Output analysis and stress testing for risk constrained portfolios

Miloš Kopa, Jitka Dupačová

Department of Probability and Mathematical Statistics
Faculty of Mathematics and Physics,Charles University Prague,
Sokolovska 83,
186 75 Prague,
Czech Republic
E-mail: kopa@karlin.mff.cuni.cz

Abstract: Solutions of portfolio selection problems are often influenced by the model misspecification and simplifications, or by errors due to approximations, estimations and incomplete information. The obtained optimal investment strategies, recommendations for the risk and portfolio manager, should be then carefully analyzed. We shall deal with output analysis, robustness and stress testing with respect to uncertainty or perturbations of input data for static risk constrained portfolio optimization problems via the contamination technique and the worst-case analysis. We shall focus on the mean-risk models and the second order stochastic dominance constrained problems under suitable smoothness and/or convexity assumptions that are fulfilled e.g. for the Markowitz mean-variance model. The presented detailed numerical illustrations concern stress testing for scenario-based mean-risk problems with the CVaR objective or CVaR constraints.

Keywords: stochastic programming, contamination, stress testing, mean-risk model, stochastic dominance