Comparison of different copula assumptions and their application in portfolio construction

František ŠTULAJTER, ČSOB AM, Slovak Republic

Abstract

The paper deals with modeling of mutual dependencies among financial assets. Its aim is to investigate the impact of different copula assumptions on optimal portfolios, when CVaR optimization is used. Strategic asset allocation perspective is supposed. It is demonstrated that copula functions enable us to separate the modeling of dependency features of financial assets from the modeling of marginal distribution characteristics, in the context of practical portfolio construction tasks. The difference between portfolios constructed using normal copula and student t copula is shown when mutual or pension fund exposed to long-only constrain is assumed. The fund is considered to invest solely into equity and fixed-income instruments. As expected, the exclusive use of linear correlation coefficients leads to underestimation of total portfolio risk. The superiority of student t copula portfolios intensifies as the confidence level of CVaR rises and/or as the CVaR target increases.

Keywords
Copula functions, correlation, CVaR, financial modeling, portfolio construction

JEL Classification: C10, G11

---

1 CSOB Asset Management, Kolarska 6, 815 63 Bratislava, Slovak Republic.
fstulajter@csob.sk