

Academic Year/course: 2021/22

30617 - Econometrics

Syllabus Information

Academic Year: 2021/22

Subject: 30617 - Econometrics

Faculty / School: 109 - Facultad de Economía y Empresa

Degree: 432 - Joint Law - Business Administration and Management Programme

ECTS: 6.0

Year: 4

Semester: First semester

Subject Type: Compulsory

Module:

1. General information

1.1. Aims of the course

The objective of the subject is to introduce the student in the management of econometric models so that, at the end of the course, he will find the necessary flexibility to design and solve basic econometric research. For this, it is essential to clearly appreciate the importance of economic data when analysing Economics at any level, as well as the difference between economic and econometric models. The subject has a practical character, as it corresponds to an instrument that the student can later use in his professional life. With this objective, we will use models, case studies and data close to the scope of application of the degree.

The first part of the syllabus presents the General Linear Model, as the simplest econometric specification to start working with real data. The second part of the program examines different extensions of this General Linear Model, with which the econometric method gains in capacity and analytical power. These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the 2030 agenda and certain specific goals (<https://www.un.org/sustainabledevelopment/en/>), contributing to some extent to the achievement of mainly the following:

Goal 4: Ensure inclusive, equitable and quality education and promote lifelong learning opportunities for all.
Target 4.3 By 2030, ensure equal access for all men and women to quality technical, vocational and higher education, including university education.
Target 4.4 By 2030, significantly increase the number of young people and adults who have the necessary skills, in particular technical and professional skills, to access employment, decent work and entrepreneurship.
Target 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for vulnerable people, including people with disabilities, indigenous peoples and children in vulnerable situations.

1.2. Context and importance of this course in the degree

The subject belongs to the module "Fundamentals of Economic Analysis and Instruments" and to the subject "Analytical Instruments".

Within the degree, the subject has an instrumental character. It combines the knowledge acquired by the graduate of Economic Theory, Mathematics and Statistics in order to be able to elaborate, estimate, interpret and predict behavioral models on certain economic and business variables.

The subject of Econometrics is the last step in the statistical-economic training of a graduate in Business Administration and Management, offering him the possibility of testing the empirical validity of different economic-business theories.

It will provide the graduate with the basic instruments for the quantification of economic relations, with special attention to the Basic Model of Linear Regression, its possibilities and limitations. The subject aims to expand the knowledge and skills of the graduate that permit the professional construction of models, taking into account the different specific approaches of econometrics to complex situations of economy, in aspects related to the planning and management of economic resources.

In this way, Econometrics deals with the application to economy of several methods. That is why it must be complemented with Economic Theory and with the required quantitative information. As a consequence, Econometrics is a subject in clear relation with the subjects of Statistics, Mathematics and Economic Theory.

1.3. Recommendations to take this course

The student should have a fundamental knowledge of Economic Theory (Microeconomics and Macroeconomics), Mathematics (Matrix Algebra), Descriptive Statistics and Statistical Inference.

2. Learning goals

2.1. Competences

Specific competences E1. To assess the situation and foreseeable evolution of companies and organizations, make decisions and extract relevant knowledge. E2. To issue advisory reports on specific situations of markets, sectors, organizations, companies and their functional areas. E3. To understand and apply professional criteria and scientific rigour to the resolution of economic, business and organizational problems. **Transversal competences** T1. Ability to solve problems. T2. Ability to make decisions. T3. Motivation for Quality and Excellence T4. Ability to apply knowledge in practice

2.2. Learning goals

1. To understand what econometric analysis consists of, what its purpose is and to learn about the quantitative dimension of any application to the field of economics, business and social sciences in general. 2. To acquire the ability to correctly interpret and manage the econometric analysis of interesting economic and business topics. 3. To be able to manage the methodology and basic techniques of econometrics that allow students to specify, estimate and perform the hypothesis testing related to one-equational econometric model. 4. To know how to handle specific software (Gretl) and acquire the computer skills necessary for the estimation, testing, validation and prediction of the General Linear Model. 5. To know the assumptions on which the normal classical linear regression model is based and what the non-fulfillment of some of these assumptions implies. 6. To be able to test the veracity of an economic hypothesis from the empirical evidence, introspection or economic theory and to make predictions about economic facts analyzing their reliability. 7. To be able to interpret basic reports on applied econometrics that use the techniques studied. 8. To be able to carry out empirical studies related to prediction, the testing of economic hypotheses and the evaluation of economic and business policies. 9. To have the necessary knowledge to, if necessary, continue to advance in this discipline with relative ease.

