# Empirical Finance

Summer term 2019 – Syllabus

**Lecture:** Tuesday, 13.15h – 14.45h, room LG 4.109
**Lecture/Tutorial:** Wednesday, 15.00h – 16.30h, room LG 4.109
**Final exam:** tba

**Instructor:**

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Office hours: by appointment

**Overview:** This is a course for advanced undergraduate (Bachelor) students. It deals with important empirical questions in finance. Issues covered are the empirical properties of high-frequency financial market data, the predictability of returns, announcement effects and event studies, estimation of the Capital Asset Pricing Model (CAPM), the modeling of time-varying volatility (ARCH and GARCH models) and the concept of Value-at-Risk. All topics are taught in an applied way that involves the implementation of the discussed methods in R. At the end of the course, students are able to discuss properties ("stylized facts") of high-frequency financial market data and can apply modern approaches to return and volatility modeling to financial time series. They know how to implement and evaluate econometric models for financial data using R. They will also be able to replicate and validate findings from state-of-the-art empirical finance research.

**Grading:** Grading is based on a writtem exam (90 minutes) at the end of the course. Students are allowed to bring a non-programmable calculator and a one-page **handwritten** *cheat sheet* (front/back).

**Course language:** The course language is English.

**Prerequisites:** You should have successfully attended the course "Empirische Wirtschaftsforschung". The courses "Investition und Finanzierung" and "Corporate Finance" are considered complementary to this course.

**Course requirements:** Course participants are strongly advised to...

- **Attend.** You can only fully benefit from this course if you attend the lectures and tutorials regularly because the course content is highly cumulative, meaning that later topics rely heavily on the material covered in previous weeks.

- **Prepare.** Ideally, read the suggested literature before class and be prepared to discuss them and to ask any open questions that you may have.

- **Follow the website.** The course material will be provided through the course website on StudOn. Important announcements will also be made using this platform.

- **Code.** Your learning gains will be much higher if you work regularly on the R exercises, which ask to implement the material that is covered in the lectures.

**R Software:** R is a free software environment. You can download R using any of the links on the following website: https://cran.r-project.org/mirrors.html.

It is recommended that you use RStudio as an editor to organize your codes. You can download a free copy of RStudio Desktop here (use the download button on the far left side).

We will use the first exercise session to explain how to install R/RStudio and to make sure that it works on everyone's laptop. The first exercise sessions are designed such that they cover the basics of programming in R.

There are also many excellent online courses for learning R, which you may want to consult if you do not have any prior experience with R. The following courses are recommended:

- A free course on Coursera offered by John Hopkins University;

- The book "R Programming for Data Science" by one of the Coursera authors;

- Many tutorials on various aspects of R offered via the swirl project;

- The course "Topics in R Statistical Language" offered by PennState University.

The most important thing to enhance your programming skills and to master the implementation of econometric methods is to try coding a lot.

# Course outline

1. Introduction

    1.1 Lecture overview

    1.2 Examples of financial market time series

    1.3 Returns and their distributions

    1.4 Statistical concepts

# Literature

**The main textbooks for this course are highlighted in red below.**

[1] Bodie, Z., A. Kane, M. Alex and A. J. Marcus (2009). *Investments*. McGraw-Hill.

[2] Campbell, J. Y., A. W. Lo and A. C. MacKinlay (1997). *The Econometrics of Financial Markets*. Princeton University Press.

[3] Christoffersen, P. F. (2012). *Elements of Financial Risk Management.* Academic Press.

[4] Copeland, T. E., J. F. Weston and K. Shastri (2005). *Financial Theory and Corporate Policy*. Pearson International Edition.

[5] Diebold, F. X. (2007). *Elements of Forecasting*. Thomson South-Western.

[6] Enders, W. (2010). *Applied Econometric Time Series*. Wiley.

[7] Gourieroux, C. and J. Jasiak (2001). *Financial Econometrics*. Princeton University Press.

[8] Hamilton, J. D. (1994). *Time Series Analysis*. Princeton University Press.

[9] Kirchgässner, G. and J. Wolters (2006). *Einführung in die moderne Zeitreihenanalyse*. WiSo-Kurzlehrbücher.

[10] Malkiel, B. G. (2015). *A Random Walk Down Wall Street: The Time-Tested Strategy for Successful Investing*, W. W. Norton & Company.

[11] Shiller, R. J. (2005). *Irrational Exuberance*, Princeton University Press.

[12] Stock, J. H. and M. W. Watson (2012). *Introduction to Econometrics.* Pearson International Edition.

[13] Taylor, S. J. (2005). *Asset Price Dynamics, Volatility, and Prediction*. Princeton University Press.

[14] Tsay, R. S. (2010). *Analysis of Financial Time Series*. Wiley Series in Probability and Statistics.

