

Abstract:

This paper proposes a dynamic framework for modeling and forecasting of realized covariance matrices using vine copulas to allow for more flexible dependencies between assets. Our model automatically guarantees positive definiteness of the forecast through the use of a Cholesky decomposition of the realized covariance matrix. We explicitly account for long-memory behavior by using ARFIMA and HAR models for the individual elements of the decomposition. Furthermore, our model incorporates non-Gaussian innovations and GARCH effects, accounting for volatility clustering and unconditional kurtosis. The dependence structure between assets is studied using vine copula constructions, which allow for nonlinearity and asymmetry without suffering from an inflexible tail behavior or symmetry restrictions as in conventional multivariate models. Further, the copulas have a direct impact on the point forecasts of the realized covariance matrices, due to being computed as a nonlinear transformation of the forecasts for the Cholesky matrix. Beside studying in-sample properties, we assess the usefulness of our method in a one-day ahead forecasting framework, comparing recent types of models for the realized covariance matrix based on a model confidence set approach. Additionally, we find that in Value-at-Risk (VaR) forecasting, vine models require less capital requirements due to smoother and more accurate forecasts.