Market Influence of Portfolio Optimizers

We study the feedback effects induced by portfolio optimizers on the underlying asset prices. Through their interaction with reference traders, who trade based on some aggregate incomes process, they are assumed to move asset prices away from the standard log-normal model. With market clearing as our main constraint, we solve analytically for the approximate dynamics of the asset price assuming that the wealth of the portfolio optimizers is small relative to the total market capitalization of the stock. We also calculate numerically the influence of portfolio optimizers when their wealth is not so small. There is good agreement between the numerical and analytical results when the wealth of the optimizers is small. We find that portfolio optimizers influence the price of the risky asset so as to decrease its volatility. The optimal allocation to the risky asset also changes as a result of the portfolio optimizers' actions. In general, it is advantageous to hold more of the risky asset, relative to the log normal Merton model.

Joint work with Suhas Nayak.