

Abstract:

The large dimensional mean-variance (MV) portfolio is estimated using the results from the random matrix theory. We construct a shrinkage-type estimator which is distribution-free and it is optimal in the sense of maximizing the expected utility, i.e., mean-variance objective function with probability one. Its asymptotic properties are investigated when the number of assets p depends of the sample size n such that their ratio p/n approaches a positive constant c as n tends to infinity. The results are obtained under weak assumptions imposed on the distribution of the asset returns, namely the existence of the fourth moments is only required. Thereafter we provide the numerical and empirical studies where the small- and large-sample behavior of the derived estimator are investigated. The resulting estimator shows significant improvements and it is robust to the deviations from normality.