

## Statistical credit risk rating and PD modelling of local governments

### Abstract

Local governments face unique challenges in credit risk modelling due to their low default rates and small portfolio volumes. Traditional statistical methods are often unreliable, necessitating the exploration of alternative approaches. Historically, expert judgment ratings and probabilities of default (PDs) have been preferred; however, the subjective nature of these models can lead to inconsistencies and biases.

This abstract explores statistical data-driven methods that integrate judgmental factors to develop more robust, consistent models. By combining quantitative data with expert insights, the accuracy and reliability of credit risk assessments for local governments can be enhanced, leading to more effective risk management and regulatory compliance.

A target definition is explored as the best area for refinement and incorporation of statistically driven factors for the development of a risk-ranking scorecard that can meet regulatory requirements for local governments. The target definition was tailored to reflect a financial distress indicator by using financial ratios, such as profitability, liquidity, and financial leverage.

To develop a robust risk-ranking scorecard, a combination of expert judgment and statistical modelling techniques is explored. This involves creating and selecting relevant predictive variables that capture the financial, economic, and governance-related risk factors specific to local governments. These variables are then assigned appropriate weightings based on empirical analysis and expert insights, ensuring that both quantitative and qualitative aspects of risk assessment are considered. By using logistic regression, the scorecard translates these factors into a structured risk ranking, which serves as the foundation for PD estimation.

A variety of statistical-based approaches can then be employed in the risk rating and Probability of Default (PD) modeling of local government portfolios. The resulting rating system can be utilized to calibrate a PD for capital allocation. The most prudent PD estimate for the portfolio, drawing on the methodologies of Tasche and Benjamin, Cathcart, and Ryan, can be calculated with consideration of the portfolio's data history length and default behavior. This estimate serves as the portfolio's central tendency.

The devised rating system, when used in conjunction with an optimization routine, allows for the calibration of PDs that account for the portfolio's risk ranking distribution and any regulatory constraints. This process results in a PD that incorporates a margin of conservatism and is evidence-based, aligning with Basel guidelines.

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