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Econometrics II

Academic Year: (2020 / 2021) **Review date: 09-07-2020**

Department assigned to the subject: Economics Department

Coordinating teacher: VELASCO GOMEZ, CARLOS

Type: Compulsory ECTS Credits : 9.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Econometrics I, Mathematics

OBJECTIVES

This is a graduate course on Econometrics. The first part of the course discusses inferences on linear models under standard conditions, paying attention to identification issues in structural simultaneous equation systems and testing linear restrictions. The second part of the course discusess econometric modeling under serial dependence and unobserved heterogeneity, which includes time series modeling and causality analysis in dynamic models. The third part of the course covers asymptotic inferences in non-linear in parameters models, paying particular attention to generalized method of moments and maximum likelihood. The last part of the course discuses inference tools in quantile regression, non-parametric models, semi-parametric models, and specification testing.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Inference on linear reduced form models. Causality and identification. Least Squares Estimates. Asymptotic inference. Restricted estimation. Measurement error. Control variables. Hypothesis Testing.

2. Inference on structural linear equations. Two Stage Least Squares Estimates. Specification Tests: Endogeneity, Overidentifying restrictions, Functional form, Heteroskedasticity.

3. Inference on systems of reduced form equations. Inference on a multivariate linear system based on OLS; GLS and FGLS; Seemingly unrelated systems of equations; the linear panel data model. The generalized method of moments: 2SLS, 3SLS. Testing overidentifying restrictions. Optimal instruments.

4. Inference on linear structural equations systems. Identification in a linear system. Estimation after identification. Identification with cross-equation and covariance restrictions. Models nonlinear in the endogenous variables.

5. Inference in the presence of unobserved heterogeneity. Random Effects Methods. Fixed Effects Methods. First Differencing Methods. Comparison of Estimators.

6. Inference with autocorrelated data. Basic concepts: Stationarity and weak dependence. Basic models: Martingale difference, linear processes, autogregressions. Laws of large numbers and central limit theorems. Autocorrelation and Heteroskedasticity-robust inference. Testing for serial correlation. GLS and IV estimates.

8. Inference on parameters in non-linear models. Examples: Non-linear regression, maximum likelihood, quantile regression, minimum distance. M and Z estimators. Asymptotic properties under classical assumptions. Asymptotics under minimal assumptions. Numerical optimization methods: Newton-Raphson and Gauss-Newton. One step estimators.

9. Generalized method of moments. Identification via moment restrictions. GMM estimates. Asymptotic inferences. Tests of overidentifying restrictions.

10. Maximum likelihood. Consistency and asymptotic normality. Asymptotic inference. Examples: binary regression, TOBIT models and count data models.

11. Quantile linear regression. Consistency and asymptotic normality. Asymptotic inference. Causality analysis using quantile regression.

12. Inference on non-parametric models. Kernel estimates of density and regression functions. Local polynomial regression. Discontinuous regression. Asymptotic inference.

13. Semi-parametric models. Varying coefficient models, index models, adaptive estimation.

14. Specification testing. Goodness-of-fit tests for distribution functions. Model checks of regression functions and conditional model restrictions.

LEARNING ACTIVITIES AND METHODOLOGY

Training activities

Lectures
Practical classes
Problem Sets
Individual student work
Tutorials

Teaching methodology

Exhibitions in class with teacher support and audiovisual media, in which the main concepts of matter are developed and the literature is provided to supplement student learning.

Practical classes with resolution of exercises and problems that illustrate the theory and allow to study particular cases and small extensions.

Problem sets to solve at home individually, helping to systematize the study of the subject and to revise fundamental concepts.

ASSESSMENT SYSTEM

Final Exam and Mid-term exam, together with Problem Sets.

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- Davidson Econometric Theory, Blackwell, 2000
- Davidson, R. and Mackinnon, J.G. Estimation and Inference in Econometrics., Oxford UP, 1993
- Gorieroux, C. and Monfort, A. Time Series an Dynamic Models , Cambridge UP, 1997
- Greene, W.H. Econometric Analysis, Macmillan, 1997
- Hayashi, F. Econometrics, Princeton UP, 2000
- Stock, J.H. and M. Watson Introduction to Econometrics, Prentice Hall, 2010
- Stock, J.H. and M. Watson Introduction to Econometrics, Prentice Hall, 2010
- Stock, J.H. and M. Watson Introduction to Econometrics, Prentice Hall, 2010
- Wooldridge, J.M. Introduction to Econometrics. A Modern Approach, South Western, 2000
- Wooldridge, J.M. Econometric Analysis of Cross Section and Panel Data, MIT Press, 2002
- van der Vaart Asymptotic Statistics, Cambridge University Press, 1998

ADDITIONAL BIBLIOGRAPHY

- P.A. Ruud Classical Econometric Theory, Oxford University Press, 2000

BASIC ELECTRONIC RESOURCES

- Bruce Hansen . Econometrics: https://www.ssc.wisc.edu/~bhansen/econometrics/
- Francis Diebold . Time Series Econometrics: https://www.sas.upenn.edu/~fdiebold/Teaching706/econ706Penn.html