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# Tangency portfolio weights under a skew-normal model in small and large dimension

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## Abstract

In this paper, we investigate the distributional properties of the estimated tangency portfolio (TP) weights assuming that the asset returns follow a matrix variate closed skew-normal distribution. We establish a stochastic representation of the linear combination of the estimated TP weights that fully characterizes its distribution. Using the stochastic representation we derive the mean and variance of the estimated weights of TP which are of key importance in portfolio analysis. Furthermore, we provide the asymptotic distribution of the linear combination of the estimated TP weights under the high-dimensional asymptotic regime, i.e. the dimension of the portfolio  $p$  and the sample size  $n$  tend to infinity such that  $p/n \rightarrow c \in (0, 1)$ . A good performance of the theoretical findings is documented in the simulation study.

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