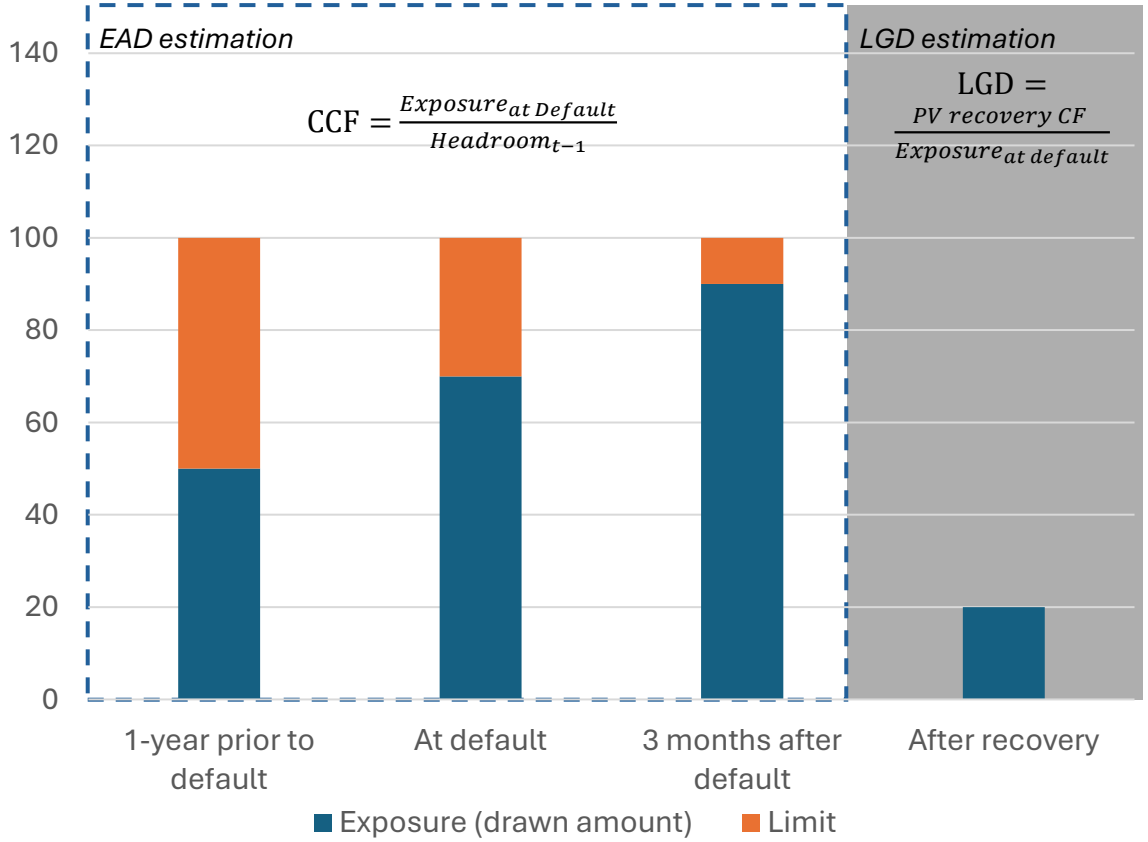
EBA consultation on methodology to estimate and apply CCFs

CCF is the neglected child of A-IRB modelling: Limited to “advanced” institutions, challenging to measure, restricted in application

- The CCF parameters aims at prediction of exposure at default (EAD) based on the unused limit amount a client has on a specific product one year prior to default
- Under the Basel framework only banks with an “advanced” IRB waiver are allowed to model credit conversion factors (CCF)
- CCF models are typically simple in design and attract less scientific or industry discussion
- There is typically limited intuition of risk practitioners (first or second line) with regards to expectation of what CCF should be – limiting discussion outside of the quantitative field

Estimating CCF comes with a challenge: The measured variable is plagued by outliers making the determination of a "true" average difficult

