarantined from the potential effects of region of instability.

8. CCF for defaulted exposures

8.1 General requirements specific to CCF in-default estimation

105. [par 165 GL PDLGD] Institutions that have obtained permission to use own estimates of CCF in accordance with Article 143(2) of Regulation (EU) No 575/2013, should assign a CCF in-default estimate to defaulted exposures that meet all the following conditions:

a. They are either non-retail defaulted exposures, or retail defaulted exposures where future drawings are reflected in their conversion factors in accordance with Article 181(2)(b);

b. They meet the conditions as described in paragraph 4.1.2;

c. They are within the range of application of the rating system subject to such permission.

106. Where institutions do not take into account additional drawings after default in their CCF estimates for retail exposures, they should not assign a CCF in-default estimate for their defaulted exposures.

107. [par 166 GL PD LGD] Where institutions take into account additional drawings in their CCF estimates, institutions should estimate CCF in-default for each of the facility grades of the distinct facility rating scale or for each of the pools that are used within the rating system using one of the following approaches:

a. the simple approach as referred to in section 8.2.

b. the modelling approach as referred to in section 8.3.

108. The simple approach may only be used for the facilities related to non-retail obligors, and the internal risk management policies in place restrict additional drawings shortly after default. The effectiveness of such risk management policy should be determined by observing a low share of observed additional drawings after default in the historical observation period in relation to the observed committed but undrawn amount at default date

109. [par 168 GL PD LGD] Institutions should take into consideration all relevant post-default information in their CCF in-default estimates in a timely manner.

110. [par 170 GL PD LGD] Institutions should perform back-testing and benchmarking of CCF in-default estimates in accordance with points (b) and (c) respectively, of Article 185 of Regulation (EU) No 575/2013.

8.2 Simple approach for in-default CCF estimates

111. Under the simple approach, institutions should apply the non-defaulted grade level CCF estimates to facilities based on their latest available grade assignment before default date.

8.3 Modelling approach for in-default CCF estimates

8.3.1 General requirements

112. [par 167 GL PD LGD] For the purposes CCF in-default estimation, and unless otherwise specified in this chapter, institutions should use the same estimation methods used for estimating CCF on non-defaulted exposures.

113. [par 169 GL PD LGD] Institutions should assess and duly justify situations where the estimates of CCF in-default shortly after the date of default systematically deviate from the CCF estimates immediately before the date of default at the facility grade or pool, where these deviations do not stem from the use of risk drivers that are applicable only from the date of default onwards. In particular, a justification for such a deviation may be that an institution restricts additional drawing possibilities after the default of a facility.

8.3.2 Reference dates

114. [par 171 GL PD LGD] For the purposes of CCF in-default estimation, institutions should set the reference dates to be used for grouping defaulted exposures in accordance with the additional drawing patterns observed. These reference dates should be used in the estimation of CCF in-default instead of the reference date as defined in section 5.4.3. For the purposes of setting the reference dates institutions should use information only on closed recovery processes taking into account additional drawings observed up to the date of estimation.

115. [par 172 GL PD LGD] Each of the reference dates referred to in paragraph 114 could be any of the following:

a. a specific number of days after the date of default; this option would be appropriate in particular where the estimation refers to a portfolio of exposures showing a stable additional pattern through time, for instance due to the application of fees and interests;

b. a relevant date associated with a specific event at which significant breaks in the additional drawing profile are observed; this option would be appropriate in particular where the estimation refers to a portfolio of exposures that are subject to significant changes of the additional drawing patterns associated with certain specific events, for instance at the date of restriction of the additional drawings possibilities;

c. any combination of the cases referred to in points (a) and (b) that better reflects the additional drawing patterns; this option would be appropriate in particular where the estimation refers to a portfolio of exposures showing a stable additional drawing pattern through time but for which breaks in such additional drawing patterns are observed around certain specific events and where the reference dates following those events are defined as a specific number of days after the event, rather than after the date of default;

d. where appropriate, the reference date can have any value between zero and the number of days until the end of the maximum period of the additional drawings process set by the institution for the type of exposures or product in accordance with section 7.1.2.

116. [par 173 GL PD LGD] For the purposes of CCF in-default estimation the same defaulted exposures in the RDS should be used at all relevant reference dates considered in the model.

117. [par 174 GL PD LGD] Institutions should monitor on a regular basis potential changes in the additional drawing patterns and in the relevant additional drawing policies which may affect the estimation of CCF in-default at each reference date.

8.3.3 Data requirements for CCF in-default estimation

118. [par 175 GL PD LGD] For the purposes of CCF in-default estimation, institutions should use the same RDS referred to in section 5.2.1, complemented by any relevant information observed during the drawing process and at each reference date, specified in accordance with paragraphs 114 to 117 and, in particular at least the following additional information:

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

b. the drawn amount at each reference date and all subsequent additional drawings after the reference date.

8.3.4 Calculation of realised CCF for defaulted exposures

119. [par 178 GL PD LGD] For the purposes of CCF in-default estimation, institutions should calculate the realised CCFs for defaulted exposures in accordance with section 5.5, except for the following differences:

a. The reference date should be determined in accordance with section 8.3.2 rather than twelve months before the date of default;

b. For a given reference date, the numerator as referred to in paragraph 61.a.i should be calculated as all subsequent additional drawings after this reference date, discounted to this reference date. and should include all fees and interest capitalised before the reference date.

c. For a given reference date, the numerator as referred to in paragraph 61.b.i should be calculated as the sum of the drawn amount at reference date, all subsequent additional drawings after this reference date, and any fees and interests that occurred after the reference date and have been capitalised in the institution's income statement, discounted to this reference date.

120. [par 179 GL PD LGD] Where, after the moment of default, institutions write-off part of the exposure, the calculation of the realised CCF should be based on the full drawn amount of the outstanding credit obligation, without taking into account the partial write-off.

8.3.5 Model development in the estimation of CCF in-default

121. [par 176 GL PD LGD] For the purposes of taking into account the information on the time in-default and additional drawings realised so far, 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 section 8.3.2.

