Multidimensional Risk and Risk Dependence

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Evaluating multiple sources of risk is an important problem with many applications in finance and economics. In practice this evaluation remains challenging. We propose a simple non-parametric framework with several economic and statistical applications. In an empirical study, we illustrate the flexibility of our technique by applying it to the evaluation of multidimensional density forecasts, multidimensional Value at Risk and dependence in risk.

We make the following contributions to the nascent literature on multi-factor risk. Firstly, we propose a simple and flexible statistical framework to evaluate time-varying, density forecasts of multidimensional risks. Secondly, we generalize Value at Risk (VaR) in a natural way. Essentially, Multidimensional Value at Risk (MVaR) is a region of the intersection of univariate VaRs with a nominal probability mass under a given density function. It turns out that MVaR is a versatile framework that allows for examining and evaluating the dependence in risk.