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A VaR Black–Litterman model for the construction of absolute return fund-of-funds

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Abstract

The objective is to construct fund-of-funds (FoFs) that follow an absolute return strategy and meet the requirements imposed by the value-at-risk (VaR) market risk measure. We propose the VaR Black–Litterman model which accounts for the VaR and trading (diversification, buy-in threshold, liquidity, currency) requirements. The model takes the form of a probabilistic integer, non-convex optimization problem. We first derive a deterministic reformulation of the probabilistic problem, which, depending on the information on the probability distribution of the FoF return, is the equivalent, or a close approximation, of the original problem. We then show that the continuous relaxation of the reformulated problem is a second-order cone optimization problem for a wide range of probability distributions. Finally, we use a specialized nonlinear branch-and-bound algorithm which implements the portfolio risk branching rule to construct the optimal FoF. The practical relevance of the model and solution method is shown by their use by

a financial institution for the construction of several FoFs that are now traded worldwide. The computational study attests that the proposed algorithmic technique is very efficient, outperforming, in terms of both speed and robustness, three state-of-the-art alternative solution methods and solvers.

Keywords:

Portfolio optimization | Probabilistic programming | Funds-of-Funds | Black–Litterman | Absolute return | Trading constraints

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