122. [par 177 GL PD LGD] For the purpose of CCF in-default estimation, institutions should analyse the potential risk drivers referred to in paragraph 74 not only until the moment of default but also after the date of default and until the date of termination of the drawing process. Institutions should analyse also other potential risk drivers that might become relevant after the date of default. Institutions should use the values of risk drivers adequate to the reference dates specified in accordance section 8.3.2.

8.3.6 Risk quantification for CCF in-default

123. [par 180 GL PD LGD] For the purposes of CCF in-default estimation, institutions should calculate the long run average CCF of the realised CCFs for defaulted facilities, referred to paragraph 84, following the requirements set out in section 5.5 with the only exception that, for each reference date, incomplete drawing processes should be used only if their relevant reference date for the application of the CCF in-default parameters is posterior to the reference date under consideration for the estimation. Institutions should ensure that CCF estimates are not biased due to any deficiencies, and incorporate sufficient margin of conservatism, according to chapter 9.

124. [par 181 GL PD LGD] In accordance with section 7.1.2, institutions should not estimate any future drawings for facilities that remain in defaulted status for a period of time longer than the maximum length of the recovery process as specified by the institution. Relevant information

regarding specific facilities may be reflected in the application of the CCF parameters by overriding the output of the rating assignment process in accordance with chapter 11.

125. [par 189 GL PD LGD] For the purpose of considering the possible adverse change in economic conditions during the expected length of the drawing processes the CCF in-default should reflect in their CCF-estimates downturn conditions as described in section 10.3.

9. Treatment of deficiencies and margin of conservatism

9.1 Identification of deficiencies

126. [par 36 GL PD LGD] Institutions should identify all deficiencies related to the estimation of risk parameters that lead to a bias in the quantification of those parameters or to an increased uncertainty that is not fully captured by the general estimation error and correlation between default frequency and the magnitude of the conversion factor, and classify each deficiency into one of the following categories:

a. Category A: Identified data and methodological deficiencies;

b. Category B: Deficiencies in the representativeness of the data used for the calibration of risk parameters and any other source of additional uncertainty

127. [par 37 GL PD LGD] For the purposes of identifying and classifying all deficiencies referred to in paragraph 126 institutions should take into account all relevant deficiencies in methods, processes, controls, data or IT systems that have been identified by the credit risk control unit, validation function, internal audit function or any other internal or external review and should analyse at least all of the following potential sources of additional uncertainty in risk quantification:

a. under category A

i. missing or materially changed default triggers in historical observations, including changed criteria for recognition of materially past due credit obligations;

ii. missing or inaccurate date of default;

iii. missing, inaccurate or outdated rating assignment used for assessing historical grades or pools for the purpose of calculation of average realised credit conversion per grade or pool. This include cases where the rating assignment is based on a missing or inaccurate reference date as defined in section 5.4.3;

iv. missing or inaccurate information on the source of cash flows and drawings;

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

vi. missing or inaccurate information used for the estimation of future drawdowns as referred to in section 7.1.2;

vii. missing or inaccurate data for the calculation of realised CCF. This includes cases where the calculation of realised CCF is based on missing or inaccurate reference date as defined in section 5.4.3, as well as missing or inaccurate information on the unadvised limit of the commitment in accordance with section 5.5.6;

viii. limited representativeness of the historical observations due to the use of external data;

ix. a lack of availability of historical data as described in paragraph 46.b.

x. missing information for the purpose of reflecting economic downturn in CCF estimates;

xi. Missing or inaccurate information for the identification of a change in the customer product mix in accordance with section 5.4.1.

b. under category B:

i. changes to internal policies and external factors, as referred to in paragraph 48.c;

ii. structural breaks in the economic and market conditions as referred to in paragraph 48.d;

iii. forward-looking expectations regarding potential changes in the structure of the portfolio, the level of risk or future changes in economic conditions which are not reflected in the observed data, as referred to in paragraph 47.

9.2 Appropriate adjustment

128. [par 38 GL PD LGD] In order to overcome biases in risk parameter estimates stemming from the identified deficiencies referred to in section 9.1, institutions should apply adequate methodologies to correct the identified deficiencies to the extent possible. The impact of these methodologies on the risk parameter, i.e. the appropriate adjustment as defined in CRR3 Article 5(8), which should result in a more accurate estimate of the risk parameter, i.e. the best estimate, represents either an increase or a decrease in the value of the risk parameter. Institutions should ensure and provide evidence that the application of an appropriate adjustment results in a best estimate.

129. [par 39 GL PD LGD] Institutions should document the methods used to apply appropriate adjustments to rectify the identified deficiencies, where relevant, as well as their justification.

130. [par 40 GL PD LGD] Institutions should regularly monitor the adequacy of appropriate adjustments. The adoption of an appropriate adjustment by institutions should not replace the need to address the identified deficiencies.

9.3 Margin of conservatism

131. [par 41 GL PD LGD] In relation to the requirement that institutions should add a margin of conservatism, as defined in Article 5(7) ('MoC') that is related to the expected range of estimation errors as required by Articles 179(1)(f) and 182 (1)(c) of Regulation (EU) No 575/2013, institutions should implement a framework for quantification, documentation and monitoring of estimation errors.

132. [par 42 GL PD LGD] The final MoC on a risk parameter estimate should reflect the uncertainty of the estimation in all of the following categories:

a. Category A: MoC related to data and methodological deficiencies identified under category A as referred to in paragraph 126.a;

b. Category B: MoC related to relevant changes to underwriting standards, risk appetite, collection and recovery policies and any other source of additional uncertainty identified under category B as referred to in paragraph 126.b;

c. Category C: MoC related to the general estimation error;

133. [par 43 GL PD LGD] In order to quantify MoC institutions should do all of the following:

a. Quantify MoC for the identified deficiencies referred to in section 9.1, to the extent not covered by the general estimation error and correlation between default frequency and the magnitude of the conversion factor, at least for each of the categories A and B at the level of the calibration segment ensuring that:

i. where appropriate adjustments in the sense of paragraph 128 are used, the MoC accounts for any increase in the uncertainty or additional estimation error associated with these adjustments;

ii. the MoC at category level related to the appropriate adjustments is proportionate to the uncertainty around these adjustments;

iii. the MoC is applied to address the uncertainty of the risk parameter estimate stemming from any deficiencies among those referred to in section 9.1 that have not been corrected via appropriate adjustments as referred to in point (i);

b. quantify the general estimation error of category C referred to in paragraph 132.c associated with the underlying estimation method at least for every calibration segment; the MoC for the general estimation error should reflect the dispersion of the distribution of the statistical estimator.

