PhD Seminar: Quantitative Methods

Prof. Dr. Fabian Hollstein

Chair of Quantitative Methods in Economics and Finance

Requirements

- An **independent empirical or quantitative study** forms the core of the work
- For **topic selection**, please hand in a **list** with **your preferred topic(s)**
- Scope: 5–10 pages (+/-1 page)
- Use of an **appropriate statistical software** (such as R, MATLAB, STATA, etc.) **is recommended**
- A mere literature review is not sufficient
- The seminar paper must be written in English
- Further **tips and formal requirements** can be found in the **guidelines on the institute homepage**
- **Preparation time: until the end of the next semester**. Afterwards, presentations of the seminar papers will be held in a **blocked seminar in the beginning of the next semester**

The DAX Correlation Risk Premium

- **Task**:
  - Correlation swaps are recently introduced derivatives instruments , whose payoffs depend on the realized average bi variate correlation of index constituents. These instruments deliver insurance against increases in correlations that typically occur around market downturns.
  - Estimate correlation swap payoffs for the German index with (at-the-money options) and evaluate the properties.
- **Basic Literature**:
  - Driessen, J., Maenhout , P. J., & Vilkov, G. (2009). The price of correlation risk: Evidence from equity options. Journal of Finance , 64 (3), 1377–1406.
  - Driessen, J., Maenhout , P. J., & Vilkov, G. (2013). Option implied correlations and the price of correlation risk. Working Paper.
  - Hollstein, F., & Simen, C. W. (2020). Variance risk: A bird's eye view. Journal of Econometrics, 215(2), 517–535.

The Cross Section of Expected Returns and Volatility

- **Task**:
  - Recent empirical evidence strongly shows that volatility risk is priced in asset markets . Investors seek insurance against increases in volatility . One way to obtain such insurance is to systematically buy stocks that are sensitive to volatility.
  - Estimate volatility betas for the German stock market using VDAX innovations and examine the performance of portfolios sorted by volatility betas
- **Basic Literature**:
  - Ang, A., Hodrick, R. J., Xing, Y., & Zhang, X. (2006). The cross section of volatility and expected returns. Journal of Finance , 61 (1), 259–299.

Long-horizon vs. Short-horizon beta estimates

- **Task**:
  - In the presence of delays in price adjustments, it can be shown that a beta measured by using infinitely long horizon returns would provide a consistent estimator for a stock's true systematic risk.
  - Estimate long horizon as well as usual betas and compare their empirical properties . Sort on the difference in beta estimates to see which stock characteristics drive these.
- **Basic Literature**:
  - Cohen, K. J., Hawawini , G. A., Maier, S. F., Schwartz, R. A., & Whitcomb, D. K. (1983). Estimating and adjusting for the intervalling effect bias in beta. Management Science , 29(1), 135–148.
  - Cohen, K. J., Hawawini , G. A., Maier, S. F., Schwartz, R. A., & Whitcomb, D. K. (1983). Friction in the trading process and the estimation of systematic risk. Journal of Financial Economics , 12 (2), 263–278.
  - Jylhä, P., Suominen, M., & Tomunen, T. (2018). Beta bubbles. The Review of Asset Pricing Studies, 8(1), 1–35.

Profitability and Asset Prices

- **Task**:
  - A new stylized empirical fact in financial markets is that more profitable firms earn higher risk-adjusted returns on average.
  - Review the literature on the profitability anomaly with different definitions and test whether it is present in a European stock market.
- **Basic Literature**:
  - Fama, E. F., & French, K. R. (2017). International tests of a five-factor asset pricing model. Journal of Financial Economics, 123(3), 441–463.
  - Hou, K., Xue, C., & Zhang, L. (2015). Digesting anomalies: An investment approach. Review of Financial Studies, 28(3), 650–705.
  - Novy-Marx, R. (2013). The other side of value: The gross profitability premium. Journal of Financial Economics, 108(1), 1–28.

Investment and Asset Prices

- **Task**:
  - A new stylized empirical fact in financial markets is that firms that invest less earn higher risk-adjusted returns on average.
  - Review the literature on the investment anomaly with different definitions and test whether it is present in a European stock market.
- **Basic Literature**:
  - Fama, E. F., & French, K. R. (2017). International tests of a five-factor asset pricing model. Journal of Financial Economics, 123(3), 441–463.
  - Hou, K., Xue, C., & Zhang, L. (2015). Digesting anomalies: An investment approach. Review of Financial Studies, 28(3), 650–705.

Momentum and Asset Prices

- **Task**:
  - The momentum anomaly describes a pattern that in the medium term, "losers" on average continue to be "losers" and winners tend to further appreciate in their prices.
  - First review the empirical and theoretical literature on the momentum anomaly.
  - Empirically investigate momentum using portfolio sorts or regression tests.
- **Basic Literature**:
  - Goyal, A., & Jegadeesh, N. (2017). Cross-Sectional and Time-Series Tests of Return Predictability: What Is the Difference? Review of Financial Studies, 31(5), 1784–1824.
  - Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. Journal of Finance, 48(1), 65–91.

International Asset Pricing

- **Task**:
  - One makes systematic mistakes when using a local asset pricing model even though assets are priced globally.
  - Review the literature on global vs. local asset pricing and test both local and global asset pricing models.
- **Basic Literature**:
  - Fama, E. F., & French, K. R. (2012). Size, value, and momentum in international stock returns. Journal of Financial Economics, 105(3), 457–472.
  - Hollstein, F. (2022). Local, Regional, or Global Asset Pricing?. Journal of Financial and Quantitative Analysis, 57(1), 291–320.
  - Karolyi, G. A., & Stulz, R. M. (2003). Are financial assets priced locally or globally? Handbook of the Economics of Finance, 1, 975–1020.

Horizon Pricing

- **Task**:
  - The performance of pricing models may be horizon dependent due to different planning periods of investors.
  - Estimate horizon-dependent factor risk premia of major asset pricing factors for the European stock market.
- **Basic Literature**:
  - Kamara, A., Korajczyk, R. A., Lou, X., & Sadka, R. (2016). Horizon pricing. Journal of Financial and Quantitative Analysis, 51(6), 1769–1793.