Econometrics III

Academic Year: (2021 / 2022)  
Review date: 02-07-2021

Department assigned to the subject: Department of Economics  
Coordinating teacher: GONZALO MUÑOZ, JESUS
Type: Compulsory  
ECTS Credits: 9.0  
Year: 2  
Semester: 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Econometrics I and Econometrics II

OBJECTIVES

The objective of this course is to deal with some important topics in the empirical analysis of micro data (households, firms, etc.). We will study issues in the specification, estimation and testing of different models with cross-sectional and with panel data. The emphasis of the course is both on the econometric techniques and in the economic applications. Therefore, this course will be useful for those interested in studying these econometric techniques per se, and for those who see the econometric techniques as necessary tools to develop applied work using micro data. The examples of applications will be from wide range of fields: labour economics, health economics, economics of education, Industrial Organization, demand estimation, evaluation of public policies, etc.

Prerequisites: Econometrics I and Econometrics II. Students are expected to know well and review before the course GMM, MLE, and other Extremum Estimators. This includes asymptotic properties of these estimators, testing, and selecting optimal instruments (in a GMM setting).

DESCRIPTION OF CONTENTS: PROGRAMME

Microeconometrics:

1. Linear Models for Panel Data

Introduction and motivation. Review of Static models and control for unobserved heterogeneity: Within-groups, between-groups and Random Effects Methods. Dynamic models. Models with strictly exogenous and predetermined variables. The bias of the within-groups estimator. GMM estimation of dynamic panel data models. Specification tests. Examples of applications of these methods:
- I.O.: Identification and Estimation of Production Functions (e.g. Productivity in the telecommunications equipment industry). Olley and Pakes (1996); Ackerberg, Caves and Fraser (2006); and its comparison with Arellano and Bover (1995) and Blundell and Bond (1998, 2000).

2. Discrete Choice Models


Examples of applied papers using these methods:

3. Sample Selection Models

Example of an applied paper using these methods:
- The Sensitivity of an Empirical Model of Married Women’s Hours of Work to Economic and Statistical Assumptions, Mroz (1987)

Macroeconometrics:

COURSE OUTLINE

PART I: INTRODUCTION

1. BASIC CONCEPTS OF STOCHASTIC PROCESSES
Definitions and examples of stochastic processes and time series. Stationarity and ergodicity. The mean. The autocovariance and autocorrelation function. One of the goals of time series analysis: Forecasts based on conditional expectation and Forecasts based on linear projection (least squares).

PART II: MODELS BASED ON UNIVARIATE INFORMATION

2. STATIONARY LINEAR MODELS I: CHARACTERIZATION AND PROPERTIES
3. STATIONARY LINEAR MODELS I': SPECTRAL ANALYSIS
4. STATIONARY LINEAR MODELS II: ESTIMATION AND INFERENCE
Estimation: The maximum likelihood method (the likelihood function for a gaussian AR(1) and a gaussian MA(1)) and Least squares. Asymptotic behavior of the sample mean and autocovariance function. Estimation of the Long-Run Variance. Inference on the parameters of ARMA models.
5. MODEL SELECTION
Box-Jenkins Methodology. Information Criteria: AIC, BIC, HQ and LCIC. Consistency of the IC. Inference on models selected by the IC. Testing versus IC.
6. FORECASTING
7. NON-STATIONARY LINEAR MODELS: THE CASE OF AN AR WITH A UNIT ROOT
Appendix: The functional central limit theorem and the continuous mapping theorem.
8. NON-STATIONARY MODELS: THE CASE OF STRUCTURAL BREAKS

PART III: MODELS BASED ON MULTIVARIATE INFORMATION

9. STATIONARY MULTIVARIATE LINEAR MODELS: VARs
10. NON-STATIONARY MULTIVARIATE LINEAR MODELS I: VAR MODELS WITH UNIT ROOTS-COINTEGRATION

Appendix: Asymptotic results for non-stationary vector processes.

11. NON-STATIONARY MULTIVARIATE LINEAR MODELS II: VAR MODELS WITH UNIT ROOTS- COINTEGRATION


12. MODEL SELECTION

Consequences of lag or/and rank misspecification in VARs. Information criteria approach to select the number of lags and the rank of cointegration. Consistency of the IC; Testing versus IC.

PARTE IV: FURTHER TOPICS

13. LONG MEMORY


14. THRESHOLD MODELS


15. DYNAMIC FACTOR MODELS


The primary texts are Brockwell and Davis (1991), Hamilton (1994), and Hayashi (2000). The other texts provide treatments of various subtopics.

LEARNING ACTIVITIES AND METHODOLOGY

Lectures to cover the most important aspects of the syllabus, and practical sessions where we will work over the Problem Sets and the Empirical Project.

ASSESSMENT SYSTEM

The first part (Panel Data) will be evaluated via a midterm (33%). The second part (Time Series Econometrics) will be evaluated (66%) by an empirical project (30 points) and a double midterm (40 and 30 points).

% end-of-term-examination: 47
% of continuous assessment (assignments, laboratory, practicals...): 53

BASIC BIBLIOGRAPHY

- Arellano Panel Data Econometrics, Oxford University Press.
- Hayashi, F. Econometrics, Princeton University Press, 2000
- Wooldridge Econometrics Analysis of Cross Section and Panel Data, MIT Press.

ADDITIONAL BIBLIOGRAPHY

- Lecture Notes http://www.eco.uc3m.es/~jgonzalo/teaching/PhDTimeSeries.html, ...

BASIC ELECTRONIC RESOURCES

- - -: http://www.eco.uc3m.es/~jgonzalo/teaching/PhDTimeSeries.html