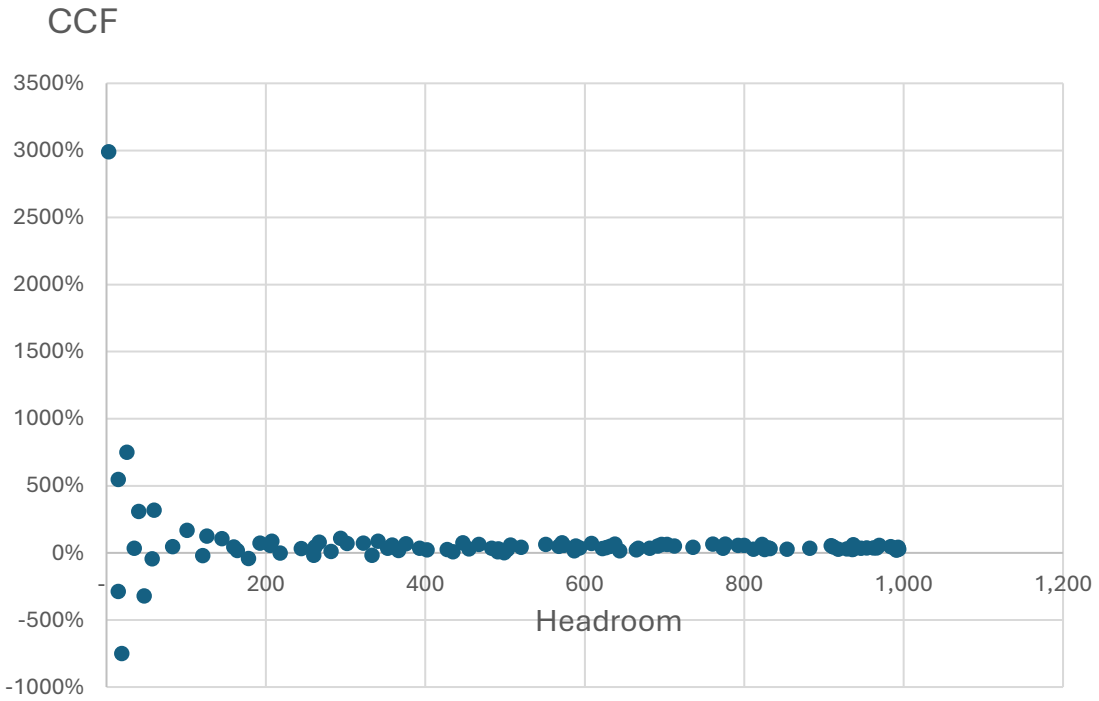
CCF estimation: The path to default



- Key challenge associated with the estimation of "CCF" is the fact observed CCF distributions are plagued by outliers
  - For clients with limited headroom on their limits compared to the loan size CCFs need to be increasingly large to cover further increase or reduction in EAD
  - As developer are asked to use a conservative estimate of the "average" for parameter estimation – the cut-off point at which observations are no longer considered can be the key driver of the applied parameter
- For clients with fully drawn limits, CCF has no impact on EAD estimate

Introducing a hypothetical data set

Unfiltered CCF estimation



- Assuming we have 100 defaulted observations
- All have a limit of 1000
- Usage one year prior to default is random [0,1000]
- Until default they did draw 40% of the available headroom (adding +/- 200 usage as noise)
- Unfiltered average CCF equals 74%

Basel 3 finalization severely limits the scope on which banks can estimate EAD (CCF) – only revolving products for SME and retail clients

Innovations of B3f for EAD estimation

CRE 30.34 – Excluded asset classes

- (…) the A-IRB approach cannot be used for the following: 1) Exposures to general corporates (…) with revenues greater than EUR 500m
- Exposures in the bank asset class CRE30.18, and other securities firms and financial institutions

