ECONOMETRICS

Academic Year: 2024/2025   **Semester:** 2nd   **ECTS:** 7,5

LEVEL OF CURRICULAR UNIT: UNDERGRADUATE (1st cycle, as defined in the Framework of Qualifications for the European Higher Education Area)

INSTRUCTOR(S)

Pedro Raposo

Miguel Salema

CONTACTS AND OFFICE HOURS

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BIOGRAPHY

Pedro Raposo is an Associate Professor at CATÓLICA-LISBON, teaching Mathematics, Labor Economics, Microeconometrics, with research interests in Labor Economics and on high dimensional fixed effects in the context of big panel datasets. He is a consultant at the National Statistics Institute working mainly on a big data project and before that he did his PhD in Economics at Tilburg University, under the supervision of Prof. Jan van Ours. Pedro has published his work in top journals such as Journal of Econometrics, Review of Economics and Statistics, Journal of Human Resources, Labour Economics. Before Pedro taught at ISEGI (UNL), where he did a MSc in Statistics, and worked in the financial sector at SIBS, after his undergraduate studies in Economics at ISEG.

Miguel Salema is a research fellow for PROSPER (Center of Economics for Prosperity) at Católica-Lisbon, with a focus on Econometrics and Labour Economics with Big Data. Thus, he is proficient in scientific computing and data analysis tools such as R. Miguel teaches several courses in Statistics both in the Master and Undergraduate programs. Furthermore, Miguel Salema holds a master's degree in economics from CLSBE with a major in Macroeconomic Policy.

COURSE OVERVIEW

Econometrics introduces students to multiple regression methods for analyzing data in economics and finance. It covers various extensions of regression analysis including regression with time series data, and instrumental variables regression. The main objective is to equip students with the ability to conduct and critique empirical studies in economics. Accordingly, the emphasis of the course is on empirical applications. The mathematics of econometrics will be introduced only as needed and will not be a central focus.

LEARNING OBJECTIVES

Upon completion of this course students are expected to understand and to apply the econometric techniques taught and listed in the program below.

TEACHING AND LEARNING METHODOLOGY

There will be theoretical lectures, where the topics covered are explained and discussed, and practical classes, where the students solve exercises, and apply the methods learned using R. There will be between 8 and 10 problem sets and a small research project.

REQUIRED BACKGROUND

This course assumes a good working knowledge of basic statistics (in particular, random variables, parameter estimation and tests of hypotheses) and some knowledge of matrix algebra.

ASSESSMENT

- Midterm (35%) + Endterm (35%);
- Problem sets (20% of the final grade);
- Research project (10% of the final grade).

There will be problem sets, each of which involves empirical analysis. The course statistical software is R, which is freeware. The data for the problem sets will be posted on an online platform. Please hand in homework assignments **before class** on the day they are due. Assignments handed in after this, but before answers are distributed (typically two days later) will be marked down by 50%. Assignments handed in after answers are distributed will receive no credit.

Students are encouraged to work with others in the class on their problem sets, but each student must write up his or her answers separately. The **maximum group size is 3**. Please list the name(s) of those with whom you worked on your assignment.

Students will conduct a small empirical study in groups of 2-5 students (depending on class size). The goal is to answer a business, economic or financial question of interest to your group through data analysis. A detailed description of the project components will be distributed and discussed in class. The project deliverables include a report (maximum 3 pages of typed text, not including graphs and tables).

The final exam will be waived only if the two following conditions are met:
(i)   final grade higher or equal to 9.5;
(ii)   neither the midterm grade nor the final exam grade is below 6.0.

Admission to final exam requires a final grade higher or equal to 7,5.

Students taking the Final Exam will pass if they have at least 10 in the exam. The grade will be an average of the performance in the exam and the final grade at Econometrics.

For students who pass the course this semester and take the Final Exam to try to improve their grade, the final grade will be an average of the performance in the exam and the final grade at Econometrics.

