

On-line course materials

MATH48191 - Statistical Modelling in Finance

Year: 4 - Semester: 1 - Credit Rating: 15

Requisites

Prerequisites

MATH20701 Probability 2

Aims

Students should gain an insight into statistical models and methods to fit financial data and assess risk. As a result they should be able to analyse financial data using statistical methods.

Brief Description

This course unit is set up to support the finance pathway of the BSc in Mathematics and Statistics. No previous knowledge of finance is required.

Learning Outcomes

On successful completion of the course, students will be able to analyse economic and financial data using statistical models. Emphasis will be placed on model fitting and interpretation.

Syllabus

- Characteristics of financial data. Mean, variance, skewness, kurtosis, heavy tails. [2]
- Distributions with Pareto tails. Maximum likelihood estimation and inference. [2]
- Correlation and dependence. Regression methods. [2]
- Asset returns. The random walk model. Market efficiency and tests. [3]
- Portfolio Theory. Risk versus expected return. The minimum variance portfolio. Efficient portfolios. [5]
- The Capital Asset Pricing Model. Estimation of Beta and testing of CAPM. Factor Models. [5]
- Value at risk. [3]
- Time series of asset returns. Stationarity. Estimation of variance and correlation. Tests of uncorrelatedness. Regression models with correlated errors. [3]
- State space models and Kalman filtering. Dynamic linear models and time-varying betas in CAPM. [4]
- Dynamic models of asset returns and volatility. [4]

Teaching & Learning Process (Hours Allocated To)

Lectures	Tutorials/ Example Classes	Practical Work/ Laboratory	Private Study	Total
33	11	0	106	150

Assessment and Feedback

End of semester examination: three hours weighting 80% plus 20% coursework.

Further Reading

- Lai TL and H Xing (2008). Statistical Models and Methods for Financial Markets. Springer. Available at <http://rylibweb.man.ac.uk/cgi-bin/doip.pl?10.1007+978-0-387-77827-3>.
- Ruppert D (2004). Statistics and Finance: An Introduction. Springer.

Staff Involved

Dr Jingsong Yuan - Lecturer

Data source is EPS system

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