CRE 32.36 – Exclusion of term loans

- (…) will be allowed for exposures for which A-IRB is permitted (see CRE30.33) to use their own internal estimates of EAD for **undrawn revolving commitments**
- A revolving loan facility is one that lets a borrower obtain a loan where the borrower **has the flexibility to decide how often to withdraw from the loan and at what time intervals**. A revolving facility allows the borrower to drawdown, repay and re-draw loans advanced to it. (…)

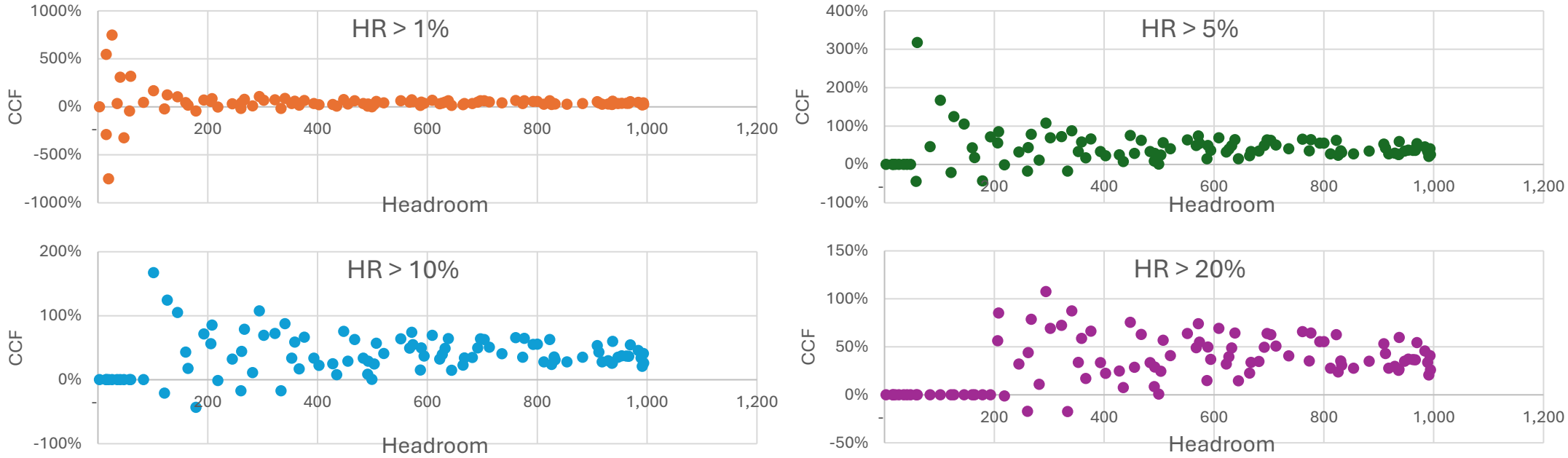
CRE 36.95 – Challenge to ULF

- A well-known feature of the commonly used undrawn limit factor (ULF) approach to estimating CCFs is **the region of instability associated with facilities close** to being fully drawn at reference date
- (…) An acceptable approach could include **using an estimation method other than the ULF approach** that avoids the instability issue by not using potentially small undrawn limits that could approach zero in the denominator

Together with a reduced scope, B3f opens up the range of methodologies that can be applied to estimate EAD

Which region is stable ?

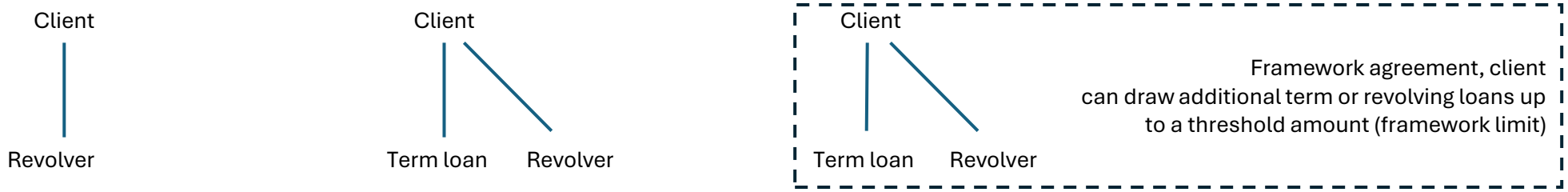
Filtering according to relative headroom size