**Articles related to Chapter 1**

1. Nobel Price in 1990: Markowitz, H. M., Miller, M. H. and W. F. Sharpe "for their pioneering work in the theory of financial economics."

2. Nobel Price in 2003: Engle, R. F. "for methods of analyzing economic time series with time-varying volatility (ARCH)."

3. Nobel Price in 2013: Fama, E. F., Hansen, L. P. and R. J. Shiller "for their empirical analysis of asset prices."

**Articles related to Chapter 2**

1. Fama, E. F. (1970). "Efficient Capital Markets: A Review of Theory and Empirical Work." *Journal of Finance, Papers and Proceedings*, 25, 383-417.

2. Fama, E. F. and K. R. French (1988). "Permanent and Temporary Components of Stock Prices." *Journal of Political Economy*, 96, 246-273.

3. Jensen, M. C. (1978). "Some Anomalous Evidence Regarding Market Efficiency." *Journal of Financial Economics*, 6, 95-101.

4. Ljung, G. M. and G. E. P. Box (1978). "On a Measure of Lack of Fit in Time Series Models." *Biometrika*, 65, 297-303.

5. Lo, A. W. and A. C. MacKinlay (1988). "Stock Market Prices Do Not Follow Random Walks: Evidence from a Simple Specification Test." *The Review of Financial Studies*, 1, 41-66.

6. Shiller, R. J. (1981). "Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends?" *American Economic Review*, 71, 421-436.

**Articles related to Chapter 3**

1. Almeida, A., R. Payne and C. Goodhart (1998). "The Effects of Macroeconomic News on High Frequency Exchange Rate Behaviour." *Journal of Financial and Quantitative Analysis*, 33, 383-408.

2. Andersen, T. G., Bollerslev, T., Diebold, F. X. and P. Labys (2003). "Modeling and Forecasting Realized Volatility." *Econometrica*, 71, 579-625.

3. Asquith, P. and D. W. Mullins, Jr. (1986). "Signalling with Dividends, Stock Repurchases, and Equity Issues." *Financial Management*, 15, 27-44.

4. MacKinlay, A. C. (1997). "Event Studies in Economics and Finance." *Journal of Economic Literature*, 35, 13-39.

5. Neely, J. C. and S. R. Dey (2010). "A Survey of Announcement Effects on Foreign Exchange Returns." *Federal Reserve Bank of St. Louis Review*, September/October, 92, 417-463.

**Articles related to Chapter 4**

1. Markowitz, H. (1952). "Portfolio Selection." *The Journal of Finance*, 7, 77-91.

2. Sharpe, W. F. (1964). "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk." *The Journal of Finance*, 19, 425-442.

**Articles related to Chapter 5**

1. Andersen, T. and T. Bollerslev (1998). "Answering the Skeptics: Yes, Standard Volatility Models do Provide Accurate Forecasts." *International Economic Review*, 39, 885-905.

2. Diebold, F. X. and R. S. Mariano (1995). "Comparing Predictive Accuracy." *Journal of Business & Economic Statistics*, 13, 253-263.

3. Engle, R. F. (1982). "Autoregressive Conditional Heteroskedasticity with Estimates of the Variance of United Kingdom Inflation." *Econometrica*, 50, 987-1007.

4. Engle, R. F. (1990). "Stock Volatility and the Crash of '87: Discussion." *The Review of Financial Studies*, 3, 103-106.

5. Engle, R. F. (2004). "Risk and Volatility: Econometric Models and Financial Practice." Nobel Lecture, *American Economic Review*, 94, 405-420.

6. Engle, R. F. and T. Bollerslev (1986). "Modelling the Persistence of Conditional Variances." *Econometric Reviews*, 5, 1-50.

7. Engle, R. F. and R. Colacito (2006). "Testing and Valuing Dynamic Correlations for Asset Allocation." *Journal of Business & Economic Statistics*, 24, 238-253.

8. Engle, R. F. and V. K. Ng (1993). "Measuring and Testing the Impact of News on Volatility." *The Journal of Finance*, 48, 1749-1778.

9. Engle, R. F. and A. J. Patton (2000). "What good is a volatility model?" *Quantitative Finance*, 1, 237-245.

10. French, K. R., G. W. Schwert and R. F. Stambaugh (1987). "Expected Stock Returns and Volatility." *Journal of Financial Economics* 19, 3-29.

11. Glosten, L. R., Jagannathan, R. and D. E. Runkle (1993). "On the Relation between the Expected Value and the Volatility of the Nominal Excess Return on Stocks." *Journal of Finance*, 48, 1779-1801.

12. Merton, R. M. (1973). "An Intertemporal Capital Asset Pricing Model." *Econometrica*, 41, 867-887.