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Empirical economics

PROF. LORENZO CAPPELLARI; PROF. MARIA LUISA MANCUSI

Course aims and intended learning outcomes

The course aims at introducing students to empirical economic analysis, that is to teach the fundamental econometric methods and techniques employed in the analysis of economic issues.

Using theoretical results and working through results and examples taken from the economics literature, the course will address problems commonly encountered in estimating econometric models and will teach students how to interpret the estimates from such models. For this reason, theory lectures, aimed at introducing econometric methods, together with economic and methodological issues, will be complemented with tutorial classes. During these tutorials students will learn to use econometric software and will employ real data to study some of the economic issues discussed during lectures.

At the end of the course, students will:

1. be familiar with the fundamental econometric methods and techniques employed in the analysis of economic problems
2. have acquainted the relevant knowledge needed to be able to choose the adequate model and model specification, recognise data specificities and the techniques appropriate to deal with them, then apply such techniques in order to find a solution to real a world problem, where it exist
3. be able to critically evaluate the validity and robustness of the empirical methods and results employed in economic studies
4. learn to correctly interpret the results from an econometric study and report the corresponding conclusions with clarity
5. be able to build upon the knowledge of the empirical methods presented in the course to study further methods and different economic problems independently.

Course content

1. *Introduction.*
2. *Empirical analysis of linear economic outcomes*
 - Properties of estimators useful for the analysis of linear outcomes.
 - Interpretation and comparison of alternative regression models.
 - Empirical application: Wage equation estimation.
3. *Empirical analysis of linear economic outcomes with non-spherical errors*
 - Heteroskedasticity and autocorrelation in linear models.
 - Properties of appropriate estimators when errors are non-spherical.
 - Empirical application 1: Labour demand estimation.
 - Empirical application 2: Demand function estimation.
4. *Identifying causal relationships among economic variables*
 - The problem of endogeneity, unobserved heterogeneity and reverse causality.
 - Solving the problem using instrumental variables.
 - Empirical application: estimating returns to human capital investments.
5. *Empirical analysis of binary, censored and truncated outcomes*
 - Maximum likelihood estimation of discrete choice models.



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- Empirical application 1: Modelling individual unemployment.
- Empirical application 2: Modelling expenditures on durables.
- Empirical application 3: Modelling women wages.

6. *Models Based on Panel Data*

- Static and Dynamic Linear Models.
- Empirical application: Which are the main factors of firms' investments?

Reading list

M. VERBEEK, *A Guide to Modern Econometrics*, Wiley (4th ed.).

Additional readings, lecture slides, and other teaching material will be uploaded on Blackboard.

Teaching method

The course is based on classroom lectures (60 hours) and is complemented by tutorial sessions in the computer lab (20 hours).

Assessment method and criteria

Students will be evaluated through a written examination, which will include both theory and empirical questions. Questions will be aimed at proving the student's understanding of the topics discussed during the lectures, but also, and importantly, their ability to apply appropriate estimation methods and to provide the correct economic interpretation to estimation results. The exam includes two theory questions and one empirical question. Theory questions have equal weight and jointly account for 75 percent of the final mark.

Notes and prerequisites

Incoming students are expected to be well acquainted with linear algebra and statistics (see for example the materials covered in Appendices A and B of Verbeek's textbook). Basic statistical concepts like Probability, Random Variables and Distributions, Estimation and Testing of Statistical Hypotheses are strong prerequisites for the course. The textbook by Newbold, Carlson and Thorne "Statistics for Business and Economics" (Pearson) provides the necessary coverage of these concepts. These topics will also be presented in the preliminary mathematics and statistics courses that will be held the week before the start of the lectures and that the students are warmly invited to attend.

Computer sessions will The course will use the Stata regression application. No prior knowledge of this application is required.