2.3. Importance of learning goals

The subject of Econometrics is important in the process of training the graduate in two aspects. In the first place, it enriches his curricular baggage with econometric techniques, which are more and more demanded in the professional scope.

This degree forms the graduates, specifically, in the management of quantitative techniques for the analysis of markets. In this sense, Econometrics is one of the essential pieces to do market research and to develop scenarios of prediction consistent with economy.

Second, the econometric method fosters the user's critical spirit in the face of economic dogmas and axioms. One of the facets of Econometrics is to evaluate and test economic theories, using real data. This aspect is important because, at the end of their training, the students must be able to judge the reality for themselves and must also have analytical methods to corroborate or refute their expectations. Econometrics provides students with all this

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he / she has achieved learning outcomes through a global examination. Specifically, for the two sittings for the subject, the final mark of students will be determined by the maximum between the following two options:

1. The final exam mark on the date set by the centre's exam schedule. This exam will include questions of a theoretical and/or theoretical-practical nature and practical exercises and will represent 100% of the mark obtained as the final mark of the subject by this option.
2. The combination of:
 1. the mark of two intermediate exams, one written (theoretical-practical) and the other of a computerized nature, to be carried out during the course as the subject matter progresses, (We will try to make the first coincide with the completion of Unit 3 and the second at the end of Unit 5) and
 2. the mark of the final examination to be held on the date set by the centre's examination calendar. Specifically, the final mark of the subject by this option will be calculated with the following weights: the intermediate exams will represent 60% (20% from the written exam and 40% from the computer one), and the final exam the other 40%.

All tests will be scored on a scale of 0 to 10.

These tests are expected to be carried out in person but if the health circumstances require it, they will be carried out

semi-on-site or online. In the case of online assessment, it is important to note that, in any test, the student may be recorded, and he or she may exercise his or her rights by the procedure indicated in:

https://protecciondatos.unizar.es/sites/protecciondatos.unizar.es/files/users/lopd/gdocencia_reducida.pdf.

The necessary software will be used to check the originality of the activities carried out. The detection of plagiarism or copying in an activity will imply the rating of 0 points in it.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process designed for this subject is based on the following:

The teaching method for the subject of Econometric implies the use of different techniques aimed at the achievement of specific objectives.

The part of the subject that deals with more theoretical and methodological issues, will be presented in lectures. In these sessions, the teacher will explain the main concepts of the econometric method, stressing economic interpretation and practical uses. That is, teachers will try to reduce theoretical issues to the minimum, and specific theoretical proofs and extensions will be provided to the student through the supporting material. To support knowledge in econometric method, and with the purpose of illustrating the use of the instruments previously studied, we will introduce regular theoretical-practical sessions in which the students, supported by the teacher, will solve small problems or study cases.

To stress the practical dimension of the subject, students will work with different software packages which deal with the search and use of useful statistical information and its treatment for econometric purposes. This work will be regularly distributed throughout the course in sessions specifically aimed at the use of econometric software.

The teaching material that the teacher will offer to the students includes, sorted by units, some guides summarising the main concepts and some theoretical-practical questions for the student to practice on his own. Teachers will also provide students with some proposed study cases, which should be solved using the recommended software, as well as some additional material for those students who desire to extend their knowledge of Econometrics. All this information will be provided through the *Anillo Digital Docente?* (ADD) of the University of Zaragoza.

4.2. Learning tasks

The syllabus offered to students will help them to achieve the proposed goals and it consists of the following activities...

1:

Theoretical lessons: They make up, approximately, 50% of the teaching activities and they are aimed at presenting the main concepts of the subject, conveniently structured into units. The teacher will formally present the corresponding material, which students have to strengthen and extend using the recommended bibliography. We recommend students to attend lessons, participate, take notes about the teachers' explanations as well as asking about any doubts and further explanations they might need. Teachers will provide the students with all the necessary teaching material to enable them to properly understand this Econometrics course.