- Average CCFs
  - HR > 1%: 45%; HR > 5%: 45%; HR > 10% 43%; HR > 20%: 41%
- One could assume stability is reached once the estimate gets close to the “true” value, which is our given example equals to throw away at least 20% of the available observations

However, these new “limitation” come with new challenges (1/2): what is a revolving loan?

Possible loan set-ups – what to include and how?

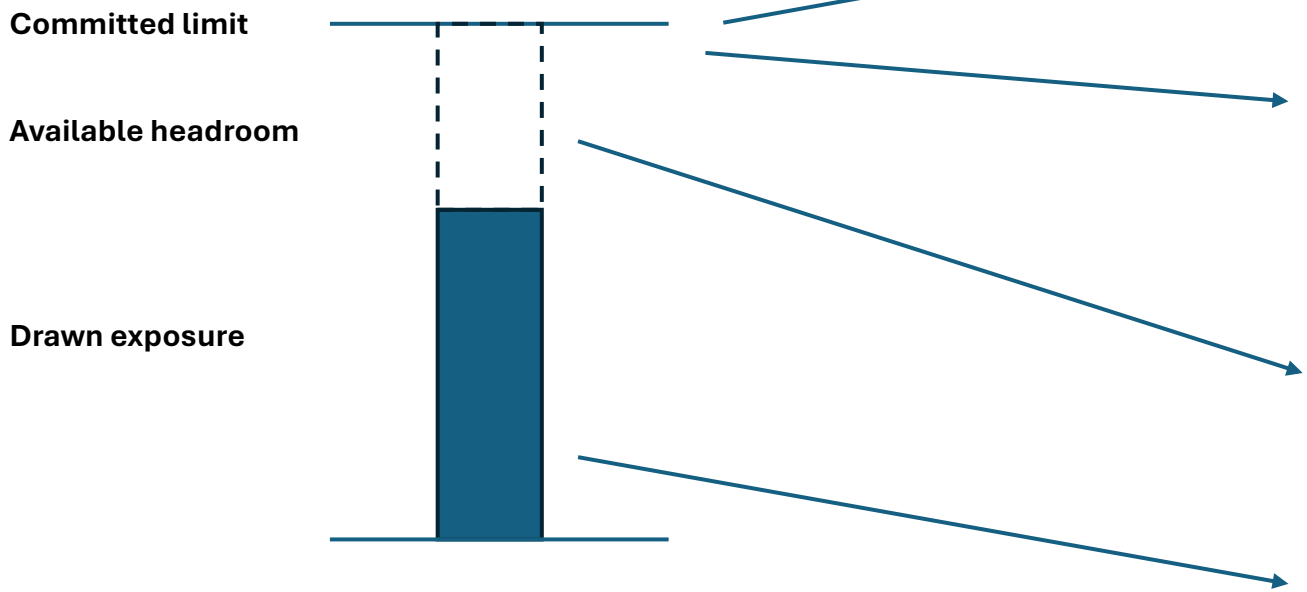


Practitioner challenges

- Set-ups where a client has a term loan and a revolving loan “spillover” effects or “interfacility transfers” might be measured (e.g. the client is using available limit on the term limit to reduce the revolver or vice versa prior to default)
- In more complex set-ups e.g. a framework agreement where the client can draw additional revolving or term exposure, distinction between products might be not clear
- Clients are dynamic and might have multiple term / revolving products at different points in time (e.g. revolver one year prior, but term and revolver at default) – decisions on inclusion/exclusion have large impact on resulting parameter

However, these new “limitation” come with new challenges (2/2): What are alternatives to the unused limit factor?

