Abstract: "A New Approach To Assess Model Risk in High Dimensions"

A central problem in quantitative risk management concerns the evaluation of the riskiness of a portfolio of risks (sum of d dependent risks). This problem is mainly a numerical issue once the joint distribution of $(X1, X2, ..., Xd)$ is completely specified. Unfortunately, while the marginal distributions of the risks Xi are often known, their interaction (dependence) is usually either unknown or only partially known, implying that any computed risk measure of S is subject to model error.

Previous academic research has mainly focused on the maximum and minimum possible values of risk measures when only the marginal distributions are known (unconstrained bounds) and the dependence is fully unspecified. This approach leads to wide bounds as all information on the dependence is ignored.

In this paper we integrate in a natural way available information on the dependence and provide a comprehensive approach that allows dealing with model uncertainty. We provide bounds that are easy to compute either analytically, by Monte Carlo simulations or with a fully non-parametric approach. Since these bounds are not always sharp, we also provide algorithms to approximate them. Interestingly, the approximate sharp bounds match closely the analytical ones. Numerical illustrations show that our approach leads to bounds that are significantly tighter than the (unconstrained) ones that are available in the literature.

This is joint work with Steven Vanduffel (Brussels)