134. [par 44 GL PD LGD] For the purpose of paragraph 133.a and for each of the categories A and B, institutions may group all or selected deficiencies, where justified, for the purpose of quantifying MoC.

135. [par 45 GL PD LGD] Institutions should quantify the final MoC as the sum of:

a. the MoC under category A as referred to in paragraph 132.a;

b. the MoC under category B as referred to in paragraph 132.b;

c. the MoC for the general estimation error (category C) as referred to in paragraph 132.c;

136. [par 46 GL PD LGD] Institutions should add the final MoC to the best estimate of the risk parameter.

137. [par 47 GL PD LGD] Institutions should ensure that the impact of the final MoC does not result in lowering the risk parameter estimates and in particular that:

a. the MoC stemming from the general estimation error is greater than zero;

b. the MoC stemming from each of the categories A and B is proportionate to the increased uncertainty in the best estimate of risk parameters caused by the identified deficiencies listed in each category. In any case, the MoC under each of the categories A and B should be greater than or equal to zero.

138. [par 48 GL PD LGD] Institutions should consider the overall impact of the identified deficiencies and the resulting final MoC on the soundness of the model and ensure that the estimates of the risk parameters and the resulting own funds requirements are not distorted by the necessity for excessive adjustments.

139. [par 207b EGIM] Where data availability is considered to be unsatisfactory, in order to still meet the requirements laid down in articles 179 and 182 of Regulation (EU) No 575/2013, it is sufficient for institutions to include a margin of conservatism in their CCF estimate such that the CCF estimate has a minimum value of 100%, provided that they meet the following conditions:

a. The data available are scarce to a degree that prevents the institution from obtaining sufficient relevant statistical evidence from them, or the exposure in scope of this CCF is immaterial with respect to the overall exposure in scope of the rating

system. This includes the case related to the lack of historical observations as described in paragraph 46.c.

b. Where data availability is considered to be less satisfactory, the MoC must be larger, and the less data an institution has, the more conservative its estimation must be. The institution should provide evidence that, in accordance with (a) the internal data available, (b) the contractual terms of the exposures to which the value is applied, and (c) the institution's policies and processes, the CCF value defined is an objectively conservative CCF estimate.

140. [par 49 GL PD LGD] For each rating system, the MoC applied should be documented in the relevant model documentation and methodology manuals. The documentation should contain at least the following:

a. A complete list of all identified deficiencies, including errors, correlations and uncertainties, and the potentially affected model components or risk parameters;

b. the category under which these deficiencies are classified, as referred to in paragraph 132;

c. a description of the methods for quantification of the MoC related to identified deficiencies as referred to in paragraph 133.a and in particular the methodologies used to quantify the MoC per category.

141. [par 50 GL PD LGD] Institutions should regularly monitor the levels of the MoC. The adoption of a MoC by institutions should not replace the need to address the causes of errors or uncertainties, or to correct the models to ensure their full compliance with the requirements of Regulation (EU) No 575/2013. Following an assessment of the deficiencies or the sources of uncertainty, institutions should develop a plan to rectify the data and methodological deficiencies as well as any other potential source of additional uncertainty and reduce the estimation errors within a reasonable timeframe, taking into consideration the materiality of the estimation error and the materiality of the rating system.

142. [par 51 GL PD LGD] When reviewing the levels of the MoC institutions should ensure all of the following:

a. that the MoC stemming from categories A and B referred to in paragraphs 132.a, and 132.b is included in internal reporting separately for each category and may be reduced over time and eventually eliminated once the deficiencies are rectified in all parts of the rating system that were affected;

b. that the MoC stemming from the general estimation error referred to in paragraph 132.c is included in internal reporting in a separate category ('C');

c. that the level of the MoC is assessed as part of the regular reviews referred to in Chapter 12 and in particular that the level of MoC related to the general estimation error remains appropriate after the inclusion of the most recent data relevant for the risk parameter estimation.

143. [par 52 GL PD LGD] Institutions should ensure that necessary changes in the MoC are implemented in a timely manner.

10. Downturn CCF estimates

10.1 General requirements on the downturn estimation framework

144. [LGD DT GL 13] For the purpose of quantifying CCFs that are appropriate for an economic downturn, institutions should apply all definitions and all requirements set out in these guidelines that are relevant for this purpose.

145. [LGD DT GL 14] In addition to paragraph 144, for the purpose of quantifying downturn CCF institutions should apply the following requirements specific to downturn CCF estimates by facility grade or pool:

a. calibrate downturn CCF at least at the same level at which institutions calculate the corresponding long-run average CCF for the purpose of calibrating CCF in accordance with section 7.2.

b. split the set of facilities covered by the same CCF model into as many different calibration segments as needed where each calibration segment carries a significantly different loss profile and might thus be affected differently by different downturn periods; for this purpose, institutions should at least consider the appropriateness of introducing calibration segments that cover material shares of exposure in different geographical areas, in different industry sectors and, for retail exposures, of different product types;

146. When identifying the economic downturn following Article 1 of the Commission Delegation Regulation (EU) No 2021/930, institutions should use, as one of the relevant indicators according to Article 2(1)(c) of the Commission Delegation Regulation (EU) No 2021/930, the yearly default rates of the portfolio in scope of application of the CCF model.

