ADVANCED ECONOMETRICS (EC312)

Course duration: 54 hours lecture and class time (Over three weeks)

LSE Teaching Department: Department of Economics

Lead Faculty: Dr Marcia Schafgans and Dr Tatiana Komarova

Pre-requisites: Students should have taken EC212 Introduction to Econometrics or an equivalent undergraduate course in econometrics. With EC312 being considerably more advanced technically than EC212, a good working knowledge of multivariate calculus and linear algebra will be required as well.

Course Objective:

This course will present an advanced treatment of econometric principles for cross-sectional, panel and time-series data sets. While concentrating on linear models, some non-linear cases will also be discussed, notably limited dependent variable models and generalised methods of moments. The course will focus on modern econometric techniques, addressing both technical derivations and practical applications. Applications in the areas of microeconomics, macroeconomics and finance will be considered.

Main Text:


OR


Further Useful References:


Assessment:

Mid course examination 50%, final examination 50%.
Contacts:
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Topics:

- **Module 1**: Main Regression. Topics to include: Principles of Estimation (Ordinary Least Squares, Generalized Least Squares and Maximum Likelihood Estimation with Micro-Econometric applications); Principles of Testing (t- and F-test; Wald, Likelihood Ratio, Lagrange Multiplier Testing Principles). Time Series: Basic Time Series Processes; Stationarity and Nonstationarity - Unit roots and Cointegration

- **Module 2**: Estimation Methodology. Topics to include: Endogeneity in linear regression models; Instruments; 2SLS estimator; Simultaneous equations. Motivation, definition and asymptotic properties of GMM estimator; Efficient GMM estimation; Over-identifying restrictions. Introduction to Panel Data Models: Fixed effect and random effect models. Arellano-Bond estimator in dynamic panel data models. Introduction to Quantile estimation.
PART A: MAIN REGRESSION

Non-required readings indicated with (*)

A.1 Multiple Linear Regression Model

- Verbeek, Ch. 2-3
- Greene, Ch. 2-3, 4.1-4.5.1, 4.7.1, 5.1-5.5

A.2 Generalized Linear Regression Model (Non-Spherical Disturbances)

- Verbeek, Ch. 4
- Greene, Ch. 9, Ch. 20.1-20.3, 20.5, 20.7-20.9

A.3 Maximum Likelihood Estimation, Trinity of Classical Testing (W, LM, LR)
With applications in Limited Dependent Variable models
Binary Choice and Count Data

- Verbeek, Ch. 6.1-6.3 and 7.1, 7.3
- Greene, Ch. 14.1-14.4, 14.6-14.6.4, 14.9.1, 17.2-17.3.4, 17.3.7, 18.4.1
A.4 Time Series, Non-Stationarity, Co-integration


- Verbeek, Ch. 8.1 - 8.7, 8.10, Ch. 9.1-9.7
- Greene, Ch. Ch. 21, 20.10
- Johnston & Dinardo: Ch 2, 2.4-2.5, Ch 7, 7.1-7.3, 7.6, Ch 8

PART B: ESTIMATION METHODOLOGY AND TOPICS IN MICROECONOMETRICS

Non-required readings indicated with (*)

B.1 Endogeneity in linear regression models.

Properties of the OLS Estimator under Endogeneity. Causes of Endogeneity: Omission of Relevant Explanatory Variables; Measurement Error in Explanatory Variables; Simultaneity; Lagged Dependent Variable as a Regressor and Serially Correlated Errors

- Verbeek, Ch. 5.2
- Greene, Ch. 5.6.1

B.2 Instrumental Variables Approach.


- Verbeek, Ch. 5.3-5.4
- Greene, Ch. 5.4, 5.6
- **Two-Stage Least Squares (2SLS) Estimator and Generalized IV estimator. Hausman Test.**
- Verbeek, Ch. 5.5
- Greene, Ch. 5.5

**B.3 Generalized Method of Moments**


- Verbeek, Ch. 5.6-5.7
- Greene, Ch. 18

**B.4 Introduction to Panel Data.**


- Verbeek, Ch. 10.1-10.2
- Greene, Ch. 13

**B.5 Introduction to Quantile Regression.**


Credit Transfer: If you are hoping to earn credit by taking this course, please ensure that you confirm it is eligible for credit transfer well in advance of the start date. Please discuss this directly with your home institution or Study Abroad Advisor.

As a guide, our LSE Summer School courses are typically eligible for three credits within the US system and 7.5 ECTS in Europe. Different institutions and countries can, and will, vary. You will receive a digital transcript and a printed certificate following your successful completion of the course in order to make arrangements for transfer of credit.

If you have any queries, please direct them to summer.school@lse.ac.uk