



## Course information 2024-25

# FN2208 Financial Data Analysis

### General information

**MODULE LEVEL:** 5

**CREDIT:** 30

**NOTIONAL STUDY TIME:** 300 hours

**MODE:** Online Taught Only

### Summary

This course is an introduction to econometrics focusing on techniques applied to empirical investigations in economics and finance. The course includes a selection of the following topics: Multivariate regression analysis; hypothesis testing; omitted variables and misspecification; and time-series modelling and forecasting. Students are introduced to recent empirical findings based on finance models, such as predictability of asset returns and econometric analyses of the CAPM and multifactor models.

### Conditions

Please refer to the relevant programme structure in the EMFSS Programme Regulations to check:

- where this course can be placed on your degree structure; and
- details of prerequisites and corequisites for this course.

You should also refer to the Exclusions list in the EMFSS Programme Regulations to check if any exclusions apply for this course.

### Aims and objectives

- To provide an understanding of econometrics as a concept and as an important set of tools for answering questions in economics and finance.
- To explain how to use regression analysis for answering questions regarding relationship of economic and finance variables.
- To identify, explain, and apply the appropriate econometric framework for testing economic and finance theories.
- To provide an understanding of the limitations of different techniques and develop an understanding of possible solutions.

- To develop a foundation for further studies in econometrics.

## Learning outcomes

At the end of this course and having completed the essential reading and activities students should be able to:

- Estimate single and multiple linear regressions models using the ordinary least squares (OLS) estimator.
- Outline and critically assess the assumptions and limitation of the OLS estimator.
- Evaluate the regression results and conduct hypothesis testing.
- Estimate panel data models and perform statistical inference on these models.
- Identify and control for omitted variable biases and endogeneity.
- Identify the need for instrumental variables (IV) estimation methods, apply the two stage least squares estimator, and test for endogeneity and valid instruments.
- Formulate and implement causal inference using experimental or quasi-experimental data.
- Apply regression techniques to time series data.
- Formulate and apply univariate and multivariate time series models to perform causal inference.
- Formulate and estimate univariate and multivariate time series models for forecasting.
- Identify and estimate stationary time series models.
- Test for unit roots.
- Test for cointegration and estimate error correction models.
- Explain, formulate, and estimate the main volatility models.

## Employability skills

Below are the three most relevant employability skills that students acquire by undertaking this course which can be conveyed to future prospective employers:

1. Decision making
2. Creativity and innovation
3. Complex problem solving

## Essential reading

Detailed reading lists are distributed at the start of the course.

Introduction to Econometrics by James Stock and Mark Watson, Pearson, 4th edition.

### Optional reading:

Wooldridge, Introductory Econometrics: A Modern Approach, 7th edition.

Chris Brooks, Introductory Econometrics for Finance, 4th Edition.

## Assessment

This course is assessed by a three-hour and fifteen-minute closed-book written examination.

## Syllabus

- **Introduction to Econometrics:** Definitions, causality, prediction, datasets.
- **Single Linear Regression Model:** Assumptions, analyses of fit, sampling distribution of estimator, testing hypotheses, confidence interval.
- **Multiple Linear Regression Model:** Omitted variable bias, assumptions, control variables, analyses of fit, heteroskedasticity, finite sample properties, foundations of asymptotic theory.
- **Inference for Multiple Regression Model:** Single and multiple coefficients, joint hypotheses, confidence set.
- **Nonlinear Regression Functions:** Polynomials, logarithms, interaction (dummy and continuous variables).
- **Violations of the OLS Assumptions:** Omitted variable bias, misspecification of the functional form, measurement error bias, sample selection bias, simultaneous causality bias.
- **Panel Data:** Model and estimation, fixed effect, time fixed effects, assumptions.
- **Instrumental Variables:** Motivation, the method, estimation, sampling distribution of TSLS, the general IV model, validity of instruments (relevance, exogeneity).
- **Regression Framework for Experiments and Quasi-Experiments:** Experiments – estimation and threats; Quasi- Experiments - estimation and threats, heterogeneous population.
- **Time Series Models:** Time series foundation, AR, MA, ARMA, ADL models – properties, estimation, and forecast (multi-period forecast), model specification and selection. Unit roots tests (DF and ADF), deterministic and stochastic trends, spurious regression, breaks.
- **Dynamic Causal Effect:** The distributed Lag model, forms of exogeneity, exogenous regressors, strictly exogenous regressors, estimation, inference.
- **Volatility Models:** ARCH, GARCH, Realized volatility.
- **Vector Autoregressive Models:** Inference, model selection, forecast.
- **Cointegration:** The error correction model, testing for cointegration.