2:

Theoretical-practical lessons: The teacher will provide students with a problem collection, as well as theoretical-practical questions related to the subject, well in advance. The main purpose of this material is for students to feel confidence with the use of all the instruments involved in the theoretical perspective of this Econometrics course. During the sessions, at least one hour every two weeks will be devoted to solving some of these questions, encouraging the participation or/and discussion between the students.

3:

Practical lessons in computer lab: This activity will be developed in the computer rooms that the Centre has reserved for the subject. The objective is twofold. On the one hand, we aim at getting students used to managing large amounts of quantitative information, which is a key aspect for their skills. On the other hand, it is important for students to gain confidence in the use of econometric software, at user level. In these sessions, practical cases will be solved by the teacher, who will guide the students' learning process.

The learning method is designed for sessions in a classroom. However, if it were necessary, due to the health situation, the

sessions would be online.

4.3. Syllabus

PART I. INTRODUCTION

Unit 1. Introduction

- 1.1. The object of Econometric
- 1.2. Econometric models and its elements
- 1.3. Type of data and models
- 1.4. A perspective of the subject

PART II. The General Lineal Model

Unit 2. Specification and estimation of the General Lineal Model

- 2.1. Introduction
- 2.2. Hypothesis of the model
- 2.3. Maximum Likelihood estimation. Properties of the estimators
- 2.4. Minimum Least Square estimation. Properties of the estimators
- 2.5. Interval estimation
- 2.6. Interpretation of estimated parameter

Unit 3. Validation and prediction

- 3.1. Hypothesis testing
- 3.2. Goodness of fit measures
- 3.3. Prediction

PART III. SOME EXTENTIONS OF THE GENERAL LINEAL MODEL

Unit 4. Diagnosis of the systematic part of the model

- 4.1. Introduction
- 4.2. Functional form analysis
- 4.3. Multicollinearity
- 4.4. Qualitative explicative variables

Unit 5. Diagnosis of the random part of the model

- 5.1. Introduction
- 5.2. Heteroscedasticity
- 5.3. Autocorrelation
- 5.4. Normality

4.4. Course planning and calendar

The sessions will be given following the calendar published by the centre for this degree. In general terms, teachers will adopt the following schedule:

Table 1. Face-to-face hours in Econometric. ADE Degree

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total
2	7	7	8	6	30

Lessons

(Theoretical
and
master)

2	2	4	2	10
4	4	7	5	20
2	2	3	5	15
4	15	16	24	75

Blackboard Practices

Computer
Practices

Tutorial

Total
class
hours

Table 2. Distribution of off-site hours of Econometric. ADE Degree.

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total
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Individual study

4	12	16	16	16	64
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Individual practical work

0	3	2	3	3	11
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Total
non-class hours

4	15	18	19	19	75
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The dates for the two intermediate exams will be announced well in advance in class and in the Teaching Digital Ring of the University of Zaragoza. The date for the global exam will be published on the notice board and the webpage of the centre, and in the webpage of the Economic Analysis Department.

During the first week of the course teachers will make a special effort in the presentation of the subject. Cases and typical examples will be used. The objective is to give the student a clear ideal, from the beginning, of the content of the subject, its purpose, the methodology to be used and the evaluation criteria. A normal week of the course consists of four class hours, two of which will be devoted, unless there are anomalous circumstances, to presenting and discussing the theoretical content of the course. The other two will be devoted to practice. At least one of the two weekly practice hours will be devoted to computer practices for the graduate to learn the use of some of the typical computer tools in the field of econometrics. The other weekly practice hour will be devoted, when necessary, to the resolution in class of theoretical-practical cases related to the subject. During the course two intermediate short exams will be carried out. They will have a theoretical and practical character and each of them will approximately cover half of the subject. We will try to make the first coincide with the completion of Unit 3 and the second at the end of Unit 5. These two exams will be done in class hours and they will be announced well in advance in class and in the Teaching Digital Ring of the University of Zaragoza.

In accordance with the schedule established by the centre, the student will carry out during the exam period a written global exam where teachers will evaluate the degree of acquisition of the required competences and skills. The date of this global exam will be published through the examination calendar itself on the website of the centre. In addition, the coordinator of the subject will announce the exam, at least 20 days in advance, through the notice board and the webpage of the centre, and in the webpage of the Economic Analysis Department