Estimation and Testing of Portfolio Value-at-Risk based on L-Comoment Matrices

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Keywords: order statistics, L-moments, Trimmed L-moments, L-comoments, portfolio value-at-risk, backtesting, saddlepoint approximation

The estimation performance of portfolio value-at-risk (PVAR) hinges on the approximation of the multivariate profit-and-loss distribution (PL). This study applied the multivariate L-moments developed by Serfling and Xiao (2007) and resorts to nonparametric multivariate estimators and descriptive measures. The PVAR estimates are examined via four backtesting methods. In addition to the three backtesting approaches: unconditional coverage, independence, and conditional coverage (Christoffersen 2003), the new approach developed by Wong (2008), based on saddlepoint approximation technique, is included.

References

Christoffersen, Peter F. 2003. Elements of Financial Risk Management. San Diego, CA: Academic Press.

Hosking, J. R. M. 1990. L-moments: Analysis and estimation of distributions using linear combinations of order statistics. Journal of the Royal Statistical Society, Series B 52:105-124.

Jurczenko, Emmanuel, and Bertrand Maillet, eds. 2006. Multi-moment Asset Allocation and Pricing Models: Wiley.

Lugannani, R., and S. O. Rice. 1980. Saddlepoint approximation for the distribution of the sum of independent random variables. Advanced Applied Probability 12:475-490.

Serfling, Robert, and Peng Xiao. 2007. A contribution to multivariate L-moments: L-comoment matrices. Journal of Multivariate Analysis 98 (1765 - 1781).

Wong, Woon K. 2008. Backtesting trading risk of commercial banks using expected shortfall. Journal of Banking & Finance 32 (7):1404-1415.