Universidad Zaragoza

Academic Year/course: 2020/21

27332 - Applied Econometrics for Business

Syllabus Information

Academic Year: 2020/21
Subject: 27332 - Applied Econometrics for Business
Faculty / School: 109 - Facultad de Economía y Empresa
228 - Facultad de Empresa y Gestión Pública
Degree: 448 - Degree in Business Administration and Management
458 - Degree in Business Administration and Management
ECTS: 5.0
Year: 4
Semester: First semester
Subject Type: Optional
Module: ---

1. General information

1.1. Aims of the course

This subject is the last step in the statistical-economic training, offering the student the possibility of contrasting the empirical validity of different economic-business theories. For this reason, the subject is given a fundamentally practical orientation, without logically obviating the theoretical contents that support it, and within this context the use of the most appropriate computer tools, such as the Gretl program, play a role essential.

The main objective of the subject is that, at the end of the course, the student has strengthened his knowledge on various econometric techniques that apply both in solving problems of Economic Theory and others that may have application in problems of the company. To this end, the student will be given some knowledge that will consolidate those already acquired in the subject Econometrics, namely, the four essential stages of the econometric method: specification, estimation, validation and use of the model, as well as problems that may arise after estimation, both in the systematic part and in the random part and how to solve them. The previous knowledge will be fixed with the resolution of some practical cases that will be solved with the help of the computer and that later they will have to expose publicly.

1.2. Context and importance of this course in the degree

Econometric Applications for Firms is an instrumental subject that requires the knowledge and skills acquired in the subjects of Econometrics, Mathematics I and II, Statistics I and II, as well as notions of Microeconomics and Macroeconomics.

At this point in the Degree, the student already has a certain level in the management of essential mathematical language, knows the most common statistical inference techniques, the keys of micro and macroeconomic models and an introduction to econometric models both under the the basic hypotheses, as well as the treatment of non-compliance with these hypotheses referring to the systematic part of the model.

Econometric Applications for Firms aims to complete the treatment of econometric models, with the student's resolution of a series of practical cases that cover a large part of the usual problems that can be found in the company when they want to do market studies, forecast of sales, estimation of production functions, etc..

1.3. Recommendations to take this course

Students need to have fundamental knowledge of Economic Theory, Mathematics, Descriptive Statistics and Statistical Inference. In addition, the students must have completed the subject Econometrics, where they will have acquired the basic knowledge about the econometric models and techniques that will be reviewed and deepened in this subject.

A very important part of the work of the subject is dedicated to the resolution of practical cases, using different computer tools for it, so it is advisable to have some flexibility in the use of the usual office automation packages, in particular, Calculus and the Gretl econometric program, which will have already been used in the subject of Econometrics. Likewise, for the elaboration and presentation of the works that will be carried out throughout the course, it is very convenient that the students manage with ease some program of process of texts and another one of elaboration of presentations.

2. Learning goals

2.1. Competences

According to what is indicated in the Degree Verification Report, at the end of the course, the student will be more competent to:

GENERIC COMPETENCES:

- Evaluate the situation and foreseeable evolution of companies and organizations, make decisions and extract relevant knowledge.
- Issuing advisory reports on specific situations in markets, sectors, organizations, companies and their functional areas.
- Understand and apply professional criteria and scientific rigor to the resolution of economic, business and organizational problems.

SPECIFIC COMPETENCES:

- Ability to solve problems.
- Ability to make decisions.
- Motivation for quality and excellence.
- Ability to apply knowledge in practice.

2.2. Learning goals

The student, in order to pass the subject, must demonstrate:

- Knowledge of the basic techniques of econometric analysis and to adapt them to the scope of application of the company.
- Knowledge on how to collect data from different sources and transform them for use in econometric analysis.
- Application of appropriate econometric techniques that, with the help of an econometric program such as Gretl, help the student to solve problems of interest in the business environment.
- Distinguish between time series data and cross-section type data and what problems may occur with each of them.
- Knowledge on how to contrast different economic hypotheses through constraints on model parameters.
- Knowledge on how to introduce dummy variables into econometric models and interpret their estimation.
- Identification of the usual problems that can arise in the term of the error of an econometric model (autocorrelation, heteroscedasticity and normality) and how to correct them.
- Knowledge on how to work with univariate time series, knowing the basic stages of the Box-Jenkins analysis.
- Know how to use the sample correlogram of a time series to identify the underlying stochastic process.
- Knowledge of the different types of temporal trends, adequately identifying the temporal trends of stochastic trends.
- Knowledge on how to treat series with stochastic trends and determine if they have any cointegration relationships.
- Ability to write an applied econometric work in a rigorous and comprehensible way.
- Summarize and group the main ideas of a work and put them into a PowerPoint presentation.
- Defend publicly the resolution of the cases that will be raised during the course.

2.3. Importance of learning goals

This subject is intended to teach the student how to apply the quantitative methods necessary to analyse, for example, the degree of competition within a given market, the effectiveness of different alternative sales policies within a company, the efficiency in terms of profitability of different advertising campaigns, or any type of market study prior to the launch of a new product.