147. [LGD DT GL 15] Where institutions identify multiple downturn periods in accordance with the final draft RTS on economic downturn submitted by EBA [RTS on economic downturn],

a. they should perform each of the steps in the following sequence:

i. calculate a downturn CCF for each identified downturn period in accordance with section 10.4 for each calibration segment;

ii. for each of those downturn periods, apply the resulting downturn CCF estimates to their current non-defaulted exposures of the type of exposures under consideration and at the time of calibration;

iii. choose the period as finally relevant downturn period that results in the highest average downturn CCF, including final MoC as set out in paragraph 135, on a considered calibration segment of their current non-defaulted exposures as referred to in (ii). Institutions should then use the resulting downturn CCFs based on the finally relevant downturn period for each calibration segment to comply with paragraph 182 1(b) CRR3.

iv. in case that institutions can calibrate downturn CCF in accordance with section 10.4.1 or 10.4.2 for at least one downturn period but they are unable to quantify downturn CCF in accordance with section 10.4.1 or 10.4.2 for one or several other downturn periods, consider only the estimates based on section 10.4.1 or 10.4.2, and add an appropriate Category A MoC in accordance with paragraph 127.a to the final downturn CCF estimates to cover for the downturn periods where sufficient and relevant loss data to assess or estimate the impact is not available;

b. In derogation to paragraph 147.a.i, institutions do not need to provide a calibration of downturn CCF for a considered calibration segment for downturn periods identified in accordance with the Commission Delegation Regulation (EU) No 2021/930 where institutions can provide evidence that the according economic factors are not relevant for the considered calibration segment.

10.2 Requirements that apply to the final downturn CCF estimates

148. [LGD DT GL 16] For the purpose of ensuring that the resulting downturn CCFs are used if they are more conservative than the long-run average CCFs in line with Article 182(1)(b) of Regulation (EU) No 575/2013, institutions should apply the following:

a. where institutions use separate estimation methodologies for long-run average CCF and downturn CCF, compare their final downturn CCFs plus the according final MoC as set out in paragraph 135, to their long-run average CCFs plus the according final MoC as set out in paragraph 135, at the level where the long-run average CCF is calculated for the purpose of quantifying CCF in accordance with paragraph 84;

b. where institutions set a single CCF estimate, which involves a long-run average CCF estimation and a downturn adjustment added to the long-run average CCF estimation, they should ensure that the final MoC as set out in paragraph 135 on the downturn CCF estimates encompasses the uncertainties stemming from both the long-run average CCF estimation and the calculation of the downturn adjustment.

149. [LGD DT GL 17] For models with risk drivers sensitive to the economic cycle, institutions should ensure that the resulting downturn CCF estimates are not unduly sensitive to changes in economic cycle. For this purpose, institutions should do all of the following:

a. analyse the difference between the distribution of exposures over facility grades or pools, or over appropriate intervals in case of continuous facility scales, of the current portfolio and the likely distribution of the current portfolio impacted by the relevant downturn period selected in accordance with paragraph 146,

b. if there is a substantial difference as a result of the analysis in (a), institutions should apply an adjustment to their downturn CCF estimates to limit the capital impact of an economic downturn in accordance with Article 181(1)(b) of Regulation (EU) No 575/2013.

150. [LGD DT GL 18] Institutions should compare the final downturn CCF with the reference value calculated in accordance with paragraph 162 on the according quantification sample and calculated at least at the level of grade or pools, or calibration segments. Institutions should justify any material difference between the final downturn CCF and the reference value.

151. [LGD DT GL 19] When comparing the final downturn CCF with the reference value in line with paragraph 150, institutions should take into account all of the following:

a. A material difference between the final downturn CCF plus final MoC as set out in paragraph 135 and the reference value can be justified if the period identified for the reference value does not stem from a downturn period or if the difference is due to the minimum MoC requirement in paragraph 126.b where the downturn CCF is based on the methodology in section 10.4.3. In case that the underlying downturn CCF is based on the methodology in section 10.4.1, institutions may use the evidence gathered from the impact assessment in paragraph 155.

b. If the material difference between the final downturn CCF and the reference value cannot be justified, institutions should re-assess their quantification of downturn CCF ensuring in particular that the downturn periods have been identified comprehensively and that, where intermediate parameters are used, the impact of the relevant downturn period observed based on section 10.4.1 or estimated based on section 10.4.2 on intermediate parameters has been aggregated adequately. After the institution has re-assessed its quantification of downturn CCF, and the methodology is assessed to be adequate, a material difference from the reference value can be explained.

10.3 Downturn CCF estimation for defaulted exposures

152. [LGD DT GL 20] For downturn CCF estimation for defaulted exposures, institutions should use the same downturn period as identified for the corresponding non-defaulted exposures.

153. [based on LGD DT GL 21] For downturn CCF estimation for defaulted exposures for the downturn period referred to in paragraph 152, the downturn component of CCF estimation for defaulted exposures as referred to in paragraph 125 should be quantified either by:

a. quantifying downturn CCF for the defaulted exposures under consideration for each reference date in accordance with section 10.4, or by

b. applying the downturn component of the CCF estimates for non-defaulted exposures. For this purpose, the downturn component of the CCF estimates for non-defaulted facilities may be inferred by considering the difference between the resulting downturn CCF estimates and the corresponding long-run average CCFs of non-defaulted facilities.

10.4 Downturn CCF estimation for a considered downturn period

154. [LGD DT GL 22-25] For the purpose of calibrating downturn CCF for each considered downturn period identified in accordance with Commission Delegation Regulation (EU) No 2021/930, institutions should use one of the three types of approaches set out in sections 10.4.1, 10.4.2, 10.4.3 in accordance with the following hierarchy set out below.

a. Where institutions have sufficient and relevant loss data to conduct the impact analysis set out in paragraph 155, they should quantify downturn CCF for the considered downturn period in accordance with section 10.4.1. For this purpose, institutions should ensure that the relevant drawing data is available during the considered downturn period as well as during an appropriate period before and after the considered downturn period.

b. Where sufficient and relevant drawing data to assess the impact of the considered downturn period is not available but it is possible to quantify downturn CCF for the considered downturn period by applying the approach set out in section 10.4.2, institutions should quantify downturn CCF for the considered downturn period in accordance section 10.4.2.

c. Where sufficient and relevant drawing data to assess the impact of the considered downturn period is not available, and it is not possible to quantify downturn CCF for the considered downturn period by applying the approach set out in section 10.4.2, institutions should calibrate downturn CCF for the considered downturn period in accordance with section 10.4.3.

