Using Weighted Distributions to Model Operational Risk

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Abstract

The quantification of operational risk has to deal with various concerns regarding data, much more than other types of risk which banks and insurers are obliged to manage. Several studies, at first more empirical and at present already more theoretical and mathematical supported, document several of those concerns. One of the main questions that worries both researchers and practitioners is the bias in the data on the operational losses amounts recorded. We support the assertions made by several authors and defend that this concern is serious when modeling operational losses data and, typically, is presented in all the databases, not only in the commercial databases provided by various vendors, but also in databases where the data for operational losses is collected and compiled internally.

We show that it's possible, based on mild assumptions on the internal procedures put in place to manage operational losses, to make parametric inference using loss data statistics, that is, to estimate the parameters for the losses amounts, taking in consideration the bias that, not being considered, generates a two fold error n the estimators for the mean loss amount and the total loss amount, the former being overvalued and the last undervalued.

We follow a different approach to the parametric inference. We do not consider the existence of a threshold for which, all losses above, are reported and available for analysis and estimation procedures. Here we consider that the probability that a loss is reported and ends up recorded for analysis, increases with the size of the loss, what causes the bias in the database but, at the same time, we don't consider the existence of a threshold, above which, all losses are recorded. Hence, no loss has probability one of being recorded, in what we defend is a realist framework. We deduce the general formulae, present some results for common theoretical distributions used to model (operational) losses amounts and estimate the impact for

not considering the bias factor when estimating the value at risk.

Key words Weighted distributions, Operational risk

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