

ST959-15 Financial Statistics

21/22

Department

Statistics

Level

Taught Postgraduate Level

Module leader

Sigurd Assing

Credit value

15

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module runs in Term 1 and aims to introduce the main approaches to statistical inference and financial time series.

Module aims

Upon completing this module, students need to be able to analyse, explain and apply the statistical techniques to finance.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Part 1: Classical and Bayesian methods of statistical inference (weeks 1-5)

- Properties of random samples
- Statistics, sufficiency and likelihood
- Point estimation, maximum likelihood estimation
- Hypothesis testing and interval estimation
- Elements of Bayesian inference

- Linear models

Part 2: Time Series (weeks 6-10)

- Auto-regressive and moving average models (ARMA), unit root (ARIMA) and seasonal models (S-ARIMA), heteroscedastic models (GARCH and extensions such as EGARCH, GARCH-M,...) and an introduction to stochastic volatility models.
- Linear and non-linear modelling of financial time series with R: exploratory analysis, model selection, model fitting, model validation and forecasting.
- Illustrative financial applications.

Learning outcomes

By the end of the module, students should be able to:

- Explain the different approaches of statistical inference for points estimation, hypothesis testing and confidence set construction.
- Apply linear models in general situations and perform ANOVA.
- Understand and critically analyse ARMA, unit root, S-ARIMA, and GARCH models. Apply these models to financial data and carry out relevant computations.
- Demonstrate an understanding of the generalised linear model, including an appreciation of the circumstances where it may or may not be applied and, where appropriate, good judgement of where to apply it.

Indicative reading list

Part 1:

- George Casella, Roger Berger: Statistical Inference, (2002) Cengage Learning; 2nd edition
- David Ruppert and David S. Matteson: Statistics and Data Analysis for Financial Engineering: with R examples, Springer; 2nd edition
- Larry A. Wasserman: All of Statistics: A Concise Course in Statistical Inference, Springer

Part 2:

- Jonathan D. Cryer and Kung-Sik Chan: (2008) Time Series Analysis: With applications in R, Spinger, 2nd edition
- David Ruppert and David S. Matteson: (2015) Statistics and Data Analysis for Financial Engineering: with R examples, Springer; 2nd edition
- Ruey S Tsay: (2010) Analysis of Financial times series, Wiley; 3rd edition
- Financial Econometrics by Christian Gourieroux and Joann Jasiak, Princeton University Press.

[View reading list on Talis Aspire](#)

Subject specific skills

Transferable skills

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (20%)
Practical classes	7 sessions of 1 hour (5%)
Private study	111 hours (74%)
Assessment	2 hours (1%)
Total	150 hours

Private study description

Weekly revision of lecture notes and materials, wider reading, practice exercises and preparing for examination.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group D1

	Weighting	Study time
Class Test Term 1 Week 7. This class test will take place during a lecture and will be based on the first part of the course.	5%	
Project 2 Term 2 Week 1. You will undertake a project in R based on the content delivered in the second part of the course. Please note that the word count is not applicable for this Project.	15%	
Locally Timetabled Examination	80%	2 hours

Weighting

Study time

~Platforms - Moodle

Assessment group R2

Weighting

Study time

On-campus Examination

100%

Duration 2 hours.

~Platforms - Moodle

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- Online examination: No Answerbook required

Feedback on assessment

- Verbal qualitative feedback will be given after the class test.
- Written quantitative and qualitative feedback will be given after the final exam and the computational project.

[Past exam papers for ST959](#)

Availability

There is currently no information about the courses for which this module is core or optional.