Modelling approaches endorsed by the Basel committee (CRE 36.95)



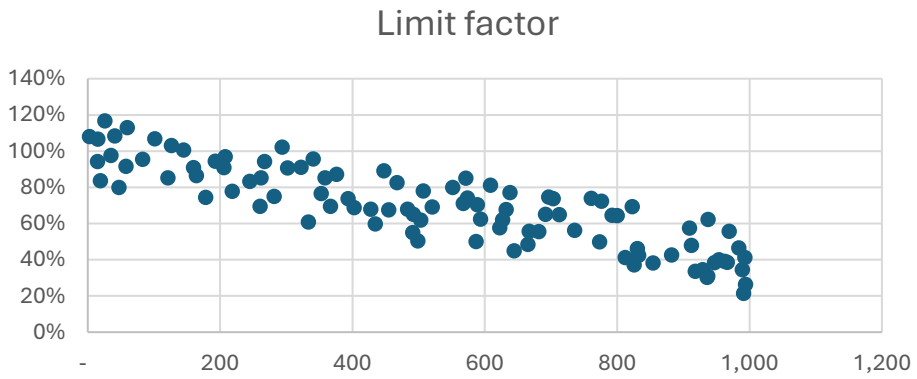
Limit factor: The predicted balance at default is expressed as a percentage of the total limit that is available to the obligor under the terms and conditions of a credit facility, ie EAD= LF[LTt_{to}]

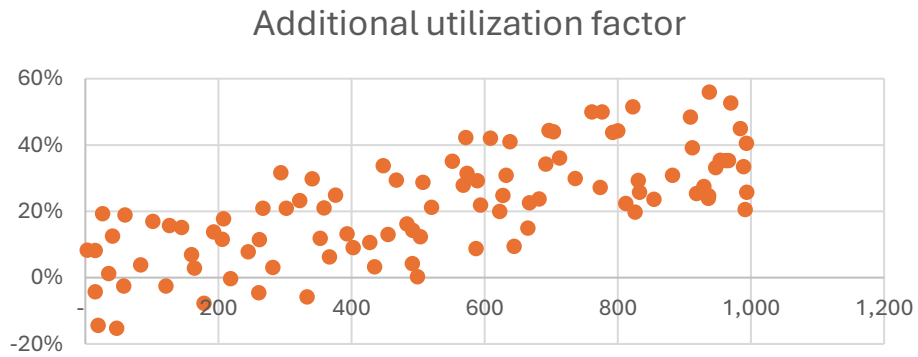
Additional utilization factor: predicted additional drawings in the lead-up to default are expressed as a percentage of the total limit that is available to the obligor under the terms and conditions of a credit facility, ie EAD = B_{t0} + AUF[LT_{to}].

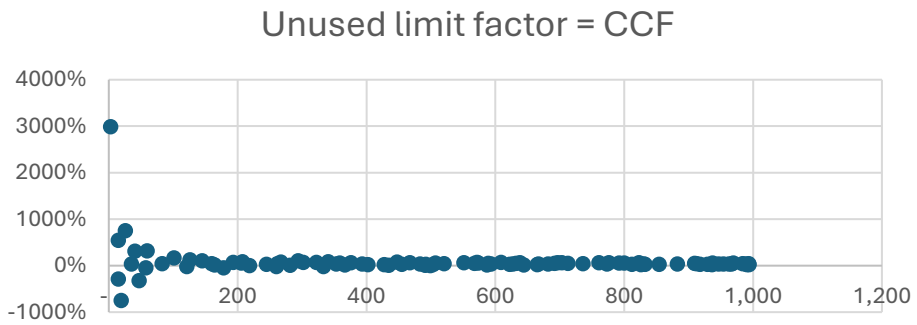
Unused Limit factor: The predicted balance at default is expressed as a percentage of the available headroom prior to default, i.e. EAD= ULF (Lt_{to} - Exp_{t0})+Exp_{t0}