[LGD DT GL 26 is deleted]

10.4.1 Downturn CCF estimation based on observed impact

155. [based on LGD DT GL 27] In order to quantify the downturn CCF based on the observed impact of a considered downturn period, institutions should carry out an analysis of the impact of this downturn period on the loss data related to the considered calibration segment.

a. The analysis shall comprise at a minimum all of the following:

i. evidence of elevated levels of realised CCFs, driven by the considered downturn period. For this purpose, institutions should calculate the arithmetic average of realised CCFs related to all defaults that occurred in a considered year. Where institutions take into account additional drawings in their CCF estimates, they should calculate the average in accordance with section 7.1.2.

ii. evidence of increased time in default per year related to all defaults in a considered year, when additional drawings are included in the CCF estimates and represent a material share of the numerator of the realised CCF considered for the long run average CCF.

b. The analysis required in paragraph 155.a shall take into account as many points in time as possible where sufficient relevant loss data is available. Otherwise, if only scarce relevant loss data is available on an annual basis, institutions should merge consecutive years of observations as long as deemed of added value for the analysis.

c. The analysis required in paragraph 155.a shall take into account any lag between a downturn period and the time when its potential impact is observed on the relevant loss data.

156. [LGD DT GL 28] Based on the evidence obtained from the impact analysis referred to in paragraph 155, institutions should calibrate downturn CCF by applying an estimation methodology which is coherent with the evidence obtained from the impact analysis.

157. [LGD DT GL 29] Where the impact analysis conducted in accordance with paragraph 155 shows no impact of a downturn period on an institution's relevant drawing data, such that the average observed realised drawings in this downturn period are not different from those under other economic conditions, the institution may use the long-run average CCF as downturn CCF, where all of the following applies:

a. the institution ensures and documents that the deficiencies identified and MoC applied in accordance with chapter 9 incorporate all additional elements of uncertainty related to the identified downturn periods;

b. for the purpose of letter (a), the institution should in particular verify that, for the considered downturn period, none of the deficiencies identified under the Category A MoC in accordance with paragraph 127.a are of higher severity and that no additional deficiencies or adjustments under the Category B MoC in accordance with paragraph 127.b are applicable.

10.4.2 Downturn CCF estimation based on estimated impact

158. [based on LGD DT GL 30] Where paragraph 154.b applies, institutions should quantify the downturn CCF using the methodology specified below.

[LGD DT GL 31 deleted]

159. [based on LGD DT GL 32] For the purposes of these guidelines, the 'extrapolation approach' refers to the estimation of the impact of the downturn period under consideration on CCFs. Where a statistically significant dependency between the realised CCFs averaged over appropriate periods in time, and the economic factors selected in accordance with Article 2 of Commission Delegation Regulation (EU) No 2021/930 which are relevant for the downturn period under consideration, can be established, the resulting estimates are based on the extrapolated values of the average realised CCFs to the period reflecting the impact of the downturn period.

[LGD DT GL 33 & 34 deleted]

160. [LGD DT GL 35] To reflect the lack of sufficient data, institutions should quantify a strictly positive Category A MoC in accordance with paragraph 127.a.x for the extrapolation approach as referred to in paragraph 159. For this purpose, institutions should quantify the Category A MoC by using an appropriate confidence interval to reflect the uncertainty related to the statistical model used to describe the dependency between the realised CCFs, intermediate parameters or risk drivers and the relevant economic factors

10.4.3 Downturn CCF estimation where observed and estimated impact is not available

161. [based on LGD DT GL 36] Where the institution can demonstrate that it is not possible to quantify the downturn CCF by using the approaches described in sections 10.4.1 and 10.4.2, institutions should quantify downturn LGD through any other approach subject to the following conditions:

a. they should ensure that the appropriate MoC required to be applied in accordance with section 9.3 includes a Category A MoC that is strictly positive to account for the missing data.

b. they should ensure that for the considered downturn period the resulting downturn CCF estimates including the final MoC are higher than or equal to the corresponding long-run average CCFs plus an add-on of 15 percentage points.

10.5 Reference value

162. [LGD DT GL 37] Institutions should calculate a reference value in accordance with the following sequence of steps:

a. Using all available data, institutions should select the two individual years with the highest observed drawing pattern by:

i. grouping all defaults according to the year in which the defaults occurred;

ii. for each year as identified in (i) calculating for the defaults that occurred in the considered year the average realised CCF in accordance with section 5.5;

iii. selecting the two individual years with the highest annual realised CCF as described in (ii) as the two individual years with the highest observed economic losses.

b. Institutions should calculate the reference value(s) at least for each calibration segment as the simple average of the average realised CCFs from the two individual years with the highest observed economic losses, as identified in paragraph 162.a.iii.

11. Application of the risk parameters

163. Institution should ensure that the same definitions are used in application and estimation of the CCF parameters. This consistency should be ensured in particular in relation to:

a. the realised CCF calculation approaches described in paragraphs 61.a and 61.b, and the application of the derogation as described paragraph 61.c.

b. the unadvised limit as described in section 5.5.6 in order to determine the committed but undrawn amount as referred to in Article 166(8) of regulation (EU) No 575/2013.

164. [based on par 194 GL PD LGD] In the application of the CCF model and where institutions receive new information with respect to a relevant risk driver or rating criterion, they should take this information into account in the rating assignment in a timely manner, in particular by ensuring both that the relevant IT systems are updated as soon as possible and that the corresponding rating and CCF assignment is reviewed as soon as possible

11.1 Conservatism in the application of risk parameters

165. [par 195 GL PD LGD] For the purpose of Article 171(2) of Regulation (EU) No 575/2013 institutions should apply additional conservatism to the outcomes of the grade or pool assignment where any deficiencies are identified related to the implementation of the model in the IT system or to the process of assignment of risk parameters to obligors or facilities in the current portfolio (application of risk parameters), especially when those deficiencies relate to data used in the rating assignment process. They should do so by establishing a framework that consists of the following phases:

a. identification of deficiencies of implementation of the model in the IT system 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.

