Quantification of Model Risk

Research and development framework for the application of machine learning to quantify model risk

Regulators are increasingly expecting banks to implement model risk appetite frameworks which demonstrate that model uncertainties are adequately understood, managed, monitored and reported, both on an individual level as well as in aggregate level. These requirements continue to evolve against a back drop of a significant rise in the number of models being developed and used in financial institutions for regulatory and business purposes e.g. IFRS 9 impairment, new stress testing requirements and new rules for internal capital models. This greater reliance on complex models and broader use across the institution inevitably leads to increased regulatory scrutiny on the institution's model risk management framework.

Regulators expect senior management to manage model risk like any other risk type. This brings up the question of how model risks can be quantified and reported consistently and comprehensively.

Deloitte together with a UK Commercial Bank developed an approach to quantify model risk using advanced analytical approaches such as machine learning, based on model performance monitoring data only. Our approach isolates model risk into three drivers: modelling data, model design and model calibration. The aim of this presentation is to describe our model risk quantification framework with the use of a real-life case study to illustrate how model risks associated with Unsecured Pillar 1 capital models can be measured.

This paper explores the techniques used to identify anomalous data points and quantify data corrections, produce automated challenger models and measure the potential errors in model calibration. The conclusions and lessons learned are also presented, including the aggregation of the distribution of errors from the three model risk drivers and our approach to converting the error distribution into an estimate of model risk in monetary terms.