



Universidad
Rey Juan Carlos

Universidad Rey Juan Carlos
Facultad de CC. Jurídicas y Sociales
(Vicálvaro campus)

CURSO 2009-2010

Degree: Business Administration (LADE bilingüe)

Department: Economía Aplicada I

Course name: Econometrics

Type: Compulsory

Year : 5th

Duration: 1 Year (2 terms)

Credits: 9

Responsible for course: Pascual Fernández Martínez

Professors:

GROUP A (1st. Term)

- Pascual Fernández Martínez
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GROUP A (2nd. Term)

- José Luis Montes
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Number of theoretical teaching hours: 60

Number of practical teaching hours: 30

Number of hours of personal work and other activities: 5 h. (weekly)

Total estimated required student work hours: 10 h. (weekly)

Course objectives, dexterities and competencies that the students will acquire:

This course is designed to introduce students to econometric techniques and their applications in economic analysis and decision making. The main objective of the course is to train the student in understanding the environment where economic factors develop their activity by using econometrics models.

Students will learn how to formulate models, based in economic theories applied to the real economy by means of relevant information and econometric software packages. Consequently they will apply to real economics cases their knowledge of economics theory (micro and macroeconomics), mathematics and statistics.

Specific objectives:

- The Lineal General Model (LGM) operation and the simultaneous equations model.
- How to estimate these models efficiently.
- To diagnose the model fit.
- To carry out predictions.
- Exemplify the non fulfillment of some of the LGM model hypothesis, analyze their consequences and propose solutions.
- Handling economic data.
- Complete an original applied research paper with real data.

Prerequisites to study the subject:

The students must have an appropriate level of Economics (Microeconomics and Macroeconomics) theory, Mathematics and, above all, Statistics.

It is also required a basic (user level) knowledge of information processing tools, as word's processors and spread sheets.

Contents. Subject Syllabus:

LESSON 1. OBJECT AND LIMITS OF ECONOMETRICS.

- 1.1. - Models in the scientific research.
- 1.2. - Economic models and Econometric models.
- 1.3. - Concept and object of Econometrics.
- 1.4. - Econometric models in theories testing.
- 1.5.- Alternative uses of the econometric models
- 1.6. - Internet addresses of econometric interest.

LESSON 2.- THE PROCESS OF ELABORATION OF THE ECONOMETRICS MODELS AND THE PREVIOUS TREATMENT OF THE INFORMATION.

- 2.1.- Norms for carrying out the compulsory term paper of the subject econometrics.
- 2.2.- Identifying and finding economic information.
- 2.3.- Homogenization and previous data treatment.
- 2.4.- E-Views software basics.

LESSON 3.- APPROACH, SPECIFICATION, ESTIMATION AND SOLUTION OF THE LINEAL GENERAL MODEL.

- 3.1.- Approach to the basic single-equation model: The Lineal General Model.
 - 3.1.1.- Expression of the model in extended and matrix form.
 - 3.1.2.- Model basic hypothesis.
- 3.2.- Estimation of the basic single-equation model.
 - 3.2.1.- Ordinary least squares estimation.
 - 3.2.2.- Maximum likelihood estimation.
 - 3.2.3.- Characteristics and properties of the distribution of the parameters estimators.
 - 3.2.4.- Estimation of the random perturbation variance

LESSON 4.- TEST AND APPRAISAL OF ECONOMETRIC MODELS.

- 4.1.- Different types of model validity tests .
- 4.2.- Tests of statistical significance of parameters.
 - 4.2.1.- Tests of individual significance of parameters.
 - 4.2.2.- Confidence intervals of Student's t test.
- 4.3.- Tests of combined significance of parameters.
 - 4.3.1.- Confidence tests for the parameters group.
 - 4.3.2.- Parameters significance tests: Snedecor's F .
- 4.4.- Significance tests starting from the determination coefficient.
- 4.5.- A priori appraisal of the model.
 - 4.5.1.- Errors measurements.
 - 4.5.2.- Errors graphical representations.
- 4.6.- Points of change in tendencies analysis.

LESSON 5.- APPROACH, ESTIMATION AND SOLUTION OF THE ECONOMETRICAL MULTI EQUATION MODELS.

- 5.1.- Reason of being of the multi-equation model.
- 5.2.- Approach to the basic simultaneous equations model.
- 5.3.- Identification of the multi-equation model
- 5.4.- Estimation of the multi-equation models: alternative modeling focuses
 - 5.4.1.- Direct estimate by ordinary least squares.
 - 5.4.2.- Limited information estimate : Indirect least squares.

LESSON 6.- STRUCTURAL HYPOTHESIS TEST I.

