DATA ANALYSIS FOR ECONOMICS

Grado en Administración de Empresas / Bachelor in Business Administration BBA SEP-2023 DAFE-NBA.3.M.G

Area Economics

Number of sessions: 30

Academic year: 23-24

Degree course: THIRD

Number of credits: 5.0

Semester: 1º

Category: COMPULSORY

Language: English

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RODRIGO ALEGRÍA HUERTA

Rodrigo Alegría got his Bachelor in Economics from Universidad de Navarra (2001). At a postgraduate level, he got a Master in Economics and Finance from Universidad de Navarra (UN) and a Master in Regional Economics from London School of Economics (LSE). He also holds a title in Big Data (UN). He has worked mainly as a researcher in different research centers such as UN in Pamplona, Geography Department (LSE), Centre for Economic Performance (LSE) and European Institute (LSE) all of them in London. As a professor he has lectured in Spain and United Kingdom and has visited different countries such as Greece, Netherlands, United States or France for conferences and seminars. He is currently an adjunct professor at IE University and at other institutions lecturing quantitative courses such as maths, statistics, data analysis and econometrics. He is also the co-director of the EconData Lab at IE University. His interests focus on urban, regional and international economics with a special interest in the spatial econometrics analysis of MNEs´ location choices.

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SUBJECT DESCRIPTION

Data Analysis for Economics is the application of statistics tools and mathematical methods to describe, analyse and predict economic and business phenomenon. The main concern of this course is related with the art of using economic theory and statistical techniques to analyse real world data sets.

This is an introductory course. Students will learn the basic techniques to analyse, model and interpret business and economic data. On one hand, the course will provide a broad training in basic econometric methods and tools, mostly related to linear regression analysis. On the other hand, students will learn practical applications to real economic and business problems using those econometric approaches.

Particular emphasis is given to the careful interpretation of numerical results and to understanding the implications of those results for economic policy and business decision making.

LEARNING OBJECTIVES

- Understand the regression model (simple and multiple), its scope and limitations.
- Interpret and evaluate relationships between variables using econometrics.
- Understand and drive the properties of OLS.
- Interpret, evaluate and apply inferential methods to linear regression.
- Understand the use and implications of data scaling, functional form and dummy variables in regression modelling.
- Identify the presence of estimation problems.
- Acquire fluency in the use of R Studio in order to apply econometric techniques using real world data.
- Apply econometric techniques for making decisions with quantitative and categorical data within an economic and business context.

The course aims to provide students with a rigorous reasoning using the econometric approach when analysing problems and making decisions. Students will also learn practical applications mostly related within an economic and business context.

TEACHING METHODOLOGY

IE University teaching method is defined by its collaborative, active, and applied nature. Students actively participate in the whole process to build their knowledge and sharpen their skills. Professor's main role is to lead and guide students to achieve the learning objectives of the course. This is done by engaging in a diverse range of teaching techniques and different types of learning activities such as the following:

There will be a distribution 50/50 between theoretical and practical sessions.

Lectures:

Theoretical sessions will be concerned with the study of the different econometric tools. The appropriate use of mathematical and statistics concepts and methods is very relevant in this part of the course. Along the different lectures, examples and/or dicussions about real applications will be provided in order to improve the understanding of the different theoretical concepts.

Classes:

Practical sessions will consist on discussions about practical worksheets so called Problem Sets. Students are required to work by themselves on these Problem Sets that will be provided in advance to the due date.

Computer Classes:

In addition, practical sessions are complemented with computer classes along the course. Students will learn how to use R studio in order to apply econometric techniques with real data sets. Part of the evaluation will consist on a computer exam with real data using the software.

The program of the course is divided into five parts (units) that are detailed in the next section (PROGRAM):

- UNIT 1: INTRODUCTION
- UNIT 2: LINEAR REGRESSION MODEL (LRM)
- UNIT 3: HYPOTHESIS TESTING
- UNIT 4: DUMMY VARIABLES
- UNIT 5: ESTIMATION PROBLEMS

The sessions within each of the units are a combination of theoretical and practical classes (lectures, problem sets and computer classes).

Learning Activity	Weighting	Estimated time a student should dedicate to prepare for and participate in
Lectures	20.0 %	25.0 hours
Discussions	0.0 %	0.0 hours
Exercises in class, Asynchronous sessions, Field Work	20.0 %	25.0 hours
Group work	20.0 %	25.0 hours
Individual studying	40.0 %	50.0 hours
TOTAL	100.0 %	125.0 hours

PROGRAM

SESSION 1 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

PRESENTATION

Lecture 1: Presentation of the programme, aims and guidelines of the course.??