Thus, the general approach of the course will aim, not so much to demonstrate the statistical-econometric principles, but to teach how to use them in a rigorous way when the student tries to apply the econometric techniques to his daily work in the world of Economics and Business.

It should also be noted that the use of the computer in a subject such as Econometrics is fundamental today. In this sense, throughout the course there will be carried out numerous computer practices with which it is intended for the student to know one of the most modern software applications currently used in the market, as well as in the teaching and research: the Gretl program. At the end of the course, it is essential for the student to achieve the management of this useful computer tool.

In short, it is a question of having the student, after passing this subject, have a series of fundamentals, both theoretical and practical, essential for their future professional development in the field of Economics and Business.

3. Assessment (1st and 2nd call)

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

4.1. Assessment procedures.

The student must demonstrate that he has achieved the results of learning activities through the following evaluation activities:

Inthefirstcall,thestudentisofferedtwoevaluationsystems:

Option1:Continuousassessment.

The evaluation of a subject such as this one in which practical work is the fundamental axis must be based on the work done by the student during the course, for this reason, the recommended option for all students is the continuous evaluation, in the that the attendance to class is strongly recommended, and that it is based on the following requirements:

- Written presentation of the works proposed by the teacher in each of the blocks of the course. In each block of work, the students must make a public presentation of one of the exercises that the teacher tells you about that block, if there are groups with two students, both should participate in the presentation. The written and oral presentation of the work in each of the blocks is a mandatory requirement for continuous assessment. Copying of works between groups will be grounds for the members of these groups to abandon the continuous evaluation. The student who does not reach the minimum required in the continuous assessment tests, cannot continue through this evaluation procedure.
- 90% of the mark of the continuous evaluation is obtained by weighting to 60% the written works that the students present at the end of each of the blocks of the subject and to 40% the presentations of the exercises that are done in class.
- The remaining 10% of the continuous evaluation grade will be obtained if the students present individually in writing a schematic as real as possible on a specific empirical study, based on the stages on how the econometric work is performed that will have been explained during the course.

Option2:Globalexam.

The student who does not opt for continuous evaluation or who does not pass the subject by this procedure or who wants to improve his qualification, will have the right to present himself to the global test, in any case prevailing in the best of the obtained grades. This global test consists of a final exam with several theoretical and theoretical-practical questions about the theoretical contents of the course, the glossary of econometric terms that will be made available to the students and a computer exam about some practical exercise that the student will have to with the help of the Gretl econometric program. In this exam, the theoretical part will score 5 points and the practical part of computer other 5 points, it is necessary to get at least 2 points in each of the parts to pass. The exam is approved obtaining at least 5 points. If a student obtains less than two points in one of the two parts, his final grade will never be greater than 4. This option is presented as a less advisable alternative than continuous evaluation, given the characteristics of the subject.

In second call, the evaluation is done by means of a global test consisting of a final exam as described above.

The evaluation of the students of the fifth and sixth call will be governed by article 23 of the Rules of Assessment of Learning, approved on December 22, 2010 by the Governing Council of the University of Zaragoza. This article establishes that the student will carry out the evaluation before a tribunal, although he / she may choose to take the exam with the rest of his / her classmates and then give the exam to be corrected by the tribunal.

4.2. Criteria of Valuation and Levels of Requirement.

Regarding the continuous assessment system, it should be clarified that it is not approved with any work submitted, ie in each batch of work there is a feedback process in case the work does not meet quality "minimums". That is, after each presentation of written works, are corrected by the teacher and the following week is given to each group a comment on the faults that have had and what can be improved. If the work in question does not reach a minimum of quality the work will be returned to the group and it will have to do again with the suggestions that have been made to it, if after three versions the work still is not well the group will leave the continuous assessment.

The aspects that are evaluated in the written works are:

1. The correct resolution of the questions posed in the statement.
2. The theoretical econometric justification used to solve the sections.
3. Correct drafting and use of economic and econometric terms.
4. Order and presentation of works.

In addition to this, during oral presentations, questions will be asked to the speakers to assess their knowledge of the subject and the case presented. The aim of these interventions by the teacher is to generate debates in class in which the other students can participate to know if they think the same as what the presenter is saying. Likewise, during the rest of the classes, the teacher can assess the participation of the students in class with questions and comments, so that it cannot be guaranteed that two students who are part of the same group have the same note at the end. The aspects that are evaluated in the oral presentations are:

1. The correct explanation of how the exercise has been resolved.
2. The answers to questions that the teacher can ask.
3. Order and conciseness in the presentation, as well as adjust to the times previously marked by the teacher so that

all groups can exhibit.

The aspects that will be valued of this proposal of empirical study are:

1. The originality of the proposal.
2. That the stages of the work are well detailed, namely, their motivation, theoretical justification, analysis of data sources, description of the econometric techniques that could be used and results expected to be obtained.
3. The viability of the same to be carried out with the usual econometric techniques.
4. That the extent of the work is in accordance with the teacher's instructions.

