UAB
Universitat Autònoma de Barcelona

Introduction to Econometrics

Code: 104874
ECTS Credits: 6

2025/2026

Degree	Type	Year
Applied Statistics	OB	2

Contact

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

It is recommended that the student have studied mathematics, statistics and linear models that have given him knowledge in linear algebra, matrix analysis, theory of probability and inference statistics (estimation and contrast of hypotheses).

Objectives and Contextualisation

This course introduces students to the empirical analysis of relationships between economic variables, providing the fundamental tools to interpret and apply econometric models in real-world contexts.

The course begins with the simple linear regression model, revisiting concepts covered in the Statistics course, and progresses to multiple regression, incorporating both quantitative and qualitative explanatory variables. The assumptions of the linear regression model will be studied in detail, and strategies to address potential violations of these assumptions will be explored. Additionally, the use of instrumental variables and binary response models, such as logit and probit models, will be introduced.

The main objective is for students to develop the ability to extract relevant information from data using the regression model, understanding its strengths and limitations with analytical rigor. Emphasis will be placed on an intuitive understanding of the theoretical foundations of econometric analysis, complemented by a strong practical orientation. Throughout the course, students will work with real data and econometric software, allowing them to apply the concepts learned to concrete problems and develop applied analytical skills.

Learning Outcomes

1. CM14 (Competence) Propose the statistical model needed to analyse data sets belonging to real studies.
2. KM17 (Knowledge) Recognise the statistical models for the analysis of data with different structures and complexities that frequently appear in different fields of application.
3. KM18 (Knowledge) Recognise the language of applications of economics and finances, biomedical science and engineering, provided by research and innovation in the field of statistics.
4. SM16 (Skill) Select appropriate sources of information for the statistical work.
5. SM18 (Skill) Refine the information available for subsequent statistical processing.

Content

(T: theory, S: problems or seminars, PS: preparation of problems or seminars, L: laboratories, PP: practical preparation, E: study, AA: other activities, indicate the number of hours dedicated to each activity)

Unit 1: Introduction

- What is economics?
- The two branches of economics.
- Economic models vs. econometric models.
- Types of data structures: cross-sectional, panel data and time series.
- Experimental, quasi-experimental, and observational data.
- Causality vs. correlation.

Unit 2: The Simple linear regression model

- Specification of the simple linear regression model.
- Basic assumptions of the linear regression model.
- Ordinary Least Squares (OLS) estimation.
- Hypothesis testing: single restriction.

Unit 3: The Multiple linear regression model

- Specification of the multiple linear regression model.
- Extension of the basic assumptions of the linear model.
- Ordinary Least Squares (OLS) estimation.
- Hypothesis testing: multiple restrictions.
- Coefficient of determination and goodness of fit.
- VIF (Variance Inflation Factor).

Unit 4: Specification errors

- Specification errors
- Missing relevant variables
- Inclusion of irrelevant variables
- Functional form erroneous
- Parameter instability.
- Diagnostic tests.

Unit 5: Violation of OLS assumptions

- Properties of OLS estimators: finite samples and asymptotics.
- Endogeneity
- Heteroscedasticity
- Autocorrelation
- Perfect and high multicollinearity.

Unit 6: Instrumental Variables and Two-Stage Estimation

- Causal identification and endogeneity.
- Instrumental variables: what they are and the conditions they must meet.
- Estimation methods: ratio and two-stage methods.
- Advanced topics: weak instruments, inference, and precision in IV.

Unit 7: Models with discrete dependent variable

- Maximum likelihood method.

- Linear probability model.
- LOGIT model.
- PROBIT model.
- Marginal effects: AME (Average Marginal Effects), MEM (Marginal Effects at Means), and MER (Marginal Effects at Representative values).

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory practices	45	1.8	CM14, KM17, KM18, SM16, SM18, CM14
Theory	30	1.2	CM14, KM17, KM18, CM14
Type: Supervised			
Solving problems	30	1.2	CM14, KM17, SM18, CM14
Type: Autonomous			
Study	45	1.8	KM17, KM18, KM17

Two hours of theoretical classes a week plus two of practices and guided teamwork for the applied essay (with econometric software) and resolution of exercises related to the contents explained in class in order to favor the assimilation of this knowledge by the student.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Delivery of Exercises	10%	0	0	KM17, KM18
Final exam	50%	0	0	KM17, KM18
Group applied project	20%	0	0	CM14, KM17, KM18, SM16, SM18
Midterm	20%	0	0	CM14, KM17, KM18

The activities to evaluate the subject will be:

1. Written test to be held in class classroom about the subject explained. This test does NOT release matter and represents 20% of the final grade.

2. Group application project. The goal is to apply the econometric techniques learned in class to a relevant social, political, or economic issue. The project will be carried out in groups of 4 to 6 students, and will be jointly evaluated by the instructor and the group members themselves.
Details and assessment criteria will be provided in Week 4. This project is mandatory in order to take the final exam. It accounts for 20% of the final grade, evaluated as follows:
70% instructor evaluation + 30% peer and self-evaluation.
3. A final exam on all course subjects. This test will contain theoretical and practical aspects, and represents 50% of the final grade.
4. Delivery of exercises and empirical work. During the course the students will have to give lists of problems and an empirical work. This activity will represent 10% of the final mark.

A student who has not participated in any of the described assessment activities will receive the "Not presented" qualification. If a student performs some of the assessment activities, even if it is only one, you can no longer opt for a "Not Presented".

Resit exams

Students whose final grade is below 5 may take the resit exam.

To be eligible, it is mandatory to have completed the midterm exam and submitted the practical assignment.

The final grade after the resit will be the higher of:

- 80% resit exam + 20% final project

- 100% resit exam

Bibliography

- Wooldridge, J.M. "Introducción a la Econometría: Un Enfoque Moderno" -Thomson Learning. (available online, UAB library)
- Stock, J.H. y Watson, M.M., \textit{Introducción a la Econometría}, Pearson.
- Angrist, J.D., Pischke, J.S., Mostly Harmless Econometrics, Princeton University Press. (Opcional)

Software

The practical sessions will be conducted using R Studio.
Basic knowledge of LaTeX is recommended for writing the group research paper.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	1	Spanish	second semester	afternoon
(TE) Theory	1	Spanish	second semester	afternoon