
The quantification and aggregation of model risk: perspectives on potential approaches

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Abstract: The field of *Model Risk Management* ('MRM') continues to evolve. To date, industry MRM efforts focused primarily on MRM for individual models. Now, more institutions are shifting focus towards aggregating firm-wide model risk. Regulatory guidance specifically focuses on measuring risk in individual and in aggregate. In this study, we will discuss various approaches to measuring and aggregating model risk across an institution. We also present an example of model risk quantification in the realm of stress-testing, where we compare alternative models in two different classes, Frequentist and Bayesian approaches, to modelling stressed bank losses.

Keywords: financial crisis; model risk; SR 11-7; stress-testing; Bayesian.

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Biographical notes: Michael Jacobs Jr. is a Principal Director in the Risk Analytics practice of Accenture. He specialises in risk model development and validation across a range of risk and product types. He has 25 years of experience in financial risk modelling and analytics, having worked 5 year for Deloitte and PwC as a Director in the risk modelling and analytics practice, with a focus on regulatory solutions; 7 years as a Senior Economist and Lead Modelling Expert at the OCC, focusing on ERM and Model Risk; and 8 years in banking at JPMC and SMBC, developing wholesale credit risk and economic capital models.

1 Introduction and motivations

Modern risk modelling (e.g. Merton, 1974) increasingly relies on advanced mathematical, statistical and numerical techniques to measure and manage risk in bank portfolios. This gives rise to *model risk* (OCC and BOG-FRB SR 11-7, 2011), defined as the potential that a model used to assess financial risks does not accurately capture those risks,¹ and the possibility of understating inherent dangers stemming from very rare yet plausible occurrences perhaps not in reference data sets or historical patterns of data (Jacobs, 2013; Jacobs et al., 2015).