166. [par 196 GL PD LGD] For the purpose of paragraph 165.a, For the purpose of paragraph 195(a) institutions should have a robust process for identifying all implementation and applica-

tion 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 application portfolio, in particular in relation to data on risk characteristics used in assigning the facility to a CCF grade, and in relation to data used to construct those risk characteristics.

b. outdated grade or pool in the application portfolio, where outdated rating should be understood as specified in Article 25(2)(b) and (c) of the CDR on IRB methodology, where ratings are used in assigning the CCF.

c. missing grade or pool, whereby a facility is considered as being within the scope of application of the IRB model but is not rated by it.

167. [par 197 GL PD LGD] For the purpose of paragraph 165.b institutions should ensure that the occurrence of any of the triggers referred to in paragraph 166 results in the application of additional conservatism to the risk parameter for the purpose of the calculation of risk-weighted exposure amounts. The final risk parameter used for the purpose of the calculation of risk-weighted exposure amounts should be based on the risk estimates of the rating system, rather than on regulatory values provided in Regulation (EU) No 575/2013. Where more than one trigger occurs, the estimate should be more conservative. The additional conservatism for each parameter and for each trigger should be proportionate to the uncertainty in the estimated risk parameter introduced by the trigger.

168. [par 198 GL PD LGD] Institutions should consider the overall impact of the identified deficiencies and the resulting conservatism at the level of portfolio covered with the relevant model on the soundness of the assignments to grades or pools and ensure that the own funds requirements are not distorted by the necessity of excessive adjustments.

169. [par 199 GL PD LGD] For the purpose of paragraph 165.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 timeframe, taking into consideration the magnitude of the impact on the own funds requirements.

170. [par 200 GL PD LGD] For the purpose of paragraph 165.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 that the activation of such triggers had on the final assignment to a grade or pool, the level of risk parameter and on the own funds requirements.

11.2 Human judgment in the application of risk parameters

171. [par 201 GL PD LGD] Institutions may use human judgement in the application of the model in the following cases:

a. in the application of the qualitative variables used within the model;

b. via overrides of the inputs of the rating assignment process;

c. via overrides of the outputs of the rating assignment process.

172. [par 202 GL PD LGD] Institutions should specify clear criteria for the use of qualitative model inputs and they should ensure a 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.

173. [par 203 GL PD LGD] 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 rating assignment process. These policies should refer both to possible overrides of inputs and outputs of such process and should be specified in a conservative manner such that the scale of conservative overrides should not be limited. In contrast, the scale of potential decreases of the estimates resulting from the model, either by overriding the inputs or outputs of the rating assignment process, should be limited. In applying the overrides institutions should take into account all relevant and up-to-date information.

174. [par 204 GL PD LGD] 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.

175. [par 205 GL PD LGD] Institutions should regularly monitor the level and justifications for overrides of inputs and outputs of the rating assignment process. 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.

176. [par 206 GL PD LGD] Institutions should regularly analyse the performance of exposures in relation to which an override of input or output of the rating assignment process has been performed in accordance with Article 172(3) of Regulation (EU) No 575/2013.

177. [par 207 GL PD LGD] Institutions should regularly assess the performance of the model before and after the overrides of outputs of the rating assignment process. Where the assessment concludes that the use of overrides significantly decreased the model's capacity to accurately

quantify the risk parameters ('predictive power of the model'), institutions should adopt adequate measures to ensure the correct application of overrides.

11.3 Use test

178. [par 208 GL PD LGD] In accordance with Article 144(1)(b) and 182(1)(f) of Regulation (EU) No 575/2013 and Articles 18 to 21 of the RTS on IRB assessment methodology institutions should use the same estimates of risk parameters for the purpose of own funds requirements calculation and for internal purposes, including risk management and decision-making processes, unless all of the following conditions are met:

a. the deviation is justified, reasonable, appropriate and documented for the specific area of use;

b. the deviation does not lead to a change in rank ordering in the assignment of obligors or facilities to grades and pools within a calibration segment other than within each grade or pool;

c. the deviation is due to the use of parameters for internal purposes without consideration of the MoC, without regulatory floors, without downturn adjustment or is due to the use of a different calibration method, which may entail specifying different calibration segments.

179. [par 209 GL PD LGD] For the purpose of paragraph 178 it may also be considered adequate to group continuous risk parameter estimates into homogenous ranks for internal purposes.

180. [par 210 GL PD LGD] Where institutions use for internal purposes estimates of risk parameters that are different from those used in the calculation of own funds requirements they should periodically reflect this in their internal reporting to senior management by providing information on both sets of parameters. In any case internal reporting should include all elements specified in Article 189(3) of Regulation (EU) No 575/2013 based on the estimates of risk parameters used for the purpose of calculation of own funds requirements.

12. Review of estimates

181. [par 215 GL PD LGD] Institutions should specify internal policies for changes of models and estimates of risk parameters used within a rating system. Such policies should provide that changes in the models should be made as a result of at least the following:

a. regular review of estimates;

b. independent validation;

c. changes in the legal environment;

d. internal audit review;

e. competent authority review.

182. [par 216 GL PD LGD] Where material deficiencies are identified as a result of the procedures referred to in paragraph 181 institutions should take appropriate actions depending on the severity of the deficiency and apply a MoC in accordance with section 9.3.

183. [par 217 GL PD LGD] For the purpose of regular reviews of estimates, institutions should have a framework in place which includes at least the following elements:

a. a minimum scope and frequency of analyses to be performed, including predefined metrics chosen by the institution to test data representativeness, model performance, its predictive power and stability;

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

c. predefined actions to be taken in case of adverse results of the review, depending on the severity of the deficiency.

In their regular reviews of estimates institutions may rely on the results of independent validation where such results are up to date.

184. Institutions should ensure that the same definition of CCF estimate is used in the review of estimates as in the estimation of the risk parameters. This consistency should be ensured in particular in relation to:

a. the realised CCF calculation approaches described in paragraphs 61.a and 61.b, and the application of the derogation as described paragraph 61.c.

b. the unadvised limit as described in section 5.5.6 in order to determine the committed but undrawn amount as referred to in Article 1666(8) of regulation (EU) No 575/2013.