- 6.1.- Small samples.
- 6.2.- Erroneous specification.
 - 6.2.1.- Omission of outstanding variables.
 - 6.2.2.- Inclusion of irrelevant variables.
 - 6.2.3.- Functional incorrect form.
- 6.3.- Structural change.
 - 6.3.1.- Econometric models and changing structures.
 - 6.3.2.- Tests of the structural change.
 - 6.3.3.- Consequences of the structure change and alternative solutions.
 - 6.3.4.- Stationary deterministic and tendency methods .
- 6.4.- Multicollinearity.

LESSON 7.- STRUCTURAL HYPOTHESIS TEST II.

- 7.1.- Stochastic regressors.
- 7.2.- Consequences of the stochastic regressors.
- 7.3.- Solutions in the single-equation domain : The Instrumental Variables method.
- 7.4.- Solutions in the multi-equation domain: The Two Stages Least Squares method.

LESSON 8.- ANALYSIS AND DYNAMICS OF THE RANDOM PERTURBANCE.

- 8.1.- Problems in the distribution.
 - 8.1.1.- Non normality.
 - 8.1.2.- Non null mean.
- 8.2.- Non scalar variances and covariances matrix.
 - 8.2.1.- Generalized Least Squares estimation .
- 8.3.- Autocorrelation.
 - 8.3.1.- First order autoregressive processes.
 - 8.3.2.- Autocorrelation tests.
 - 8.3.3.- Autocorrelation correction in the single-equation domain.
- 8.4.- Heterocedasticity.
- 8.5.- Summary of the lineal regression model basic hypothesis: Non fulfillments, consequences and fundamental tests..

LESSON 9.- TIME SERIES MODELS. ARIMA MODEL.

- 9.1.- Autorregresive models and moving average models.
- 9.2.- Moving average autorregresive integrated models.
- 9.3.- Treatment of the estationarity in ARIMA models.
- 9.4.- Stages in the application process.
- 9.5.- Identification of time series models.

Educational methodology:

The course will be carried out with the aid of the basic reference, the professors explanations and those other materials that, at due time, will be delivered in class or suggested.

The subject will be taught, firstly by theoretical classes, where the subject syllabus contents will be explained; secondly, by practical classes, which will be analyzed and solved several exercises, helping to understand the previously explained theoretical contents. There will also be carried out practical classes in computers classrooms with the purpose that the student interprets the results obtained applying computer packages, in particular the Econometric Views (E-Views) software.

Besides the regular classes, the student could carry out consultations with the professor on weekly tutoring sessions, whose schedule and place will be announced at the beginning of the course.

Course scheduling

FIRST TERM

1° WEEK	2° WEEK	3° WEEK	4° WEEK	5° WEEK
LESSON 1	LESSON 2	LESSON 3	LESSON 3	LESSON 3
6° WEEK	7° WEEK	8° WEEK	9° WEEK	10° WEEK
LESSON 3	LESSON 4	LESSON 4	LESSON 4	LESSON 4
11° WEEK	12° WEEK	13° WEEK	14° WEEK	
LESSON 5	LESSON 5	LESSON 5	LESSON 5	

SECOND TERM

1° WEEK	2° WEEK	3° WEEK	4° WEEK	5° WEEK
LESSON 6	LESSON 6	LESSON 6	LESSON 6	LESSON 7
6° WEEK	7° WEEK	8° WEEK	9° WEEK	10° WEEK
LESSON 7	LESSON 8	LESSON 8	LESSON 8	LESSON 8
11° WEEK	12° WEEK	13° WEEK	14° WEEK	
LESSON 9	LESSON 9	LESSON 9	LESSON 9	

Evaluation:

Course evaluation will be made with the results obtained by the student in official exams and a compulsory paper.

The exam will consist of two distinct parts: theoretical and practical; It will be necessary to demonstrate a minimum level of knowledge of each part to pass the whole exam. It will be a midterm exam in January (predictably lessons 1 to 5), with a similar structure to the official one (theoretical and practical). Students who pass this exam will be released in this part of the course for the final exam. If a student suspends the May final exam will be presented to the whole subject in future reviews.

To pass the course will be mandatory preparation and presentation of an original paper of highly practical content. The paper delivery process will be the following one: students who wish to submit the midterm exam (around January) must submit the first part of the paper whose contents are explained in detail in class, and that should be composed by the first three stages of the annex lower these lines. The second part of the paper, composed by the rest of stages of the annex (or the entirety of the paper, for those students that decide this way), will be delivered at the, limit date, day of the final exam in the May or June exams.

Approve the paper is mandatory to pass the course. The paper evaluation will be considered in the final mark on the subject. The paper will be done using computer means, especially the econometric software E-Views, spread sheets and words processors.

Regular class attendance is crucial for success in this course.

