Efficient maximum likelihood estimation of copula based meta t-distributions

Abstract:
Recently an efficient fixed point algorithm for finding maximum likelihood estimates has found its application in models based on Gaussian copulas. It requires a decomposition of a likelihood function into two parts and their iterative maximization. Therefore, this algorithm is called maximization by parts (MBP). For copula-based models, the algorithm MBP improves the efficiency of a two-step estimation approach called inference for margins (IFM) and is an promising alternative method to direct maximization of the likelihood function (DIR). For the first time, the MBP algorithm is derived and applied to Student t-copula based models. A superiority of the proposed algorithm over IFM and DIR methods is illustrated in a simulation study for data with small sample sizes. This makes the proposed algorithm an excellent candidate for estimation in a rolling window set up, which is able to account for time varying dependency structures. This approach is followed by the analysis of swap rates demonstrating the necessity of time varying copula effects.

Stichworte:
Copula, inference for margins, maximum likelihood estimation, maximization by parts, meta-t distribution, rolling windows