Bayesian Risk Aggregation: Correlation Uncertainty and Expert Judgement

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Abstract

In this paper we present a novel way for estimating aggregated economic capital (EC) figures based on Bayesian copula estimation where we explicitly address the important issue of parameter uncertainty associated with inter-risk-correlations. Contrary to the classic approach where one is using a single deterministic correlation matrix, we rather employ different possible matrixes, which are drawn from an appropriate posterior distribution. Typically, this distribution will be calculated based on empirical data (e.g., time series of risk drivers relevant for each risk type) as well as expert judgment. The correlation uncertainty also implies an uncertainty for the aggregated EC and thus we are able to derive credible intervals for all risk figures. These intervals contain the true value of the aggregated EC in line with the stated degree of belief and the empirical data.