Scenario quantification for operational risk modeling

Background

Financial institutions are required to hold regulatory capital commensurate with the risk of their portfolios. Mainly, banks are exposed to market, credit and operational risks. To quantify the capital requirements for these risk types, banks migrate from a standardized approach to an advanced approach. The advanced methods require the use of sophisticated models with the intent for increased risk sensitivity and better risk management. This problem deals with advancing the research and providing answers to questions pertaining to advanced methods in operational risk modeling

Operational risk is the risk of loss resulting from inadequate or failed internal processes, people, systems, or from external events. It includes legal risk but excludes strategic and reputational risk. Relative to market and credit risk, the research and proposed modeled methods have lagged. However, this area is seeing new growth in just the past 10 years.

The current methodology adopted by regulators and the financial community is referred to as the advanced measurement approach (AMA). In the advanced approach, banks use a four element model requiring the use of: internal loss data, external loss data, scenario analysis and a business line assessment called BEICF (business environment internal control factors).

The foundation of the model is taken from the actuarial literature using a method called the Loss Distribution Approach (LDA). Having compiled internal and external loss data, banks typically model the frequency and severity of losses separately, perform an n-fold convolution and obtain an aggregate loss distribution. The 99.9 percentile is taken which quantifies the required operational risk capital before layering on the other two components. A BEICF assessment is more of a hybrid quantitative and qualitative overlay that is usually used to adjust final capital requirements.

In terms of the fourth element, banks are also required to formulate "what-if" scenarios to incorporate "forward-looking" measures to the model and to fill the void of data scarcity. That is, workshops are usually held throughout a bank to solicit expert opinion on events that could happen within a business unit. Usually a scenario has two elements: a frequency (e.g. 1 in 5 year event or 1 in n year event) and a severity impact (e.g. $100k to $500k). This information is then inputted into the LDA model using one of a few industry standard methods.

Problem

What is the best way to conduct a workshop in order elicit expert opinion on potential losses? Thus far, best practice has shown scenarios being defined as having a frequency and severity estimate. Research has shown that humans show cogitative biases when required to think in probabilistic terms. Seeking information to quantify rare events corresponding to the tail of distributions shows varied responses from participants. Moreover, referencing internal and external losses in order to formulate forward-looking measures tends to yield anchored results that pivot on past experience. The end goal has usually been to obtain necessary and sufficient information in order to calibrate frequency and severity distributions. Hence, workshop responses have a direct impact on distributional parameter calibration.

By virtue of the industrial problem solving workshop, a natural advantage would be to see what type of questioning works in a group setting. Having a best practice measure as to how to optimally derive point estimates or solicit responses to calculate statistical moments or quantiles corresponding to fitted distributions would be very useful. As well, investigations as to what sort of probability distributions (normal, fat-tailed) are best suited for scenario design is of great importance.