

Abstract

The representation of temporal patterns is essential to time series analysis. In the case of two or more time series, one needs to account for temporal patterns not only in each univariate series but also in their joint behaviour. We propose a multivariate model which enables the specification of time-dependent dynamic patterns in multivariate time series in a flexible way. The model is built by first addressing the serial dependence in each series and then modelling the interdependencies among their innovations using a time-varying vine copula model. To specify the vine decomposition, we employ a heuristic model selection tool that accounts for both the magnitude and variation of the empirical Kendall's tau across different time intervals. The time variation in the strength of pairwise dependencies is inferred using nonparametric smoothing techniques, and the uncertainty in the resulting estimates is assessed using a parametric bootstrap. The methods are used to analyze daily exchange rate returns of seven major currencies from August 2005 to August 2016.