

EC/IB/ST 350 ECONOMETRICS FOR BUSINESS
IES Abroad Madrid

DESCRIPTION:

Econometrics is the application of statistics and mathematics to economic and financial data. In today's world data are largely available and econometric techniques are crucially important to conducting reliable data analyses in private and public institutions. This course introduces students to regression methods for analysing data in business and economics. After presenting the basic theoretical features of each method, it will familiarize students with how to practically implement estimation and hypothesis testing techniques in various empirical contexts. The main goal of the course is to provide students with a solid theoretical background in introductory-level econometrics, to stimulate their abilities to apply such techniques on diverse datasets, and to enable them to critically analyse empirical studies in economics, business, and finance.

CREDITS: 3 credits

CONTACT HOURS: 45 hours

LANGUAGE OF INSTRUCTION: English

PREREQUISITES: One undergraduate-level course in Statistics, Microeconomics, or Macroeconomics

ADDITIONAL COST: None

METHOD OF PRESENTATION:

Lectures, seminars to discuss assignments, data analysis sessions.

Slides for each lecture will be made available to students before each lecture. References to the textbook will be provided as well to facilitate and clarify the content of the slides.

REQUIRED WORK AND FORM OF ASSESSMENT:

- Course Participation - 10%
- Assignments - 20%
- Midterm - 25%
- Final Exam - 30%
- Final Project - 15%

Course Element

Course Participation

In addition to actively participating in class, students are required to perform weekly readings and complete practical problem sets. Some of these practice problems will be based on students' datasets and will be carried out using the popular and freely available statistical software Gretl. Students will be expected to complete and submit these exercises. The solutions to these assignments will be discussed during class and are meant to enable students to gain some self-awareness on their level of understanding of the topic and to practice new concepts as they are introduced.

Assignments

Students will be given 4 problem sets composed of practice questions addressing the material covered in the classes before each assignment is due. They are given via Moodle and must be delivered via Moodle in PDF format. When appropriate, some of the questions may involve the use of statistical software. Students may work in groups, but each must submit his or her solutions individually. The solutions to the problems will be discussed extensively in class.

Midterm

The midterm exam will be held in class and will be composed of theoretical and practical questions on all the material covered up to that point. Questions in the midterm exam will not involve the use of statistical software. Students will be allowed to use a formulae sheet and statistical tables.

Final Exam

The final exam will be held in class and will be composed of practical questions on all the material covered in the course. Questions in the final exam will not involve the use of statistical software. Students will be allowed to use a formulae sheet and statistical tables.

Final Project

Students will be asked to conduct a comprehensive analysis of an empirical dataset that requires them to evaluate data, perform advanced calculations, and make recommendations concerning the data. Students will work in groups on this project over the course of the semester and will be asked to discuss their progress periodically in class. Each group will be assigned a different dataset, which will be assigned based on students' interests and backgrounds. They will be asked to explain and support their results. Results will be presented as a group during the last class of the semester. This project will constitute 10% of the final grade.

LEARNING OUTCOMES:

By the end of the course, students will be able to:

- Know the fundamental econometric models for cross-sections, time series and panel data, their statistical properties, and how to apply them to real data.
- Estimate and critically interpret parameter estimates in simple empirical settings.
- Conduct a comprehensive analysis of an empirical dataset and explain and support their results.
- Evaluate a dataset to extract policy and/or business recommendations.

ATTENDANCE POLICY:

As a member of our class community, you are expected to be present and on time every day. Attending class has an impact on your learning and academic success. For this reason, attendance is **mandatory for all IES Madrid classes**, including course-related excursions. Absences will only be excused in cases of documented medical or family emergencies. Any assessed work, including exams, tests, and presentations, will be rescheduled if the absence is justified; otherwise, it will be graded as 0. You are allowed a maximum of 1 unexcused absence for once-a-week courses and 2 unexcused absences for twice-a-week courses. Each additional absence will deduct 5 points from your final grade. **Accumulating 7 or more absences in twice-a-week courses, or 4 or more in once-a-week courses, may lead to a failing grade.** Students arriving more than 11 minutes after the scheduled start time will be marked as 'late.' Three 'late' arrivals will be counted as 1 absence. Any student arriving 30 minutes or more after the scheduled start time will be marked as 'absent.' For more information, please refer to the full [Attendance and Punctuality Policy](#) document.

CONTENTS:

Session	Content
Session 1	Statistical Review Probability distributions, expected value, estimator of the sample mean and its sampling distribution, and hypothesis testing.
Session 2	Simple linear regression model Model assumptions. Ordinary least squares (OLS) and its statistical properties.
Session 3	Multiple regression model Model assumptions, interpretation of estimates, multicollinearity, t-test and F- test.
Session 4	Dummy variables. Discussion of practical questions on Topics 2 and 3 Definition of dummy variables and interpretation of coefficients. Selection of relevant questions on Topics 2 and 3.

Session 5	Heteroskedasticity Consequence of heteroscedasticity, robust standard errors, weighted least squares.
Session 6	Model misspecification Omitted variable bias, inclusion of irrelevant variables, proxy variables
Session 7	Discussion of practical questions on Topics 5 and 6 Selection of relevant questions on Topics 5 and 6. By week 4 students should have started to design their survey, and their preliminary work will be discussed during this session.
Session 8	Endogeneity and instrumental variables Random regressors, definition of endogeneity, instrumental variable estimator (IV), two stages least squares
Session 9	Solutions Assignment 1
Session 10	Endogeneity and instrumental variables. Measurement error, omitted variables, and their IV solution. Testing for endogeneity.
Session 11	Simultaneous equations Identification problem, IV solution to simultaneity.
Session 12	Discussion of practical questions on Topics 8, 9 and 10. Selection of relevant questions on Topics 8, 9 and 10. Discussion on how to carry out an empirical analysis starting from a real-life dataset.
Session 13	Linear probability model. Model specification, interpretation of coefficients and limitation of this approach.
Session 14	Midterm take-home exam to be held at the beginning of Week 7 Review of models for cross-sectional data Review of key concepts covered in Weeks 1-6 using comprehensive examples.
Session 15	Solutions Assignment 2
Session 16	MIDTERM EXAM
Session 17	Time series models Model assumptions, static models, distributed lag models
Session 18	Serial correlation Definition of serial correlation, consequences, robust standard errors, testing for serial correlation.
Session 19	Discussion of practical questions on Topics 12, 13 and 14. Selection of relevant questions on Topics 12, 13 and 14.
Session 20	Panel data analysis Definition of panel dataset, pooled OLS, analysis via differencing
Session 21	Panel data analysis Fixed effects and random effects models
Session 22	Discussion of practical questions on Topics 17 and 18 Selection of relevant questions on Topics 17 and 18.
Session 23	Solutions Assignment 3
Session 24	Review of models for time series and panel data Review of key concepts covered in Weeks 7- 10 using comprehensive examples.

Session 25	Empirical project We will review the main topics on cross-sectional data given the empirical analysis students have to carry out independently.
Session 26	Empirical project Each group will present the results of their analysis to the rest of the class.
Session 27	Solution Assignment 4
Session 28	Labour Day (no class)
Session 29	Final Project review
Session 30	FINAL EXAM

REQUIRED READINGS

- Wooldridge, J., *Introductory Econometrics – A Modern Approach*, South-Western Cengage Learning, 4e International Edition, 2008.

RECOMMENDED READINGS:

- Additional readings will be provided, if necessary, on a case-by-case basis.