185. [par 218 GL PD LGD] The reviews of estimates to be performed at least annually in accordance with Article 179(1)(c) of Regulation (EU) No 575/2013 should be performed taking into account the metrics, standards and thresholds defined by the institution in accordance with paragraph 183. The scope of such reviews should comprise at least the following elements:

a. an analysis of data representativeness on the application portfolio of the quantification sample, as described in section 5.3;

b. an analysis of the performance of the model and its stability over time, which should have both of the following characteristics:

i. the analysis should identify any potential deterioration of the model performance, including the model's 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; this analysis should be performed on relevant subsets, e.g. in the case of CCF estimates for

1. products with and without unadvised limits;

2. facilities within and outside the region of instability where applicable;

3. contractual arrangements not yet accepted by the obligor at reference date.

ii. the analysis should be performed with regard to the whole application portfolio, without any data adjustments or exclusions performed in model development; for comparison purposes, the performance at the time of development should also be obtained for the whole application portfolio, prior to any data adjustments or exclusions;

c. an analysis of the predictive power of the model. To ensure that their CCF estimates are effectively quarantined from the potential effects of region of instability, institutions should assess, for both, facilities within and outside the region of instability, the predictive power at the level of both the CCF and the implied exposure value estimate. The analysis should include 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 whether including the most recent data leads to a significant change in the long-run average CCF or downturn CCF;

ii. a back-testing 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; for this purpose institutions may take into account the results of back-testing performed as part of the internal validation in accordance with Article 185(b) of Regulation (EU) No 575/2013 or they may perform additional tests, for instance with regard to a different timeframe of the dataset.

186. Where institutions include a sufficient margin of conservatism in their CCF estimate such that the CCF estimate has a minimum value of 100% in order to meet the requirements laid down in articles 179 and 182 of Regulation (EU) No 575/2013, they should ensure that the two conditions set out in paragraph 139 continue to be met. With respect to paragraph 139.b, it should be ensured that the applied values remain conservative over time by comparing them with the realised CCFs of each defaulted facility within the subset of exposures to which such values are applied as a CCF estimate.

187. [par 219 GL PD LGD] Institutions should specify conditions under which the analyses referred to in paragraph 184 should be performed more frequently than annually, such as major changes in the risk profile of the institution, credit policies or relevant IT systems. Institutions should perform the review of the CCF model whenever they observe significant change in economic conditions as compared with the economic conditions underlying the dataset used for the purpose of model development.

188. [par 220 GL PD LGD] 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 the full review of the rating systems, taking into consideration their materiality, and covering all aspects of model development, quantification of risk parameters and, where applicable, the estimation of model components. This review should include all of the following:

a. a review of the existing and potential risk drivers and an assessment of their significance based on the predefined standards of review referred to in paragraph 183;

b. an assessment of the modelling approach, its conceptual soundness, the fulfilment of the modelling assumptions and alternative approaches.

Where the results of this review recommend changes to model design, appropriate actions should be taken following the results from this analysis.

189. [par 221 GL PD LGD] For the purpose of the review specified in paragraphs 183 to 188 institutions should apply consistent policies for data adjustments and exclusions and ensure that

any differences in the policies applied to the relevant datasets are justified and do not distort the results of the review.

5. Accompanying documents

5.1 Draft impact assessment

The CP GL CCF tries to strike a balance between consistency with current supervisory expectations already in place based on existing regulation, especially in relation to LGD estimation, and on the other hand allow for simplification of the CCF estimation approach where the risk of underestimation is low. Instead of providing an impact assessment on the policy choices made in this consultation paper, the consultation paper on the guidelines on CCF estimation includes many questions to the industry on the proportionality and materiality of the policy choices made. At this stage, the EBA welcomes feedback from the industry on the detailed questions in the CP, as well as on whether these proposed guidelines reflects appropriately this balance.

5.2 Overview of questions for consultation

Fixed CCF and use of own estimates of LGD

1. **Question 1:** How material are the cases for your institution where you would have to assign an SA-CCF to exposures arising from undrawn revolving commitments and thus restrict the use of own estimates of LGDs within the scope of application for IRB-CCF in the CRR3? For which cases would you not have enough data to estimate CCFs but have enough data to estimate own estimates of LGDs?

Level of facility

2. **Question 2**: Do you have any comments related to guidance on the identification of a related set of contracts which are connected such that they constitute a facility?

Scope of IRB-CCF

3. **Question 3:** Do these GL cover all relevant aspects related to the definition of revolving commitments that you consider relevant for the scope of the IRB-CCF? Have you identified any product that should be in the scope of the IRB-CCF that is currently excluded in the GL? In terms of off-balance sheet exposures, how material are the exposures that fall within the defined scope of the IRB-CCF for your institution?

4. **Question 4:** Are there products that have an advised limit of zero but a nonzero unadvised limit that should be included in the scope of the IRB-CCF GL? How material are these cases for your institution?

5. **Question 5:** Do you think that dynamic limits (e.g. limits the extent of which is dependent on the market value of financial collateral pledged by the obligor in relation to the revolving loan) warrant a specific treatment in the IRB-CCF GL? How material are these cases for your institution?

6. **Question 6:** Have you identified any unwarranted consequences of including fully drawn revolving commitments in the scope of the IRB-CCF. How material are these cases for your institution?

Construction of RDS

7. **Question 7**: Do you have any concerns on the introduction of the notion of the different samples that constitute the RDS for CCF estimation? Do you have a modelling practice implemented that deviates from this approach?

8. **Question 8:** Are there cases for your institution where the calibration samples should be shorter than the sample used to calculate the long run average (LRA) CCF?

Representativeness

9. **Question 9:** Do you have any concerns with the requirements introduced to analyse and mitigate a lack of representativeness for CCF? Do the requirements on the different data samples when observing a lack of representativeness impede your ability to model CCF portfolios?

10. **Question 10:** Do you have any concerns with linking the fixed CCF to the lack of historical data available to the institution in relation to the coverage by the RDS of material subsegments of the application portfolio? How is your institution currently treating these cases?

