Econometrics

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Teacher Assistant: Nuno Sobreira

The slides are available in FENIX

Learning/ Teaching Methods: 1 lecture of 3 hours and 1 tutorial of two hours per week.
Lectures: Following the instructions of the president of ISEG the lectures are going to be online and students can watch them live via MS TEAMS.

- The exercises that the students must solve each week are going announced in the lectures and posted in FENIX.

Tutorials:

- The tutorials are going to be on-site, but are going to be filmed and the students can watch them live via MS TEAMS
- Both the lectures and tutorials are not going to be recorded.

Assessment based on an on-site exam, which accounts for 100% of the grade.

- A minimum final mark of 9.5 is required to pass the module of Econometrics.
- Time allowed for the exam: 2 hours.
- Only two sheets (4 sides A4) of notes made exclusively by the student may be consulted in the exams. No formula sheets are provided.
- Students are responsible for printing the statistical tables available in the website of the module and for taking them to the examination. Students are not permitted to write any notes in the statistical tables.

This type of assessment is for students that have not met the pass criteria of the module in the regular assessment and for students that wish to improve their marks (melhorias). The assessment will take place on the date scheduled by the School in the resit exam period, by a written exam which accounts for 100% of the grade. . Time allowed: 2 hours. A minimum mark of 9.5 in this exam is required to pass the module of Econometrics. Only two sheets (4 sides A4) of notes made exclusively by the student may be consulted in the resit exam. No formula sheets are provided.

Textbooks

Main Textbook:

- Wooldridge, J. M. (2013), Introductory Econometrics: A Modern Approach, 5th. ed., international edition, South Western, Cengage Learning.

Other references:

- Stock, J. H. e Watson, M. W. (2011), Introduction to Econometrics, 3rd. ed., Pearson, Addison Wesley.
- Verbeek, M. (2017). A guide to modern econometrics. John Wiley & Sons.

Econometrics

The pre-requisites of the Econometrics course are:

1. Mathematics 1.
2. Mathematics 2.
3. Statistics 1.
4. Statistics 2.

Topics in Mathematics that students are **required to know:**

1. Basic calculus (product, quotient and chain rules); first and second order derivatives including partial derivatives
2. Increasing/decreasing and convex/concave functions
3. Basic algebra, including manipulating powers and fractions
4. Univariate and multivariate optimisation (first order conditions)
5. Constrained optimisation using Lagrange multipliers
6. Logarithmic and exponential functions
7. Integrals

Econometrics

Topics in Statistics that students are **required to know:**

1. Probability
2. Discrete Probability Distributions: Binomial and Poisson distributions
3. Continuous Probability Distributions: Uniform, Normal, t-Student, F, Chi-Squared
4. Expected values, Variances.
5. Bivariate distributions; covariance and correlation
6. Conditional probabilities and conditional probability distributions
7. Conditional expected values and variances; the law of iterated expectations.
8. Sampling and Sampling Distributions
9. Estimators: Unbiasedness and Efficiency
10. Hypothesis testing and confidence intervals
11. Statistical Inference about Means and Proportions with two Populations
12. The Empirical Correlation Coefficient.
13. The simple regression model (this topic is going to be revised).

Econometrics

Upon successful completion of this course, students will be able to:

- To understand the basic assumptions and concepts of the Multiple Linear Regression Model for cross-section data;
- To understand the mechanics of the Ordinary Least Squares (OLS) estimator;
- To specify and test hypotheses on the context of the Linear Regression Model;
- To test the validity of the fundamental assumptions of OLS and deal with their violations.
- To understand the basic assumptions and concepts of the Multiple Linear Regression Model for Time Series;
- To specify and estimate models for time series that capture specific features of the data like trends and seasonality.
- To use the econometric software (EVIEWS).
- To critically assess existent studies.

I - Topics on Regression Analysis with Cross-Sectional Data
1. Introduction: The Nature of Econometrics and Economic Data
2. The Multiple Linear Regression Model (MLRM) and Ordinary Least Squares (OLS)
3. Inference in the Multiple Linear Regression Model
4. Asymptotic results for OLS
5. Topics on Functional Form
6. Multiple Regression Analysis with Qualitative Information: Dummy variables
7. Heteroskedasticity
II - Regression Analysis with Time Series Data
1. Basic Regression Analysis with Time Series Data
2. Further Topics in Using OLS with Time Series Data
3. Serial Correlation and Heteroskedasticity in Time Series Regressions