



Master 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 **preference list** with at least **3 topics**
- Scope: 20 pages (+/-1 page) for groups of 2 and 25 pages (+/-1 page) for groups of 3
- 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: 9 weeks**. Afterwards, presentations of the seminar papers will be held in a **blocked seminar in June or July**
- Assessment: 60% written work, 40% presentation



Generalized Linear Regression Models

- **Task:**
 - In case the relationship between the dependent and the independent variable of a regression model is not linear or the dependent variable is not continuous (but discrete or categorical), the implementation of classical linear regression is not suitable.
 - Introduce and discuss alternative regression models (generalized linear regression, logistic regression, Poisson regression,...).
 - Implement each of the presented models using appropriate data and interpret the results.
- **Basic Literature:**
 - Dobson, A. J., Barnett, A. G. (2018). An Introduction to Generalized Linear Models, 4th Edition. CRC Press, New York.
 - Lindsey, J. (1997). Applying Generalized Linear Models. Springer, New York.
 - Abdulkabir et al. (2015). An Empirical Study of GLM for Count Data. *Applied and Computational Mathematics*, 4(5).
- **Supervisor:** M.Sc. Anna van Nooy



Volatility Modeling

- **Task:**
 - An important stylized fact in financial markets is volatility clustering. I.e., periods of high volatility tend to alternate with periods of comparably low volatility. (G)ARCH models introduced by Engle (1982) and Bollerslev (1986) are specifically designed to capture the volatility clustering of returns.
 - Theoretical description of the (G)ARCH model family.
 - Investigate empirically different models of the GARCH family and compare the forecasting performance.
- **Basic Literature:**
 - Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica*, 987-1007.
 - Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, 31(3), 307-327.
 - Alexander, C. (2008): *Market risk analysis*, Volume II: Practical financial econometrics.
- **Supervisor:** M.Sc. Anna van Nooy



The Cross Section of Expected Returns and Volatility

- **Task:**
 - Recent empirical evidence 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.
- **Supervisor:** M.Sc. Anna van Nooy



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 intervallling 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.
- **Supervisor:** M.Sc. Anna van Nooy



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.
- **Supervisor:** M.Sc. Anna van Nooy



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.
- **Supervisor:** M.Sc. Anna van Nooy



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.
- **Supervisor:** M.Sc. Anna van Nooy