

Structured dictionary learning of rating migration matrices for credit risk modeling

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Abstract

Rating migration matrix is a crux to assess credit risks. Modeling and predicting these matrices are then an issue of great importance for risk managers in any financial institution. As a challenger to usual parametric modeling approaches, we propose a new structured dictionary learning model with auto-regressive regularization that is able to meet key expectations and constraints: small amount of data, fast evolution in time of these matrices, economic interpretability of the calibrated model. To show the model applicability, we present a numerical test with both synthetic and real data and a comparison study with the widely used parametric Gaussian Copula model: it turns out that our new approach based on dictionary learning significantly outperforms the Gaussian Copula model.

Keywords Rating migration matrix · Dictionary learning · Auto-regressive modeling · Interpretability · Gaussian Copula mode