FAU Erlangen Nürnberg

Chair of Statistics and Econometrics

Empirical Finance

Summer term 2022 – Syllabus

Lecture/Tutorial: Tuesday, 13.15h – 14.45h, LG 4.109
Lecture/Tutorial: Wednesday, 09.45h – 11.15h, 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 **handwritten** *cheat sheet* (front and back page).

Course language: The course language is English.

Prerequisites: You should have successfully attended an introductory course on econometrics, e.g., 'Data Science: Ökonometrie' (previously: 'Empirische Wirtschaftsforschung'). The courses 'Analysis of Macroeconomic and Financial Markets Data', '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 code. You can download a free copy of RStudio Desktop here (use the download button on the 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:

- 'Basiskurs R/RStudio' provided by our chair (course language is German);
- 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
2. Return predictability
3. Announcement effects and event studies
4. Capital Asset Pricing Model
5. Volatility models
6. Value-at-Risk

Main textbooks

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

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

[3] Cochrane, J. H. (2005). *Asset Pricing: Revised Edition*. Princeton University Press.

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

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