These tests are expected to be carried out in person, but if health circumstances require it, they will be carried out in a semi-presence or online manner. In the case of online evaluation, it is important to note that, in any test, the student can be recorded, being able to exercise his 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. Detection of plagiarism or copying on an activity will involve grading 0 points on the activity.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions, tutorials and seminars.

4.2. Learning tasks

This course is organized as follows:

Lectures (25 hours). The teacher will summarize each topic, so that in a two-hour session students can see the fundamental theoretical aspects and relevant issues facing the resolution of practical cases. Class attendance is strongly recommended, as well as participation and asking for clarifications or doubts. T eacher will provide students with sufficient advance schemes for each of the topics.

Practice sessions (25 hours). This activity will take place in a computer room. The aim is that the student learns how to solve a series of case studies related to real situations of econometric problems that may have an interest in the business world. The teacher will present at the beginning of each class the corresponding case, giving the necessary guidelines for the resolution on the computer. The student will have to load the data in the econometric program and resolve the issues raised. The teacher will guide t he students in the process of developing each case, and solving doubts that may arise. After each of the three section of cases, there will be a session in which every student will present orally and briefly (about 10 minutes) one case that the teacher indicates them in advance, in which they will summarizing the methodology applied and the most important results of the exercise.

Tutorials and seminars (12.5 hours). The teacher will schedule a calendar of tutoring, to be published in advance, aimed at the custom resolution of doubts and to provide more direct support to the student with problems related to this course.

Autonomous work and study
(62.5 hours).

Final exam. There will be a final exam for those who either do not opt for the continuous evaluation syst em, fail the course or want to improve their marks, in which competences and skills acquired throughout t he course will be evaluated. The exam will consist of a combination of written exercises about the theoretical concepts as well as a computer test in which some practical exercises must be solved.

In principle, the teaching delivery methodology is expected to pivot around face-to-face classes. However, if necessary for health reasons, the face-to-face classes may be taught semi-face-to-face or online.

4.3. Syllabus

This course will address the following topics:

Introduction

During the first two weeks of the course, there will be a presentation of the course and the fundamental elements of Econometrics will be revised. This constitutes a simple refreshment of ideas about knowledge that the student should already have after studying the courses of Economic Theory and Econometrics in previous years. Then, the Gretl econometric program will be revised in one or two sessions, since this will be the one through which practice sessions will be carried out and through which different exercises proposed along the course will be solved.

Section I. The problems of the business.

Case studies:

Case 1.1. Estimating a production function Cobb-Douglas with the original data Cobb and Douglas. Case 1.2. Estimate of the impact of money on a Cobb-Douglas function.

Case 1.3. Estimation of a consumption function with cross-section data.

Case 1.4. Production costs in the electricity sector US.

Econometrics topics to be covered in the case studies:

- OLS estimation and economic interpretation of results.
- Individual contrast and joint hypothesis.
- Select nested models.
- Detection and treatment of problems in the error term.
- Dummy variables.

Theoretical contents supporting practical cases:

- Revision of the OLS estimation and error term problems.
- Problems specification and structural break.

Section II. The microeconomic business environment.

Case studies:

Case 2.1. Study of the relationship between wage growth and unemployment estimates of the Phillips curve with the original Phillips's data.

Case 2.2. Determinants of tourism income in Spain.

Case 2.3. Study of the influence of changes in the weather in electricity consumption in the US.

Case 2.4. Influence of smoking bans at work on smokers in the US.

Econometrics topics to be covered in the case studies:

- Estimation and economic interpretation of results.
- Estimation of functional forms.
- Contrast economic assumptions by using dummy variables.
- Estimation with binary dependent variable.

Theoretical contents to practical cases:

- Problems associated with the data. Multicollinearity and influential observations.
- Models with binary dependent variable.

Section III. The macroeconomic environment of the business.

Case studies:

Case 3.1. Univariate study and prediction of a time series.

Case 3.2. Study of long-term relationship between the interest rate and the inflation rate in the US. Case 3.3. Study of the balance between real wages and productivity of the labor market in the US.

Econometrics topics to be covered in the case studies:

- Identification and estimation of ARIMA models.
- Identification of the order of integration of time series.
- Estimation of cointegration relations.
- Estimation of the short- and long-term. Error correction mechanism.

Theoretical contents to practical cases:

- Univariate time series models.
- Integration and cointegration.

4.4. Course planning and calendar

Table 1. Distribution of in-class hours

	Introduction	Section 1	Section 2	Section 3	Total
Lectures	2	8	7	8	25
Practice sessions	2	8	7	8	25
Tutorials and seminars	1'5	4	4	3	12'5
Total hours	5'5	20	18	19	62'5

Table 2. Distribution of autonomous hours

	Introduction	Section 1	Section 2	Section 3	Total
Autonomous work	4	4	10	8	26
Practical work	2'5	10	14	10	36'5
Total hours	6'5	14	24	18	62'5

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the Moodle website (https://moddle2.unizar.es); Academic calendar website (https://academico.unizar.es/calendario-academico/calendario); or the website of your corresponding faculty (Zaragoza: https://econz.unizar.es/, Huesca: http://fegp.unizar.es/, Teruel: http://fcsh.unizar.es/).

4.5. Bibliography and recommended resources