Parameter Uncertainty, Portfolio Turbulence and Aggregate Stock Returns

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Optimize Portfolio based on estimates $\hat{\mu}$ and $\hat{\Sigma}$ of true $\mu$ and $\Sigma$

Optimize Portfolio based on (updated) estimates $\hat{\mu}$ and $\hat{\Sigma}$?

Uncertainty about parameters!

According to Garlappi et al. (2007, RFS) such investors withdraw from the market

Our paper:

- Hotelling’s $T$-Statistic quantifies parameter uncertainty (PU): how far are current returns away from their historic average?
  \[ P_{PU} = \frac{1}{N} \bar{r}_t - \bar{\mu}' \Sigma^{-1} \bar{r}_t - \bar{\mu} \]

  \[ w^* = \frac{c_{PU}}{\gamma} \hat{\mu} \Sigma^{-1} \]
  with
  \[ c_{PU} = 1 - \lambda_{PU} \frac{\hat{\Sigma}^2}{\hat{\mu}^2} \]
  if $\hat{\Sigma}^2 > \lambda_{PU}$

Investors with aversion to PU reduce their investment in the optimal portfolio

Implications for aggregate stock returns?

Given that:
- Enough Investors are averse to PU AND
- React to elevated levels of PU by reducing their investments in the market THEN
- PU should predict aggregate stock returns negatively

We show that:
- $c_{PU}$ predicts aggregate stock returns IS and OOS
- outperforms all other popular variables including SII
- stable predictor according to Welch & Goyal (2008, RFS)
- statistically and economically significant
- robust to a large variety of different specifications

This in turn confirms:
- Investors are averse to PU and react according to Garlappi et al., (2007)!

Sample:
- Exact replication of Rapach et al., (2016, JFE)

Results

Implications for aggregate stock returns

In- and out-of-sample performance

Asset Allocation Strategy

Motivation

Structural Break? Regime Shift?

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