Book Chapters: Introductory Econometrics (See Bibliography)

SESSION 2 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

REVIEW OF STATS. & BASIC CONCEPTS IN ECONOMETRICS

Lecture 2: Definition of population, sample, random variable, expected value, sample covariance, sample variance and correlation coefficient.

SESSION 3 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

ESTIMATOR & ITS PROPERTIES

Lecture 3: Definition of estimator and its properties: unbiasedness, efficiency, consistency and sufficiency.

SESSION 4 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge

INTRODUCTION TO THE LINEAR REGRESSION MODEL

Lecture 4: The simple linear regression model and its assumptions.

SESSION 5 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge

CLASS

Problem Set 1: Descriptive and correlation analysis.

SESSION 6 (ASYNCHRONOUS)

Sustainability Topics:

- Social Challenge

COMPUTER CLASS 1

Introduction, descriptive and correlation analysis.

SESSION 7 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

ESTIMATION AND PROPERTIES OF THE REGRESSION COEFFICIENTS

Lecture 5: Ordinary Least Squares estimation method. Model derivation and interpretation of the estimated coefficients. Determination coefficient. Unbiasedness and precision of the regression coefficients. Gauss-Markov theorem.

SESSION 8 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

ESTIMATION AND PROPERTIES OF THE REGRESSION COEFFICIENTS

Lecture 6: Ordinary Least Squares estimation method. Model derivation and interpretation of the estimated coefficients. Determination coefficient. Unbiasedness and precision of the regression coefficients. Gauss-Markov theorem.

SESSION 9 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

TRANSFORMATION OF VARIABLES

Lecture 7: Transformation in a new variable. Logarithmic transformation.

SESSION 10 (LIVE IN-PERSON)

Sustainability Topics:

　　　　- Social Challenge

MULTIPLE LINEAR REGRESSION MODEL

Lecture 8. Introduction to the MLRM.

SESSION 11 (LIVE IN-PERSON)

Sustainability Topics:

　　　　- Social Challenge

CLASS

Problem Set 2: OLS estimation.

SESSION 12 (ASYNCHRONOUS)

Sustainability Topics:

　　　　- Social Challenge

COMPUTER CLASS 2

Estimation of the regression model.

SESSION 13 (LIVE IN-PERSON)

Sustainability Topics:

　　　　- Environment

MID-TERM REVIEW

Review of the basic concepts learnt during Units I and II.

SESSION 14 (LIVE IN-PERSON)

Sustainability Topics:

　　　　- Economic Development

MID-TERM EXAM

SESSION 15 (LIVE IN-PERSON)

Sustainability Topics:

　　　　- Social Challenge

HYPOTHESIS TESTING IN THE SLRM

Lecture 9: Individual and overall tests.

SESSION 16 (LIVE IN-PERSON)

Sustainability Topics:

      - Social Challenge

HYPOTHESIS TESTING IN THE MLRM

Lecture 10: Individual and overall tests.

SESSION 17 (LIVE IN-PERSON)

Sustainability Topics:

      - Environment

DISCUSSION CLASS

Discussion of the results of the mid term exam.

SESSION 18 (LIVE IN-PERSON)

Sustainability Topics:

      - Social Challenge

CLASS

Problem Set 3: Hypothesis testing.

SESSION 19 (ASYNCHRONOUS)

Sustainability Topics:

      - Social Challenge

COMPUTER CLASS 3

Hypothesis testing.

SESSION 20 (LIVE IN-PERSON)

Sustainability Topics:

      - Social Challenge

DUMMY VARIABLES

Lecture 11: Definition, application, types and interpretation.

SESSION 21 (LIVE IN-PERSON)

Sustainability Topics:

      - Social Challenge

DUMMY VARIABLES

Lecture 12. Chow Test.

SESSION 22 (LIVE IN-PERSON)

Sustainability Topics:

      - Social Challenge

CLASS

Problem Set 4: Dummy variables.

SESSION 23 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

ESTIMATION PROBLEMS

Lecture 13: Specification errors. Definition and detection of the multicollinearity problem.

