

Quantification of margin of conservatism category C: Correlations and quantification levels

11.8.2026 - Jan Henrik Wosnitza | Deutsche Bundesbank

Probabilities of default (PDs) estimates inherently carry general estimation uncertainty. To mitigate this general estimation uncertainty, the European banking regulation requires financial institutions to quantify the margin of conservatism category C (MoC C). This paper provides practical insights for enhancing MoC C quantification in PD estimates by analyzing default rates with overlapping one-year performance windows (hereafter referred to as overlapping one-year default rates), comparing two quantification levels, and addressing biases in asset correlation estimates. Addressing these issues is crucial for ensuring sufficiently conservative credit risk assessments and, thereby, maintaining financial stability.

Financial institutions estimate the PDs for their obligors to make prudent lending decisions, assess and manage credit risk, and comply with regulatory standards. Due to the general estimation uncertainty associated with these estimates, the European banking regulation requires financial institutions to incorporate a MoC into their PD estimates. While the categories A and B of this MoC address institution-specific issues, category C focuses on the general estimation error. This paper explores three key challenges in quantifying MoC C:

1. the impact of overlapping one-year default rates,
2. the comparison of MoC C quantification at calibration segment level versus grade level, and
3. a downward bias in asset correlation estimates.

Methodology

This study employs theoretical derivations in conjunction with simulation experiments to address these research questions. Equations are derived to account for the dependencies in monthly default counts that arise from overlapping one-year default rates. To harmonize MoC C quantification between calibration segment level and grade level, the confidence level for grade level MoC C is adjusted following linearization. Finally, a simulation framework utilizing synthetic time series of default rates is employed to measure and correct the downward bias in asset correlation estimates.

Key findings

Financial institutions can determine calibration target levels, i.e. long-run average default rates (LRADRs), by employing either overlapping or non-overlapping one-year default rates. While existing literature focuses on MoC C quantification for LRADRs based on non-overlapping one-year default rates, this paper derives a formula for the variance of the LRADR that incorporates dependencies between overlapping one-year default rates.

The ECB Guide to Internal Models establishes MoC C quantification at grade level as the standard. However, many financial institutions calculate LRADRs at calibration segment level. The paper addresses this gap by approximating the confidence level for grade level MoC C that aligns with MoC C quantification at calibration segment level. Specifically, financial institutions can achieve

equivalence in risk weighted exposure amounts between grade level and calibration segment level MoC C quantification by multiplying grade level MoC C with a variance ratio. This approach ensures that the rating philosophy (point-in-time versus through-the-cycle) does not distort MoC C levels.

Asset correlations, which capture dependencies between obligors' defaults, are essential for credit risk modeling. However, estimates derived from default rates are often downward biased, particularly when obligors with varying PDs are pooled for estimation purposes. This paper corroborates that this downward bias in asset correlation estimates increases with higher discriminatory power and asset correlation. Common confidence bands, such as those at the 95 % or 99 % confidence level, are inadequate to offset this bias. Instead, the study provides tailored adjustment factors that fully compensate for the bias, ensuring more accurate MoC C quantification. The result is also pertinent to economic capital quantification in the second pillar of the Basel Capital Accord, where financial institutions estimate asset correlations as a key input parameter for their credit portfolio models.

Conclusion

This research addresses critical gaps in the MoC C quantification, providing practical solutions for financial institutions. By quantifying MoC C for overlapping one-year default rates, harmonizing grade level and calibration segment level MoC C quantification, and correcting biases in asset correlation estimates, the study enhances the accuracy of MoC C. Future research could explore the application of these methodologies to other risk parameters.

Wosnitza, J. H. (2026), Quantification of margin of conservatism category C: Correlations and quantification levels, Bundesbank Discussion Paper, No 20/2026.

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