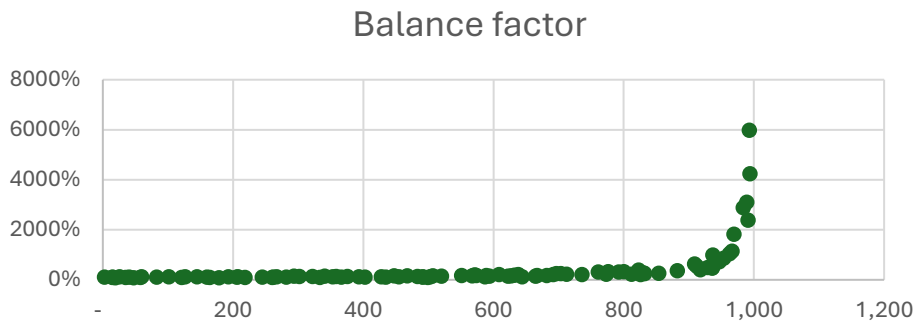
Balance factor (BF): The predicted balance at default is expressed as a percentage of the current balance that has been drawn down under a credit facility, ie EAD=BF[B_{t0}]

Visual comparison of the proposed approaches









- The approaches conditioned on limits appear to be much more robust, while the newly propose balance factor shows similar instability issue as the well known CCF/ULF

The EBA Guideline on methodology to estimate and apply CCFs is supposed to clarify these questions for institutions within its jurisdiction

Key contribution of draft EBA guideline

1 Scope & Application

- Fixed CCF (100%) where data is insufficient
- Inclusion of unadvised limits in CCF estimation

2 Data

- Introduction of Dev., testing and quantification sample
- Specific representativeness requirements (simplified)

3 Methodology

- Alignement with PD LGD (CCF specific)
- “Region of instability” guidance
- Rules for “fast defaults” and “serial defaults”

4 Differentiation & Quant.

- Requirements for risk driver selection and model performance testing
- Introduction of long-run average (LRA) CCF

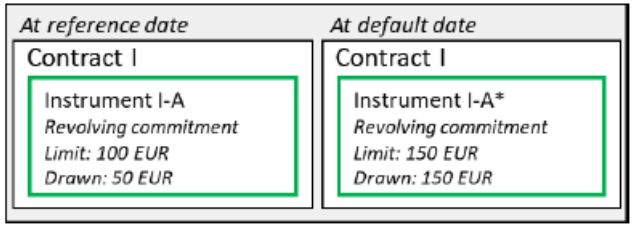
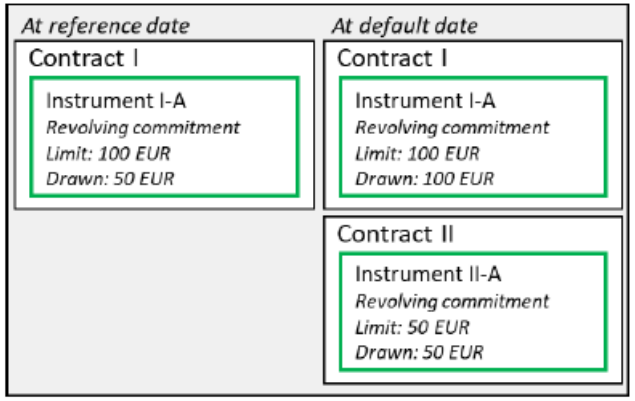
5 Defaulted exposure

- Two approaches: Simple (1) and modelled approach (2)
- Banks may choose whether to include additional drawings after default in CCF or LGD estimates.