SESSION 24 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

ESTIMATION PROBLEMS

Lecture 14: Other estimation problems. Non-linearity. Outliers

SESSION 25 (ASYNCHRONOUS)

Sustainability Topics:

- Social Challenge
- Economic Development

COMPUTER CLASS 4

Dummy variables and validation.

SESSION 26 (LIVE IN-PERSON)

Sustainability Topics:

- Economic Development

CLASS

Problem Set 5: Estimation problems.

SESSION 27 (ASYNCHRONOUS)

Sustainability Topics:

- Social Challenge
- Economic Development

COMPUTER MOCK EXAM

SESSION 28 (LIVE IN-PERSON)

Sustainability Topics:

- Social Challenge
- Economic Development

COMPUTER EXAM

SESSION 29 (LIVE IN-PERSON)

Sustainability Topics:

- Environment
- Social Challenge
- Economic Development

FINAL REVIEW

Review of the course.

SESSION 30 (LIVE IN-PERSON)

Sustainability Topics:

- Environment
- Social Challenge
- Economic Development

FINAL EXAM

EVALUATION CRITERIA

criteria	percentage	Learning Objectives	Comments
Final Exam	40 %		Final Exam (session 30)
Intermediate tests	25 %		MidTerm Exam (session 14)
Class Participation	10 %		Ongoing
Group Work	25 %		Computer Exam (session 28)

Each student has four (4) chances to pass any given course distributed over two (2) consecutive academic years. Each academic year consists of two calls: one (1) ordinary call (during the semester when the course is taking place); and one (1) extraordinary call (or "re-sit") in June/July.

Students who do not comply with the 70% attendance requirement in each subject during the semester will automatically fail both calls (ordinary and extraordinary) for that Academic Year and have to re-take the course (i.e., re-enroll) during the next Academic Year.

The Extraordinary Call Evaluation criteria will be subject to the following rules:

Students failing the course in the ordinary call (during the semester) will have to re-sit evaluation for the course in June / July (except those students who do not comply with the attendance rule, and therefore will not have that opportunity, since they will fail both calls and must directly re-enroll in the course during the next Academic Year).

It is not permitted to change the format nor the date of the extraordinary call exams or deadlines under any circumstance. All extraordinary call evaluation dates will be announced in advance and must be taken into consideration before planning the summer (e.g. internships, trips, holidays, etc.).

The June/July re-sit will consist of a comprehensive evaluation of the course. Your final grade for the course will depend on the performance in this exam or evaluation only. I.e., continuous evaluation over the semester (e.g. participation, quizzes, projects and/or other grade components over the semester) will not be taken into consideration on the extraordinary call. Students will have to achieve the minimum passing grade of 5 and the maximum grade will be capped at 8.0 (out of 10.0) – i.e., "notable" in the extraordinary call.

Re-takers: Students who failed the subject on a previous Academic Year and are now re-enrolled as re-takers in a course will need to check the syllabus of the assigned professor, as well as contact the professor individually, regarding the specific evaluation criteria for them as re-takers in the course during that semester (ordinary call of that Academic Year). The maximum grade that may be obtained as a retaker during the ordinary call (i.e., the 3rd call) is 10.0 (out of 10.0).

After exams and other assessments are graded by the professor (on either the ordinary or extraordinary call), students will have a possibility to attend a review session (whether it be a final exam, a final project, or the final overall grade in a given course). Please be available to attend the session in order to clarify any concerns you might have regarding your grade. Your professor will inform you about the time and place of the review session.

Students failing more than 18 ECTS credits after the June/July re-sits will be asked to leave the Program. Please, make sure to prepare yourself well for the exams in order to pass your failed subjects.

In case you decide to skip the opportunity to re-sit for an exam or evaluation during the June/July extraordinary call, you will need to enroll in that course again for the next Academic Year as a re-taker, and pay the corresponding tuition fees. As you know, students have a total of four (4) allowed calls to pass a given subject or course, in order to remain in the program.

BIBLIOGRAPHY
Compulsory
 - Wooldrigde, J. (2019). *Introduction to Econometrics: A modern Approach.* 7th. Cengage. ISBN 9781337558860 (Printed)
BEHAVIOR RULES

Please, check the University's Code of Conduct here. The Program Director may provide further indications.

ATTENDANCE POLICY

Please, check the University's Attendance Policy here. The Program Director may provide further indications.

ETHICAL POLICY

Please, check the University's Ethics Code here. The Program Director may provide further indications.