Mean-Variance Optimal Portfolios in the Presence of a Benchmark with Applications to Fraud Detection

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Abstract:
We first study mean-variance efficient portfolios when there are no trading constraints and show that optimal strategies perform poorly in bear markets. We then assume investors use a stochastic benchmark (linked to the market) as a reference portfolio. We derive mean-variance efficient portfolios when investors aim to achieve a given correlation (or a given dependence structure) with a stochastic benchmark. We also provide upper bounds on Sharpe ratios and show how these can be useful for fraud detection. For example it is shown that under some conditions it is not possible for investment funds to display negative correlation with the financial market and to have a positive Sharpe ratio. All results are illustrated in a Black-Scholes market.

This is joint work with Steven Vanduffel.