Model Risk Diversification in Bank-wide Risk-Weighted Assets

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Abstract

Basel III imposes strict guidelines on large banks that develop statistical models to estimate their risk-weighted assets (RWAs). Banks are required to quantify additional buffers, called a margin of conservatism (MoC), to protect against model risk. Setting the appropriate confidence level for the MoC is, however, non-trivial, and is frequently the topic of debate between banks and regulators. In this paper, we introduce the quantile scaling factor (QSF), a novel tool for regulatory model risk management. The QSF is derived under an asymptotic single risk factor (ASRF) model applied to estimated credit portfolio RWAs. An empirical study on a realistic, synthetic bank loan book applies the QSF framework and the results are discussed. We find that errors in RWA estimates driven by idiosyncratic model risk factors and loan books with more uniform portfolio RWA concentrations benefit from high model risk diversification. This lowers the confidence level required per portfolio's MoC to attain a bank-wide confidence level set by the bank's own model risk appetite. Model risk diversification strengthens further the more portfolios a bank has in its loan book. The presented QSF framework provides risk managers with a simple tool to ensure their bank's model risk appetite is appropriately met. However, given that no two loan books are the same, it complicates regulatory benchmarking exercises and challenges current practices by supervisory authorities like the ECB.

Keywords: Risk-Weighted Assets; Model Risk Management; Statistical Coverage; Quantile Scaling Factor; Margin of Conservatism; Systemic Model Risk; Diversification; Credit Risk Management; Model Risk Appetite

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