

Econometrics I

Code: 102308
ECTS Credits: 6

| Degree | Type | Year | Semester |
|--|------|------|----------|
| 2501572 Business Administration and Management | OB | 2 | 2 |
| 2501573 Economics | OB | 2 | 2 |

Contact

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Use of languages

Principal working language: catalan (cat)
Some groups entirely in English: Yes
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: Yes

Teachers

Montserrat Farell Ferrer
Maria Dolores Márquez Cebrián
Concepció Piñol Pérez
Ana Vazquez Fariñas

Prerequisites

It is highly recommended that the student has successfully completed *Mathematics I, II* and *Statistics I, II*. Having full command of the materials presented in these courses is essential to succeed in *Econometrics I*.

Objectives and Contextualisation

Econometrics I presents basic tools for the empirical analysis of relationships between economic variables. The course begins with the simple regression model, already introduced in *Statistics II*, and continues with multiple regression, including both quantitative and qualitative regressors.

The goal of this course is for students to learn to extract information from economic data using basic regression analysis, being able to rigorously assess the advantages and limitations of this tool. Major emphasis shall be placed on understanding the intuition behind the general theoretical aspects of econometric analysis. Throughout the course numerous applications using real data and econometric software will be presented to help students learn to value the empirical applications of the tools introduced.

This course provides the fundamentals for the analysis of economic data that continues with the courses of *Econometrics II*.

Skills

Business Administration and Management

- Apply the basic statistics for improving processes of analysis and systematisation of business information and learn rigorously and scientifically about the company chain of value.
- Capacity for adapting to changing environments.
- Capacity for independent learning in the future, gaining more profound knowledge of previous areas or learning new topics.
- Capacity for oral and written communication in Catalan, Spanish and English, which enables synthesis and oral and written presentation of the work carried out.
- Demonstrate initiative and work individually when the situation requires it.
- Identify and apply econometric methodology to respond to the problems that appear in the empirical study of some economic data.
- Organise the work in terms of good time management, organisation and planning.
- Select and generate the information necessary for each problem, analyse it and take decisions based on that information.
- Take decisions in situations of uncertainty, demonstrating an entrepreneurial and innovative attitude.
- Use of the available information technology and adaptation to new technological environments.

Economics

- Apply the basic statistics for improving processes of analysis and systematisation of business information and learn rigorously and scientifically about the company chain of value.
- Capacity for adapting to changing environments.
- Capacity for independent learning in the future, gaining more profound knowledge of previous areas or learning new topics.
- Demonstrate initiative and work individually when the situation requires it.
- Identify and apply econometric methodology to respond to the problems that appear in the empirical study of some economic data.
- Organise the work in terms of good time management, organisation and planning.
- Select and generate the information necessary for each problem, analyse it and take decisions based on that information.
- Take decisions in situations of uncertainty, demonstrating an entrepreneurial and innovative attitude.
- Use of the available information technology and adaptation to new technological environments.

Learning outcomes

1. A capacity of oral and written communication in Catalan, Spanish and English, which allows them to summarise and present the work conducted both orally and in writing.
2. Capacity to adapt to changing environments.
3. Capacity to continue future learning independently, acquiring further knowledge and exploring new areas of knowledge.
4. Demonstrate initiative and work independently when required.
5. Identify and apply the appropriate econometric methodology to respond to the problems appearing in the empirical study of some economic data.
6. Look for economic information from different sources: databases, Internet, etc.
7. Make decisions in situations of uncertainty and show an enterprising and innovative spirit.
8. Organise work, in terms of good time management and organisation and planning.
9. Prepare the data obtained from the sources for subsequent quantitative analysis.
10. Select and generate the information needed for each problem, analyse it and make decisions based on this information.
11. Use available information technology and be able to adapt to new technological settings.
12. Use information technology programmes to perform a quantitative analysis of the data.

Content

Unit 1: Introduction to econometric analysis

- What is econometrics? Objectives
- The nature of economic data

- Causality versus correlation
- The structure of economic data

Unit 2: The simple regression model

- The simple regression model. The regression line
- Least squares estimation. The fitted line. Goodness of fit
- Interpretation of the coefficients. Special cases: dependent variable in logs. Qualitative regressor
- Distribution of the estimator under ideal conditions. Statistical properties
- Inference with t-statistic
- Prediction
- Applications

Unit 3: The multiple regression model: estimation

- The multiple regression model. The population regression function
- Least squares estimation. The sample regression function
- Goodness of fit. R squared and adjusted R squared.
- Numerical properties of the estimator
- Distribution of the estimator under ideal conditions. Statistical properties
- The components of the variance of the estimator
- Applications.

Unit 4: Linear regression analysis: inference and prediction

- Hypothesis testing with the t statistic
- Confidence intervals
- Hypothesis testing using the F statistic
- Inference under the presence of collinearity
- Prediction
- Applications

Unit 5: Multiple regression model: further issues

- Functional form. Variables in logs. Polynomial forms. Interaction terms
- Regression models with qualitative regressors. The use of dummy variables
- Test of structural change
- Applications

Methodology

The course will be structured as follows:

1. Lectures

During lectures, key concepts and methods will be presented using many examples to facilitate a clear understanding of the materials presented. An exercise list will be provided for each unit. Students will be asked to work on them, as an independent activity, in small groups or on their own. The instructor will select some exercises from the lists to be discussed in class.