The students will submit a filling card, properly fulfilled, to the professors at the beginning of the course

ANNEX: NORMS FOR THE COMPULSORY COURSE WORK OF THE ECONOMETRICS.

Our teaching experience has taught us that only an active role by the student allows you to learn the possibilities and limitations of econometrics.

The goal aimed it is that students develop an econometric single equation model, process in which they can translate (and understand) the theoretical knowledge learned on the course, as well as learning how to use statistical sources and bibliographical references (and the Internet) with computer resources. Students will learn how to use the econometric software E-Views, and will finish the course as middle-advanced users of this computer software. They will also have to carry out a detailed report of the completed paper, by means of spread sheets and word processors software. The work may be done individually or in groups of a maximum of two students.

The phases in the paper completion will be the following ones:

- 1) Choosing a scope
- 2) Detailed specification of the initial model.
- 3) Search and depuration of the data.
- 4) Estimation of the model: application of the E-Views software.
- 5) Interpretation of the results.
- 6) Process of improvement of the model.
- 7) Final report.

Phase I. Choice of the topic field. The econometric model can be applied to the most diverse fields in economy, business management or even to social topics, not strictly economic.

The choice of the applied topic will be open for the students, but we suggest you choose a topic which has an interest or previous knowledge. Anyway, the professor will be able to delimit the areas where the work will be carried out.

Phase II. Detailed specification of the initial model. Although anyone can outline the model based on his own knowledge of the problem and in his theoretical knowledge, it is convenient to carry out a previous search of models of the selected area. For this, in the first place, you will proceed to the search of theoretical models, by means of the analysis of economic, sociological, or managerial theories that explain the principal conditions of the chosen phenomenon.

Later on, related econometric references on the elected topic will be looked for. For it, It is advisable to examine books on applied econometrics, econometrics reviews concerning the area of chosen specialization, and sources of bibliographical search in general, in libraries or the Internet, by means of specialized browsers.

Phase III. Search and cleaning of the data. For each one of the variables in the model (as much for the explanatory as for the endogenous ones) will be carried out a record indicating: exact definition, statistic source, measure units, original frequency and conversion method or transformations realized (being it the case), brief description of data evolution and analysis of unusual data. As starting point, we will need a minimum number of 15 sample points for each selected variable, always working with annual data or cross-section, not being acceptable papers with data of periodicity lower than the annual.

Phase IV. Estimate of the model: application of the software E-Views. During the course the students will learn the process of model calculation, starting from the given data. But, except for educational means, the economist facing the estimation of a model should have computer software to carry out the operations indicated by the theoretically deduced formulas. In our case the software will be E-Views whose use the students will finish fully mastering.

Phase V. Interpretation of the results. The careful analysis of the results of the estimated model is an essential point of the paper in which the understanding of the econometric methods will be verified in relation to the hypothesis testing, goodness of fit analysis and model verification.

Phase VI. Improvement of the model. The analysis of the results of the previous phase will show apparent imperfections of very diverse nature that will generally demand to restart the process altering the initial model, the data, and re-estimating and verifying again the model.

Phase VII. Elaboration of the final report. The whole paper must be finished with the elaboration of a report, structured with the following format:

1. ~ Index.
2. Summary, in less than a page: selected topic, applied model, data, and main paper conclusions.
3. Introduction, dedicated to describe the paper objectives related to the chosen topic.
4. ~ Theoretical and econometric background, showing the results of the models search in the selected area.
5. ~ Selected model, justifying your election and explaining the notation.
6. Used data where, next to graphics and charts data, reference is made to the used sources, data magnitude, transformations carried out, potential errors or inaccuracies, etc.
7. ~ Estimated model and tests, where the principal econometric results and your interpretation are summarized. In the case that several model have been estimated, the weak points of those eliminated (nonfulfillment of structural hypothesis) will be commented and a more detailed analysis of the finally selected one is desirable.
8. Main results, with a brief comment on the principal conclusions allowing to establish the model and its likely applications.
9. Bibliography, containing the complete references of the truly consulted works (Internet, books, articles, etc.)

Teaching language: English

Recomended references:

Basic reference:

- Wooldridge, J. (2008), Introduction to Econometrics. South Western College.

Other references:

- Pulido, A. y Pérez, J., (2001), Modelos Económicos. Ed. Pirámide.
- Carrascal, U. et al, (2001), Análisis Económico con E-Views. Ed. Ra-Ma.
- Fernández, A. et al, (1995), Ejercicios de Econometría. Ed. McGraw-Hill.
- Fernández, A. (2005), Econometría. Ed. Pearson.
- Greene W.H. (2008), Econometric Analysis. Pearson Education.
- Novales, A., (2002), Econometría. Segunda Edición. Ed. McGraw-Hill.
- Otero, J.M.,(1993), Econometría. Series Temporales y Predicción. Ed. AC.