Author(s):
Błażej Mazur, Mateusz Pipień

Abstract title:
A family of non-standard bivariate distributions with applications to unconditional modelling in empirical finance

Abstract:
We develop a class of parametric bivariate distributions that are capable of accounting for non-standard empirical properties that are evident in some financial time series. We aim at creating a parametric framework that allows for serious divergences from the multivariate Gaussian case both in terms of properties of marginal distributions and in terms of the dependence pattern. We are particularly interested in obtaining a multivariate construct that allows for considerable degree of heterogeneity in marginal properties of its components (like tail thickness and asymmetry). Moreover, we consider non-standard dependence patterns that go beyond a linear correlation-type relationship while maintaining simplicity, obtained by introducing rotations. We make use of marginal distributions that belong to generalized asymmetric t class analysed by Harvey and Lange (2017), allowing not only for skewness but also for asymmetric tail thickness. We illustrate flexibility of the resulting bivariate distribution and investigate its empirical performance examining unconditional properties of bivariate daily financial series representing dynamics of stock price indices and the related FUTURES contracts.