Representativeness - Historical Observation Period

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Introduction

One of the more difficult and challenging requirements for European banks is that for the purpose of determining the historical observation period (HOP) referred to in Articles 180(1)(h) and 180(2)(e) of Regulation (EU) No. 575/2013 (CRR), additional observations to the most recent 5 years, at the time of model calibration, should be considered relevant when these observations are required in order for the HOP to reflect the likely range of variability of default rates of that type of exposures as referred to in Article 49(3) of the RTS on IRB assessment methodology.

Additional guidance on how to achieve this is presented in the EBA guidelines on PD, LGD, estimation, Paragraph 82 to 86 (EBA/GL/2017/16) which links to the requirements under Chapter 4.2.4 (Representativeness of data for calibration of risk parameters) Paragraph 33. The guidelines require banks to calculate their Long-run Average default rate (LRA used for capital purposes) and this LRA should be representative of the HOP meaning institutions should assess whether the HOP contain a representative mix of good and bad years.

The guidelines, however, do not specify the definition of a representative mix of good and bad years and leave this open to interpretation for banks.

The purpose of this article is to provide a simple example and checklist of how banks can comply with this specific requirement for PD quantification (the same methods can be applied to CCF quantification).

> **Notice:** The views and methodologies expressed in this article are my own and do not represent a strict outlook, methodologies or the view of any corporation or company.

1 Representative mix of good and bad years

The latest amendments of the CRR (575/2013 now CRR3 2024/1623) specifically under Article 180, require banks to ensure that their data shall include a representative mix of good and bad years of the economic cycle relevant for the type of exposures. In case the HOP is found to be representative, the average observed default rate (LRA ODR or Central Tendency) is used as the long-run average default rate. If this is not the case, an adjustment needs to be made (appropriate adjustment on the LRA ODR).

> **Info:** Very few modellers connect this requirement with that of the requirements for downturn identification since usually at these large banks, PD and LGD/CCF teams work separate. Those that do, define a bad year as equal to a downturn period which is not always the case since downturns are usually the most severe economic conditions in a certain historical time span whereas a bad year/period can be less severe than a downturn year/period but still contain adverse situations in the economy and exposure under consideration for the bank.

Many banks in the Netherlands define their good and bad years with a range of percentiles, but this can lead to complicated arguments and justification of the percentiles used.

1.1 Variability of all observed one-year-default rates

A first check to ensure compliance to Paragraph 83 of the EBA/GL/2017/16 is to assess the variability in of all observed one-year-default rates. There are many methods that this can be done, however, in the EBA report on the 2023 credit risk benchmarking exercise - results on the analysis of the variability of own funds requirements based on the IRB approach (April 2024), the relative standard deviation (RSTD) or Coefficient of Variation (CV) are used.

The CV is a statistical measure of the relative variability or dispersion of a dataset relative to its mean. It is expressed as a percentage to provide a unitless measure of variability, making it also useful for comparing the degree of variation from one dataset to another, even when the scales of the datasets differ significantly.

One can use this metric to assess the variability in the ODRs of the past 5 years compared to the full HOP (Paragraph 85). One can also assess if this metric is much larger than 0 to ensure that the ODRs are spread out over a wide range, suggesting a significant level of diversity or fluctuation in the respective period which would suggest sufficient variability in the observation period.

> **Question 1**
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> Does your institution independently check for this requirement, and do they use any statistical metrics?

1.2 Identification of good and bad years

Having significant variability does not ensure that the HOP contains a representative mix of good and bad years.

Additionally, banks need to take into consideration the requirement of Paragraph 83 (c), such that significant changes in the economic, legal or business environment within the HOP are also assessed. This means that economic, business and risk experts should be part of the process in the identification of good and bad years and also on the compliance side to ensure the historical observation period contains a representative mix of good and bad years.

> **Question 2** *(Expert Involvement)*
>
> Does your institution consider economic, business and risk experts to be part of your process to identify good and bad years?

One can interpret this requirement such that a bad year is characterized by a significant increase in the default rate (and should be related to the same fluctuation in the economy). The assessment of what constitutes a "significant increase in the default rate" should include both the absolute and relative changes in the default rates. One can argue that EBA expects banks to be able to demonstrate how it distinguishes between idiosyncratic and systematic risk.

Therefore, it is important not only to define good or bad years in relation to the economic variables used but also in relation to the ODR (one can for example ask the question: does the peak/trough in the economic variable relate/correlate with the peak/trough in the ODR).

The requirement, "representative mix of good/bad years" does not mean that there should be a mix of 50% good and 50% bad years in the HOP. It means one should not calibrate your model on only good or on only bad years, but a sufficient mixture that makes sense for the type of exposure under consideration with relation to events in the economy.

For example, in the residential mortgages market of the Netherlands, 5 economic bad years and/or crises (2002-2003, 2008-2009, 2012-2013, 2019-2020, 2022-2023) over a period of about 25-30 years occurred. This means, on average, a bad year occurs approximately once every five years or so when considering the house market over a long period. This however, can vary for different exposures under consideration and also different countries.

1.3   Adjustment of the LRA ODR

When considering an adjustment of the LRA ODR given that there is not a representative mix of good/bad years in the HOP, one should follow the guidelines set out in Paragraph 85 and 86.

Typically this adjustment is done by means of an extrapolation/backcasting process. The extrapolation should be done to a period where the assumption is met to ensure a representative mix of good and bad years given that the ODRs are correlated with the economic variable under consideration.

In the case where such an extrapolation is done, for example where there was an under representation of bad years (not sufficiently enough) in the HOP, one should then upwards adjust the LRA ODR as the inclusion of more bad years in the HOP of the ODR is expected to increase the observed default rate on average upwards. In this case, a sufficient margin of conservatism (MoC) on the adjustment should be computed to account for the bias in the estimation. This is another difficulty faced by banks when doing this adjustment.

> ❶ **Info:** When calculating the MoC, very few modellers make the connection with the Type-2 approach MoC under downturn quantification methodologies.

2   Conclusion

In order to ensure that the HOP contains a representative mix of good/bad years, one can expect to follow a long line of analysis to ensure compliance to this requirement (such as in downturn LGD identification and quantification). In my experience, the ECB is very strict with this requirement, as this analysis directly affect the capital held by the bank.

It is therefore suggested to have a dedicated software system in place to calculate the severity and sensitivity of this analysis per calibration segment to ensure that the conclusion of the analysis is sufficiently conservative.

> ◆ **Notice:** The above article represents the challenges I encountered while addressing this problem. It highlights the practical insights and solutions I developed to tackle these issues effectively. If you or your organization is facing similar challenges and would like to explore how these solutions could be applied or adapted to your context, I would be happy to discuss this further. Please feel free to reach out to me via email.