

Modelling High-dimensional Volatilities

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Abstract

Modelling multivariate volatility processes is a challenge with important practical relevance to asset pricing, portfolio allocation and risk management. The available statistical models are often either too simple (in order to be practically feasible) or too complex (involving too many parameters). We present a methodology in the middle ground: it may catch the complex dynamic structure of high-dimensional volatilities within a parsimonious representation. It consists of two steps: (i) filter out static components by an idea of factor-modelling; (ii) fit the volatility dynamics by the CUC approach of Fan, Wang and Yao (2008). For the latter, a new fast algorithm is proposed, which is applicable even when the dimension is in the order of a few thousands.