Consumer product mix

11. **Question 11:** Are there any concerns with requiring consistency in the analysis of changes in the product mix with the institution's definition of facility? Are institutions able to identify and link contracts (partially) replacing other contracts where the closing or repayment of one contract is related to the origination of a new contract? Are institutions able to link new contracts that are originated after the reference date to related contracts existing at reference date? In particular, is it possible in the case contracts that are revolving commitments are replaced by contracts that are non-revolving commitments (e.g. by a term loan)?

12. **Question 12:** Do institutions consider it proportionate to the risks of underestimation of CCF to perform the identification analysis and allocation procedure? If it is deemed not proportional, what would be an alternative approach that is still compliant with Article 182(1b) CRR?

12 month fixed horizon and 'fast defaults'

13. **Question 13:** Do you have any concerns on the proposed approach for the treatment of so-called 'fast defaults'? In case you already apply a 12-month fixed-horizon approach, do you apply a different treatment for 'fast defaults' in practice, (and if so, which one)? Is the 'fast default' phenomenon material according to your experience? If yes, for which exposures, exposure classes or types of facilities?

Multiple default treatment

14. **Question 14:** Do you have any concerns on the multiple default treatment? To what extent are your current models impacted by the application of a multiple default treatment?

Allocation mechanism

15. **Question 15:** Do you agree with the three principles for the calculation for realised CCF in the context of consumer product mix, and their implications for the cases mentioned as examples? In case of disagreement, what is the materiality of the cases with unwarranted results, in particular in relation with the definition of facility applied in your institution? In case of material unwarranted results, can you describe your alternative practice to this CP?

16. **Question 16:** Are there any concerns related to the allocation mechanism described in these GL?

Additional drawings after default

17. **Question 17:** Where credit lines are kept open even if the facility is in default, the alternative option described in this consultation box could lead to high realised CCF values. Is this a relevant element for your institution and if yes, why and how material are these cases within the scope of IRB-CCF models?

18. **Question 18:** In case of multiple defaults, the CCF might also be driven by drawings while the obligor was in its default probation period or in the dependence period between the merged defaults. Do you expect this to be material for your CCF models?

19. **Question 19:** Do you see any unwarranted consequences of the proposed approach for incorporating additional drawings after default? In particular, in order to maintain consistency between the realised CCF calculation and the calculation of the denominator of the realised LGD as described in paragraph 140 of the GL PD and LGD, would this require a redevelopment of your LGD models?

Region of instability

20. **Question 20:** Do you think that the relative threshold is an appropriate approach to restrict the use of the alternative CCF approach for those facilities in the region of instability? Do you think it is appropriate to define a single relative threshold per rating system or are there circumstances where multiple relative thresholds would be warranted? Do you see a need to use an absolute threshold in addition to the relative thresholds?

21. **Question 21:** Do you consider the guidance sufficiently clear in relation to the requirement for institutions to set up a policy to define a threshold value?

22. **Question 22:** Do you consider it appropriate to set a prescribed level or range for the defined threshold, and if so, what would be an appropriate level for the threshold? In case an absolute threshold is warranted, what would be an appropriate prescribed level for an absolute threshold?

23. **Question 23:** Do you think that, for the facilities in the region of instability, and/or for fully drawn revolving commitments, a single approach should be prescribed (e.g. one of the approaches above defined in the Basel III framework), or that more flexibility is necessary for institutions to use different approaches they deem most appropriate for these facilities?

24. **Question 24:** If such flexibility is indeed warranted, what is the technical argumentation why prescribing a single alternative approach for these facilities is not suitable? Which cases or

which types of revolving commitments could not be modelled under the approaches prescribed? Are there types of revolving commitments that could not be modelled by any of the approaches described in the Basel III framework?

25. **Question 25:** Which of the three approaches described in the Basel III framework is preferred in case a single approach would be prescribed?

Long run average CCF

26. **Question 26:** For the purpose of the long run average calculation, are there any situations where such intermediate exposure weighted averaging at obligor level would lead to a different outcome (that is unbiased) with regard to the CCF estimation? How material is this for your portfolio?

Estimation of additional drawings after default

27. **Question 27:** Do you have any comments on the condition set to use the simple approach to estimate additional drawings after default. Do you consider that the simple approach is also relevant for retail portfolios?

28. **Question 28:** It was considered that requiring institutions to exclude unresolved cases from the long run average CCF, if their realised CCF is lower than the LRA of the corresponding facility grade, could be seen as too conservative. Do you have any comments on this treatment introduced in the simple approach? Do you have specific examples when this treatment would not be appropriate?

29. **Question 29:** Do you have any comments on the modelling approach to estimate additional drawings after default for unresolved cases?

30. **Question 30:** Do you have any concerns with the requirement to use as a maximum drawing period the maximum recovery period set for LGD?

Calibration to the long run average

31. **Question 31:** For CCF estimation, do you use estimation methods that incorporate portfolio-level-calibration of the estimates? What are the main reasons to use a calibration at a level that is higher than the grade-level calibration?

CCF in-default

32. **Question 32:** Do you have any comments on the guidance for the CCF estimation of defaulted exposures?

33. **Question 33:** Do you have any comments on the determination of the low share of observed additional drawings after default in the historical observation period relative to the observed

undrawn amount at default date? Do you consider it appropriate to set a prescribed threshold to determine what constitutes this low share? If so, what would be an appropriate value for such a materiality threshold?

Downturn CCF

34. **Question 34:** Are there examples where the haircut approach should be considered the most appropriate approach for estimating the downturn CCF?

35. **Question 35:** Do you think the add-on of 15 percentage points is adequately calibrated when the downturn impact cannot be observed nor estimated? Could you provide clear examples or reasons why this add-on should be higher or lower than 15 percentage points?

36. **Question 36:** Have you observed, or do you expect a (statistically significant) correlation between economic indicators and realised CCFs? If so, do you expect higher or lower levels of CCFs observed in the downturn periods compared to the rest of the cycle? Do you have policies in place that restrict or, on the other hand, relax the drawing possibilities in the downturn periods?

37. **Question 37:** The possibility to have no downturn effect on CCF estimates is restricted to the case where observations are available during a downturn period. Which alternative methodologies could be used to prove the non-existence of a downturn effect on CCF estimates, in the case where no observation is available during a downturn period?