Parameter Uncertainty, Portfolio Turbulence and Aggregate Stock Returns

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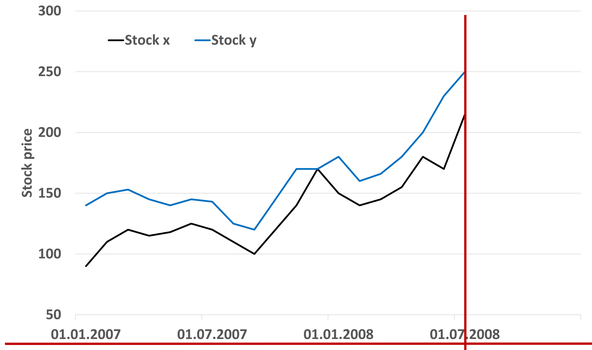
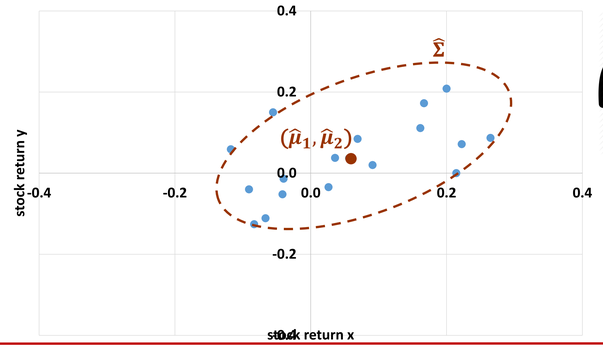
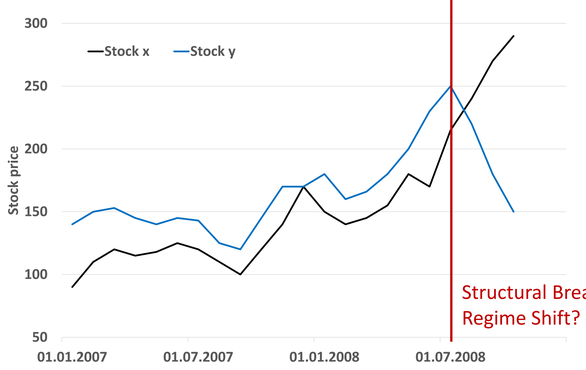
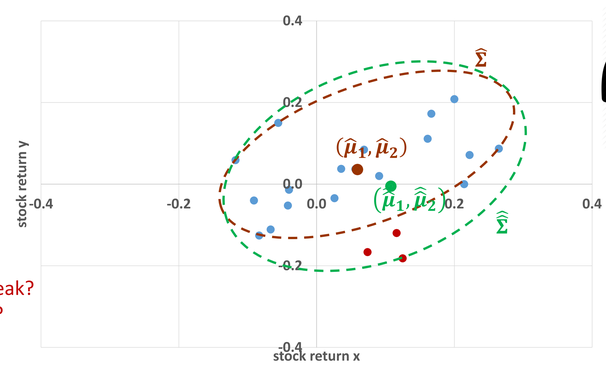
Motivation





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





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

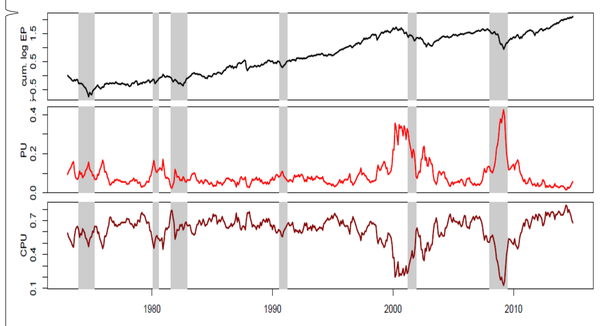
$$PU_t = 1/N(\bar{r}_t - \hat{\mu})'\hat{\Sigma}^{-1}(\bar{r}_t - \hat{\mu})$$

- According to Garlappi et al., (2007) and Kan & Zhou (2007):

$$w^* = \frac{c_{PU}}{\gamma}\hat{\Sigma}^{-1}\hat{\mu} \text{ with } c_{PU} = 1 - \left(\frac{\lambda PU_t}{\widehat{\theta_t^2}}\right)^{\frac{1}{2}} \text{ if } \widehat{\theta_t^2} > \lambda PU_t$$

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

Implications for aggregate stock returns?



Results

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

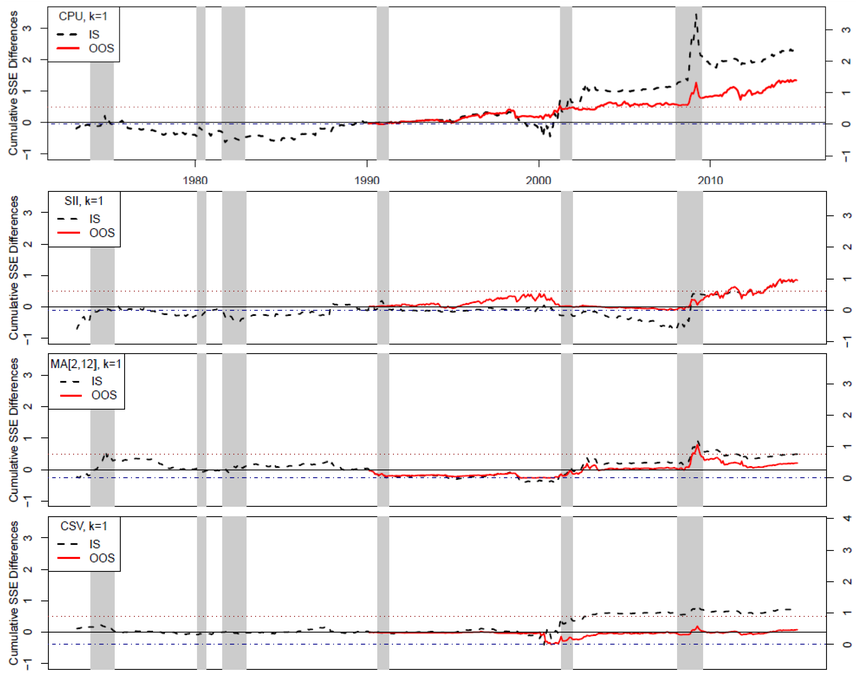
This in turn confirms:

- Investors are averse to PU and react according to Garlappi et al., (2007)!

Sample:

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

In- and out-of-sample performance



Asset Allocation Strategy