

Essays on Portfolio Choice with Bayesian Methods

Deniz KEBABCI

How investors should allocate assets to their portfolios in the presence of predictable components in asset returns is a question of great importance in finance. While early studies took the return generating process as given, recent studies have addressed issues such as parameter estimation and model uncertainty. My dissertation develops Bayesian methods for portfolio choice – and industry allocation in particular – under parameter and model uncertainty.

My first essay addresses the effect of parameter estimation error on the relation between asset holdings and the investment horizon. This paper assumes that returns follow a regime switching process with unknown parameters. Parameter uncertainty is accounted for through a Gibbs sampling approach. After accounting for parameter estimation error, buy-and-hold investors are generally found to allocate less to stocks the longer the investment horizon. When the dividend yield and T-bill rates are included as predictor variables, the effect of these predictor variables is minimal, and the allocation to stocks is still smaller, the longer the investor's horizon.

The second essay uses industry portfolios to examine the implications of incorporating uncertainty about a range of (conditionally) linear factor models. I specifically examine a CAPM, a linear factor model with different predictor variables (dividend yield, price to book ratio, price to earnings ratio, and price to sales ratio) and a time-varying CAPM specification. All approaches incorporate parameter uncertainty in a mean-variance framework. Time-varying CAPM specifications are intuitive in the sense that one cannot expect the environment for each industry to stay constant through time, and so the underlying parameters can be expected to be time-varying as well. Accounting for time-variation in market betas improves the portfolio performance as measured, e.g., by the Sharpe ratio compared to both an unconditional CAPM and a linear factor model with different predictor variables. I also look at the implications for portfolio performance of utilizing a Black-Litterman approach versus a standard mean-variance approach in the asset allocation step. The former can be thought as a model averaging approach and thus can be expected to help dealing with parameter estimation and model uncertainty.

The third essay develops Bayesian methods to look at style investing. This paper analyzes the determinants that affect style investing, such as style momentum, and predictor variables such as macro variables (e.g. the yield spread, inflation, oil prices, etc.) and looks at how learning about these variables affects the predictability of returns. I look at the asset allocation implications of these specifications both with Bayesian and non-Bayesian methods. Returns on style portfolios such as value and size appear to be related to the default premium and other macro variables.