

ST959-15 Financial Statistics

26/27

Department

Statistics

Level

Taught Postgraduate Level

Module leader

Miryana Grigороva

Credit value

15

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module aims to introduce the main approaches to statistical inference and financial time series.

[Module web page](#)

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

- 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

- 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

[Reading lists can be found in Talis](#)

[Specific reading list for the module](#)

Subject specific skills

- Demonstrate facility with rigorous probabilistic methods.
- Evaluate, select and apply appropriate mathematical and/or probabilist techniques.
- Demonstrate knowledge of and facility with formal probability concepts, both explicitly and by applying them to the solution of finance problems.
- Create structured and coherent arguments communicating them in written form.
- Construct logical mathematical arguments with clear identification of assumptions and conclusions.
Reason critically, carefully, and logically and derive (prove) mathematical results.

Transferable skills

- Problem solving: Use rational and logical reasoning to deduce appropriate and well-reasoned conclusions. Retain an open mind, optimistic of finding solutions, thinking laterally and creatively to look beyond the obvious. Know how to learn from failure.
 - Self awareness: Reflect on learning, seeking feedback on and evaluating personal practices, strengths and opportunities for personal growth.
 - Communication: Present arguments, knowledge and ideas, in a range of formats.
 - Professionalism: Prepared to operate autonomously. Aware of how to be efficient and resilient. Manage priorities and time. Self-motivated, setting and achieving goals, prioritising tasks.
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Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (20%)
Practical classes	7 sessions of 1 hour (5%)
Private study	111 hours (75%)
Total	148 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 D2

	Weighting	Study time	Eligible for self-certification
Class Test	5%		No

	Weighting	Study time	Eligible for self-certification
This class test will take place during a lecture and will be based on the first part of the course.			
Project	15%		Yes (extension)
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.			
Centrally-timetabled examination (On-campus)	80%	2 hours	No
<ul style="list-style-type: none"> • Answerbook Pink (12 page) • Students may use a calculator 			

Assessment group R3

	Weighting	Study time	Eligible for self-certification
On-campus Examination	100%		No
Duration 2 hours.			

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

Post-requisite modules

If you pass this module, you can take:

- IB9KC-15 Financial Econometrics

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