



S420 Statistics of Financial Markets

Syllabus (Winter Semester 2026/2027)

Instructor: Prof. Dr. Martin Biewen

Learning Target

Students master the most commonly used statistical methods for analysing financial variables. The module enables them to understand the motivation and derivation of the different methods. Students apply these methods in practical applications using the statistical software Stata.

Topics

The module deals with statistical models and methods for the analysis of financial data.

The following topics are covered:

- 1) Univariate Return Distributions
- 2) Extreme Value Theory
- 3) Multivariate Return Distributions
- 4) Copulas, Value at Risk
- 5) ARIMA Time Series
- 6) Random Walks, Market Efficiency
- 7) Stochastic Volatility, GARCH Time Series
- 8) CAPM-Model, Performance Measures
- 9) Stochastic Dominance
- 10) Brownian Motion, Stochastic Calculus
- 11) Option Pricing, Black-Scholes-Model
- 12) Neural Networks, Support Vector Machines
- 13) Credit Risk Management

Structure

- Lecture: 90 Minuten

Enrollment information

No registration required.

Requirement

Basic knowledge of probability theory, linear algebra and econometric methods.

Coursework

- 9 ECTS-Credits
- Written exam (90 Minutes), registration required.

Teaching methods

Independent study, literature study.

Course language

English.

Software

This course uses Stata.

Literature

Trede/Schmid: Finanzmarktstatistik

Franke/Härdle/Hafner: Statistics of Financial Markets

Härdle/Simar: Applied Multivariate Statistical Analysis

Danielsson: Financial Risk Forecasting

Campbell/Lo/MacKinlay: The Econometrics of Financial Markets

Klemelä: Nonparametric Finance

McNeil/Frey/Embrechts: Quantitative Risk Management

Efron/Hastie: Computer Age Statistical Inference

Baum: An Introduction to Modern Econometrics Using Stata

Bofelli/Urga: Financial Econometrics Using Stata

Professor

Prof. Dr. Martin Biewen