COURSE CONTENT

Week #	Topic	Readings (SW Chapter)	Problem Sets: Posted	Due
1	Bivariate regression – the model	4		
	Bivariate regression - estimator	4	PS#1	
2	Bivariate regression – testing and CI	5		
	Bivariate regression – Heteroskedasticity	5	PS#2	PS#1
3	Multiple regression – the model	6		
	Multiple regression – estimator	6		
4	Multiple regression – testing and CI	7		
	Multiple regression – model specification	7	PS#3	PS#2
5	Non linear regression functions – general strategy	8		
	Non linear regression functions – log, polynomials	8	PS#4	PS#3
6	Non linear regression functions - interactions	8		
	Non linear regression functions – application /exam review	8		PS#4
	Midterm Exam			
7	Time series regression – intro	15		
	Time series regression – stationarity	15	PS#5	
8	Time series regression – autoregressions	15		
	Time series regression – additional predictors and ADL	15		PS#5
9	Time series regression – MSFE and forecast intervals	15		
	Time series regression – nonstationarity	15	PS#6	
10	Assessing regression studies – internal validity of the model	9		
	Assessing regression studies – external validity of the model	9	RP#1	PS#6
11	Instrumental variable estimator – single instrument	12		
	Instrumental variable estimator – General IV model	12	PS#7	
12	Instrumental variable estimator – checking validity	12		
	Instrumental variable estimator – Application /exam review	12		PS#7
	Research Project			RP#1
	Endterm Exam			

BIBLIOGRAPHY

Required readings:

Stock, J.H. and M.W. Watson, *Introduction to Econometrics* (fourth edition), Pearson, 2020.

Recommended books:

Wooldridge, J. M., INTRODUCTORY ECONOMETRICS, Thomson.

Online materials:

Exercise books and classes handouts are available online

Extra Costs (case studies, platforms…): Online Econometrics Assignments

ADDITIONAL RESOURCES

Bootstrap is a curated collection of resources, techniques, and personal development tools from academic sources, thought-leaders, and well-established productivity practices. bootstrap_ - Productivity & Study Resources | CATÓLICA-LISBON (ucp.pt)

CODE OF CONDUCT AND ETHICS

Católica Lisbon School of Business and Economics is a community of individuals with diverse backgrounds and interests who share certain fundamental goals. A crucial element to achieve these goals is the creation and maintenance of an atmosphere contributing to learning and personal growth for everyone in the community. The success of CATÓLICA-LISBON in attaining its goals and in maintaining its reputation of academic excellence depends on the willingness of its members, both collectively and individually, to meet their responsibilities.

Along with all the other members of our community, students are expected to follow professional standards and CATÓLICA-LISBON standards of Academic Integrity. Some details should be mentioned here: Please arrive on time for class with uninterrupted attendance for the duration of the class. Signing attendance sheet for anyone else in the class constitutes fraud and a violation of the CLSBE code of conduct. Use of computers and other electronic devices during the class is not allowed, unless expressly requested by the instructor of the course. Students who persistently act in a disruptive and disrespectful manner during the class session may be invited to leave.

Students are expected to behave at all times according to the fundamental principles of academic integrity, including honesty, trust, fairness, respect, and responsibility. In particular,

a. In **individual graded assignments** of any type, students may not collaborate with others or use any materials without explicit permission from the instructor of the course;

b. In **group assignments** and reports, all students listed as authors should have performed a substantial amount of work for that assignment;

c. It is dishonest to fabricate or falsify data in experiments, surveys, papers, reports or other circumstances; fabricate source material in a bibliography or "works cited" list; or provide false information in other documents in connection with academic efforts;

d. **Plagiarizing**, i.e. "to steal and pass off the ideas or words of another as one's own and or to use another's production without crediting the source" (Merriam-Webster Dictionary) is an Academic Integrity breach. It can be avoided by using proper methods of documentation and acknowledgement. Visit this guide for additional resources on how to avoid plagiarism in your written submissions https://www.turnitin.com/papers/understanding-the-turnitin-similarity-report-student-guide

e. In **exams** students must not receive or provide any unauthorized assistance. During an examination, students may use only material and items authorized by the faculty. Use of smartwatches or other communication devices is not permitted during the exam.

Academic integrity breaches will be dealt with in accordance with the school's code of Academic Integrity: https://www.clsbe.lisboa.ucp.pt/system/files/assets/files/academicintegritycode.pdf