Worst-case Optimal Robust Decisions for Multi-period Mean-Variance Portfolio Optimization

Nalan Gulpinar
Warwick Business School, The University of Warwick,
Coventry, CV4 7AL, UK.

Financial decision making involves uncertainty and consequently risk. It is well known that asset return forecasts and risk estimates are inherently inaccurate. The inaccuracy in forecasting and estimation can be addressed through the specification of rival scenarios. In this paper, we extend the multi-period mean-variance portfolio optimization and asset liability management problems to the robust worst-case design with multiple rival return and risk scenarios. A worst-case optimal strategy would yield the best decision determined simultaneously with the worst-case scenario. In risk management terms, such robust strategy would ensure that the min-max optimal performance will improve if the worst-case scenarios do not materialize.

Key words: Financial portfolio optimization, asset liability management, scenario tree.