6 MoC & Downturn

- MoC framework for CCF with fixed downturn ad-on (15%) if no downturn observed
- Reference value concept to challenge results

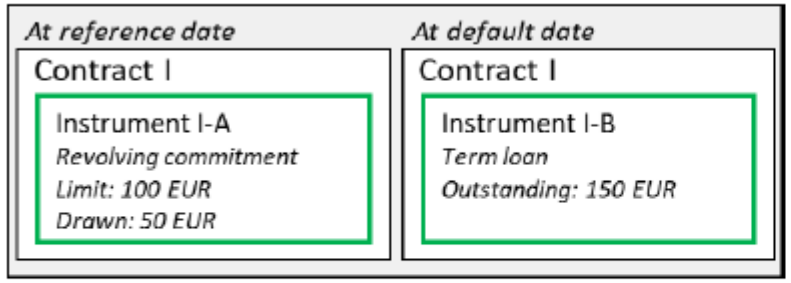
Challenges of the draft guidelines: Treatment of clients with change in product composition (selected examples)

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%

In case of product composition changes, the EBA always opts for the most conservative option.

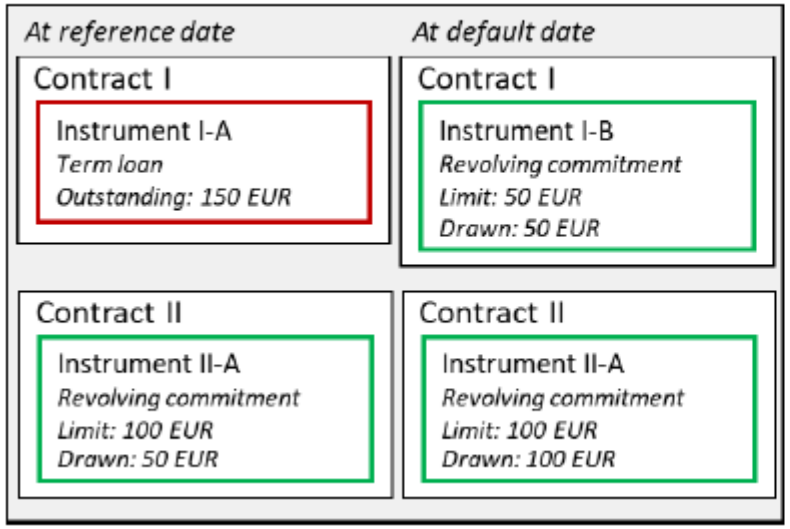
If an institutions wants to deviate from this, burden of proof of appropriateness of approach is on the bank:
“institutions should develop an appropriate methodology for the allocation of drawings and repayments to the original contracts. (...) Institutions should be able to demonstrate the soundness of the allocation mechanism”

Challenges of the draft guidelines: Treatment of clients with change in product composition (selected examples)

Example of changes made to a facility	Realised CCF calculation
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%

Product switches still need to be considered for CCF estimation even if at default a product is no-longer in scope.

Challenges of the draft guidelines: Treatment of clients with change in product composition (selected examples)

Example of changes made to a facility	Realised CCF calculation
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%

Limit amount of ex-ante out-of-scope products are excluded!

For specific components of the framework, the draft guidelines differ in guidance to existing regulation

Para.	EBA Requirement	Difference in guidance
13	*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.*	*CRR3 Art.111.4 : "For contractual arrangements offered by an institution, but* ***not yet accepted by the client*** *(…) percentage applicable shall be the one provided for in accordance with paragraph 2* (**SA approach**)*."*
22	*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****.*	CRR3 Art.116.8: "An institution that uses IRB-CCF shall calculate the exposure **value for undrawn commitments as the undrawn amount multiplied by IRB-CCF**".
110	*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.*	EGIM 2025§322 (d): When the historical observation period is considered to be representative of the LRA, the average realised CCFs should be computed as the **arithmetic average of the yearly averages** of realised CCFs in that period.
139	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**% (…)	CRR3 Art. 166.8b**: SA-CCFs shall be used** for: (…) (b) exposures where the minimum requirements for calculating IRB-CCF as specified in Section 6 are not met by the institution or where the competent authority has not permitted the use of IRB-CCF.
112	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.	CRR3 does **not introduce any distinction in exposure value between defaulted and non-defaulted exposures** (Article 166). The same Articles 153.1 and 154.1 of CRR detail RWA for both non-defaulted and defaulted exposures