2. Lab sessions

In order to better grasp the different econometric concepts and methods, some of the sessions will take place in the computer room, where econometric software will be used. The main goal for these sessions will be for the student to learn to rigorously apply to tools presented.

3. Tutoring

Students can use instructor's office hours to get help on specific questions. Office hours will be announced in either the intranet (*Campus Virtual*) or in the instructor's webpage.

4. Studying

It is expected that the activities described above, take about one a fraction of the time that the student is supposed to dedicate to *Econometrics I*. The rest of the time should be filled with students' independent work (studying, reading the course textbook, problem solving,...). This activity is crucial to assimilate the theoretical aspects and the applications of the tools presented.

Important:

- This course is organized assuming students attend 100% of the lectures and lab sessions.
- To successfully pass this course, class attendance is critical.
- For a good class environment: Everybody should arrive on time and plan on staying for the entire class.

Activities

| Title | Hours | ECTS | Learning outcomes |
|------------------------------|-------|------|---------------------------------------|
| Type: Directed | | | |
| Lab sessions | 17 | 0.68 | 6, 5, 9, 12 |
| Lectures | 33 | 1.32 | 2, 5, 7, 10, 11 |
| Type: Supervised | | | |
| Tutoring | 8 | 0.32 | 2, 5, 4, 8, 7, 9, 10, 11, 12 |
| Type: Autonomous | | | |
| Studying and problem solving | 85 | 3.4 | 6, 2, 1, 3, 4, 5, 8, 7, 9, 10, 11, 12 |

Evaluation

Students evaluation will be based on the following activities:

1. Midterm exam

There will be a written test covering the material covered so far. It will be a closed book exam.

2. Final exam

There will be a final exam covering the course content. It will be a closed book exam.

3. Exercise submission and lab tests

Students will be asked to solve exercises during lab sessions. Additionally, students will be required to submit exercises. The professor might require for the exercises to be solved during class.

Grading Policy

a. Course grade is calculated according to the following expression:

$$\text{COURSE GRADE} = 0.3 * (\text{EXERCISES AND LABS}) + 0.2 * \text{MIDTERM} + 0.5 * \text{FINAL}$$

b. To pass the course, the course grade needs to be equal or greater than 5. If the course grade is between 3.5 and 4.9, the student can sit in the retake exam, as established in section **Retake process** included below. The student will fail the course if the grade is below 3.5.

c. A student who has not participated in any of the assessment activities will be considered as 'Not evaluable'.

Calendar of evaluation activities

The dates of the evaluation activities (midterm exams, exercises in the classroom, assignments, ...) will be announced well in advance during the semester.

The date of the final exam is scheduled in the assessment calendar of the Faculty.

"The dates of evaluation activities cannot be modified, unless there is an exceptional and duly justified reason why an evaluation activity cannot be carried out. In this case, the degree coordinator will contact both the teaching staff and the affected student, and a new date will be scheduled within the same academic period to make up for the missed evaluation activity." **Section 1 of Article 115. Calendar of evaluation activities (Academic Regulations UAB).** Students of the Faculty of Economics and Business, who in accordance with the previous paragraph need to change an evaluation activity date must process the request by filling out an **Application for exam reschedule** accessible at:

https://eformularis.uab.cat/group/deganat_feie/application-for-exams-reschedule

Grade revision process

After all grading activities have ended, students will be informed of the date and way in which the course grades will be published. Students will also be informed of the procedure, place, date and time of grade revision following University regulations.

Retake Process

"To be eligible to participate in the retake process, it is required for students to have been previously evaluated for at least two thirds of the total evaluation activities of the subject." **Section 3 of Article 112 ter. The recovery (UAB Academic Regulations).** Additionally, it is required that the student to have achieved an **average grade of the subject between 3.5 and 4.9.**

The date of the retake exam will be posted in the calendar of evaluation activities of the Faculty. Students who take this exam and pass, will get a grade of 5 for the subject. If the student does not pass the retake, the grade will remain unchanged, and hence, student will fail the course.

Irregularities in evaluation activities

In spite of other disciplinary measures deemed appropriate, and in accordance with current academic regulations, *"in the case that the student makes any irregularity that could lead to a significant variation in the grade of an evaluation activity, it will be graded with a 0, regardless of the disciplinary process that can be instructed. In case of various irregularities occur in the evaluation of the same subject, the final grade of this subject will be 0"*. **Section 10 of Article 116. Results of the evaluation. (UAB Academic Regulations).**

Evaluation activities

| Title | Weighting | Hours | ECTS | Learning outcomes |
|-----------------------------------|-----------|-------|------|--------------------------|
| Exercise submission and lab tests | 30% | 4 | 0.16 | 6, 3, 9, 11 |
| Final exam | 50% | 2 | 0.08 | 1, 4, 5, 8, 7, 10, 12 |
| Midterm | 20% | 1 | 0.04 | 2, 1, 4, 5, 8, 7, 10, 12 |

Bibliography

- Stock, J.H. & Watson, M.M., *Introduction to Econometrics*. Pearson Education. 3 ed.
- Wooldridge, J. M., *Introductory Econometrics: A Modern Approach*. South-Western Cengage learning. 6ed. 2015.
- Uriel Jiménez, E., *Introduction to Econometrics*. Electronic book. Universidad de Valencia.